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european society of
head and neck radiology

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Réunion conjointe des sociétés
de Radiologie Tête et Cou

ESHNR 2014

Journées de province du CIREOL 2014

27th Congress and Refresher Course

September 25–27, 2014, Marseille, France

FINAL PROGRAMME

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head and neck radiology

2014
27th Congress and Refresher Course
September 25–27, Marseille/France

Friday, September 26, 2014
Restaurant “La Nautique”

19:30 Dinner at restaurant “La Nautique”

Join us for an extraordinary night at restaurant »La Nautique«.
Located on the first floor of the Pavilion Floating Société Nautique de Marseille, the restaurant Nautique offers a breathtaking view of the Old Port and boats. This magnificent place is in walking distance to the Palais du Pharo.
We are looking forward to offering you a unique and unforgetable night!

One ticket per person required. Please show your ticket when entering the location.

Dress code: casual elegant

Restaurant “La Nautique” Pavillon Flottant
20 Quai Rive Neuve | 13007 Marseille
Phone +33 491 330 178

Gala Dinner

The ECR GmbH may not accept liability for personal injury, loss/damage to property, personal or otherwise belongings of participants and/or accompanying persons, either during or as a result of the evening event.

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Welcome Reception

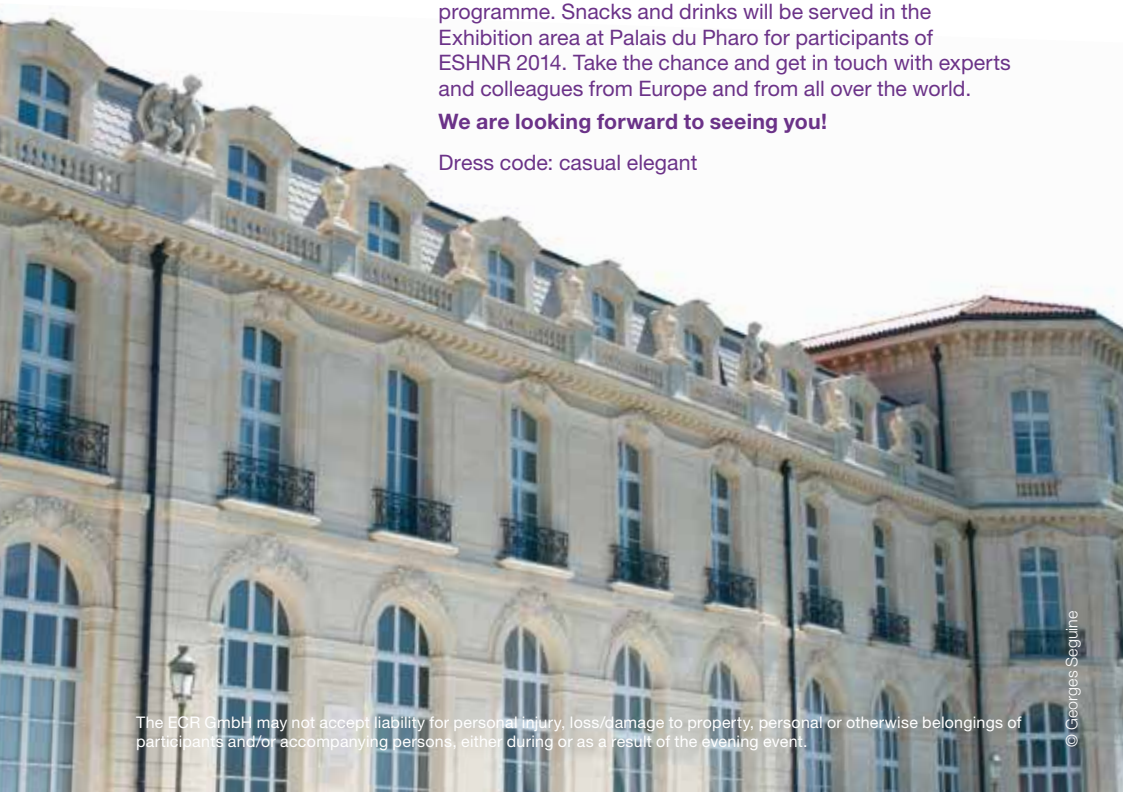
Thursday, September 25, 2014
Palais du Pharo

18:00 Exhibition area

We cordially invite you to the ESHNR 2014 Welcome Reception, which starts subsequently to the scientific programme. Snacks and drinks will be served in the Exhibition area at Palais du Pharo for participants of ESHNR 2014. Take the chance and get in touch with experts and colleagues from Europe and from all over the world.

We are looking forward to seeing you!

Dress code: casual elegant



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DEAR COLLEAGUES AND FRIENDS,

On behalf of the Organising Committee, it is a great privilege for us to welcome you to the 27th Congress and Refresher Course of the European Society of Head and Neck Radiology in Marseille, France. Located along the southeast coast of France, Marseille is one of the oldest cities and ports in France, as it was founded in 600 BC by Greeks under the name of Massalia. The Old Port guarded by its two massive forts, its main boulevard “La Canebière”, numerous old buildings such as “La Vieille Charité” or the basilica “Notre-Dame-de-la-Garde” and museums give evidence of the historical and artistic interest of the town that has been designated as European Capital of Culture in 2014. The congress venue “Le Palais du Pharo” is situated at the extremity of the Old Port facing the Frioul archipelago which comprises the “Château d’If”, made famous by the A. Dumas novel “The Count of Monte Cristo”. From the calanques, a rugged coastal area extending to Cassis, to the hinterland comprising the Provence region or the Montagne Sainte Victoire immortalised by Cezanne, Marseille offers an exceptional diversity of interest.
During this congress, the scientific programme includes a broad spectrum of topics that covers imaging of most of the ENT-regions and emphasises the new technological advances. This year’s congress comprises 13 scientific sessions and 5 refresher courses on different topics of head and neck radiology. A special emphasis is devoted to the questions that the temporal bone and cochlear implants pose to imaging. A session on dento-maxillary imaging, the indications and use of CBCT has been organised. Special sessions “What’s new in functional imaging?“ and another one “Salivary glands“ will provide practical information. Experts shall also discuss the actual possibilities in head and neck interventional radiology. Furthermore, two interactive sessions based on case discussion are organised where all participants will have the opportunity to vote and discuss. Some abstract submitters attained the possibility to present their own studies either to the audience orally or via the electronic poster presentation system.
Moreover, I would like to express my sincere appreciation to the Scientific and Organisational Committee for their hard work as well as to all speakers and participants of the congress, the courses and interactive sessions for kindly accepting to contribute to this outstanding meeting. Besides the scientific programme, a decent social programme has been organised in order to support the dialogue and friendship in the beautiful city of Marseille.

I do hope that ESHNR 2014 will prove to be an exceptional experience for all participants.

I wish you a pleasant and memorable time in Marseille,

Dr. Nadine Martin-Duverneuil
Congress President, 27th Congress and Refresher Course

Prof. Guy Moulin, Dr. Arthur Varoquaux, Dr. Frédérique Dubrulle
Local Organising Committee

PRESIDENT & COMMITTEES

Congress President

N. Martin-Duverneuil, Paris/FR

Local Organising Committee

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Ph. Halimi, Paris/FR
A. Jacquier, Marseille/FR
S. Marciano, Marseille/FR
O. Monnet, Marseille/FR
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A. Varoquaux, Marseille/FR
V. Vidal, Marseille/FR
L. Vivarrat-Perrin, Marseille/FR

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F. Veillon, Strasbourg/FR
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FACULTY

T. Beale, London/UK
M. Becker, Geneva/CH
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F. Bidault, Villejuif/FR
S. Bisdas, Tübingen/DE
A. Bonafé, Montpellier/FR
A. Borges, Lisbon/PT
J. Casselman, Bruges/BE
V. Chong, Singapore/SG
C. Chossegros, Marseille/FR
Ch. Czerny, Vienna/AT
P. De Graaf, Amsterdam/NL
B. Defoer, Antwerp/BE
P. Dessi, Marseille/FR
F. Dubrulle, Lille/FR
M. Elmaleh-Bergès, Paris/FR
U. Ernemann, Tübingen/DE
S. Espinoza, Le Kremlin-Bicêtre/FR
R. Evans, Wales/UK
D. Farina, Brescia/IT
N. Freling, Amsterdam/NL
S. Golding, Oxford/UK
Ph. Halimi, Paris/FR
R. Jacobs, Leuven/BE
C.Z. Karaman, Aydin/TR
A. King, Hongkong/CN
R. Kohler, Geneva/CH
S. Kösling, Halle a. d. Saale/DE
F. Lafitte, Paris/FR
M. Lemmerling, Gent/BE
M. Mack, Munich/DE
R. Maroldi, Brescia/IT
N. Martin-Duverneuil, Paris/FR
J. Olliff, Birmingham/UK
K. Orhan, Ankara/TR
M. Ozsahin, Lausanne/CH
Ph. Petit, Marseille/FR
F. Peyrade, Nice/FR
S. Robinson, Vienna/AT
J. Silvera, Paris/FR
M. Tassart, Paris/FR
H. Thoeny, Bern/CH
J.M. Triglia, Marseille/FR
A. Trojanowska, Lublin/PL
A. Varoquaux, Marseille/FR
F. Veillon, Strasbourg/FR
B. Verbist, Leiden/NL

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GENERAL INFORMATION

Onsite Congress Office

In case of any questions, kindly consult the ESHNR registration desk, staff members will be happy to assist you.

Registration/Badge/Tickets

You receive your badge and the final programme at the registration desk onsite. You are kindly asked to wear your badge visibly on the congress grounds at all time.
Pre-ordered Evening Event Tickets will be handed out additionally to the congress badges. Evening Event Tickets may be purchased onsite at the registration desk upon availability.

Certificate of Attendance

The Certificate of Attendance/CME Accreditation can be viewed and printed after the congress upon entering your ESHNR MyUserArea at the ESHNR website (www.eshnr.eu). To enter your MyUserArea, please use your last name in combination with your personal ID printed on your congress badge.

CME Credits

The 27th Congress and Refresher Course of ESHNR is designated to a maximum of 15 CME credits by the European Accreditation Council for Continuing Medical Education (EACCME). Each medical specialist should only claim those hours of credit that he/she actually spent in the educational activity.

Conference Language

The meeting will be held in English and no simultaneous translation will be offered.

Onsite Registration Fees

ESHNR Members	€ 450.00
CIREOL Members	€ 450.00
ESHNR Non-Members	€ 585.00
Residents in training*	€ 330.00
Single Day Ticket**	€ 310.00

Fee includes: admittance to scientific sessions and exhibition, final programme including book of abstracts, refreshment during breaks and lunches, welcome reception and certificate of attendance

*requires confirmation of the institution's head by way of proof
**only available once per person/registration

Payment

Onsite payment can only be made by credit card (Visa or Euro/Mastercard) or in cash (Euro). Please understand that no other payment facilities like debit cards, cheques, etc. will be accepted.

Congress Venue

Palais du Pharo
58 Boulevard Charles Livon
13007 Marseille/France
+33 4 91 14 64 95

Disclaimer/Liability

Education Congress Research GmbH/ESHNR cannot accept any liability for the acts of the suppliers to this meeting or the attendees' safety while travelling to or from the congress. All participants and accompanying persons are strongly advised to carry adequate travel and health insurance, as ECR GmbH/ ESHNR cannot accept liability for accidents or injuries that may occur. ECR GmbH/ ESHNR is not liable for personal injury and loss or damage of private property.

Name Changes

Name changes will be treated like the cancellation of the registration and a new registration of the other participant.

Mobile Phones

Please do not forget to switch off your mobile phones before entering any of the lecture rooms.

Organising Secretariat

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GENERAL INFORMATION

Media Center

Trained staff will be available to assist you with the equipment. The Media Center should only be used for a test run of the presentations. Please note that the Media Center should not be used to prepare your entire presentation and that due to the large number of speakers the workstations are only available for minor editing.

Registration Opening Hours

Wednesday, September 24	15:00 – 17:00
Thursday, September 25	07:45 – 18:00
Friday, September 26	07:45 – 18:00
Saturday, September 27	07:45 – 13:00

Poster Exhibition – EPOS™

ESHNR 2014 is using the EPOS™ system, Electronic Presentation Online System, the electronic format of the scientific exhibition developed by the European Congress of Radiology (ECR). EPOS™ offers a much greater flexibility than traditional scientific exhibits and provides better options for scientific communication.

EPOS™ Area

Several working stations are available in the EPOS™ Area at which the current electronic exhibits can be viewed by the congress participants during the congress. All ESHNR electronic posters will be accessible online after the congress via the ESHNR website.

The EPOS™ area is located on the first level of Palais du Pharo.

Thursday, September 25	09:00 – 18:00
Friday, September 26	09:00 – 18:00
Saturday, September 27	09:00 – 13:00

Industry Exhibition

The industry exhibition area is located on the first level of Palais du Pharo.

Thursday, September 25	09:00 – 18:00
Friday, September 26	09:00 – 18:00
Saturday, September 27	09:00 – 13:00

Breaks

Complimentary coffee, tea and refreshments will be served during the official coffee breaks to all congress delegates.

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GENERAL INFORMATION

Welcome Reception

On behalf of congress president Dr. Nadine Martin-Duverneuil, the local Organising Committee and the Executive Committee of ESHNR, we would like to cordially invite you to join the welcome reception in the industry exhibition area on Thursday, September 25, 2014. The welcome reception starts at the end of the scientific programme.

Gala Dinner

Join us on Friday, September 26, 2014 at 19:30 for an extraordinary night at restaurant “La Nautique”.

Please note, tickets are limited – price per ticket is set at EUR 55.00.

Restaurant “La Nautique”, Pavillon Flottant, 20 Quai Rive Neuve, 13007 Marseille, phone +33 491 330 178

Guideline for Speakers

The Media Centre is located on the first level of Palais du Pharo.

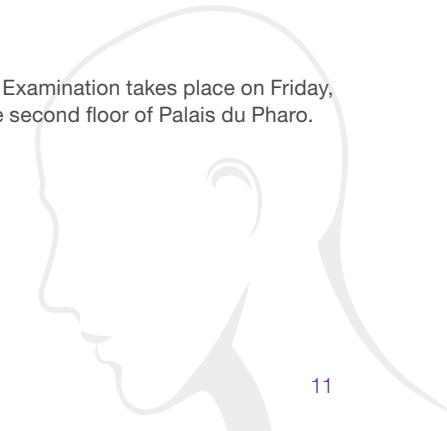
- You are kindly requested to submit your presentation two hours before your session starts at the latest (USB sticks are recommended).
- All presentations have to be uploaded in the conference IT-system. No personal computer will be accepted for projection.
- Please be at the lecture room at the latest five minutes prior to the start of your session and identify yourself to the chairs.
- Kindly observe exactly your presentation time. Each session contains enough time for discussion. Exceeding the time limit will not be accepted and the chairpersons are requested to stop presentations in such cases.

Recording

Video- or audio-recording of any sessions or presentations is not allowed without the speaker’s/organiser’s prior written permission.

Diploma Examination

The European Board in Head and Neck Radiology Diploma Examination takes place on Friday, September 26, 2014, in room “Petit Mucem”, located on the second floor of Palais du Pharo.



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MARSEILLE INFORMATION

Restaurants

Restaurant “La Nautique” €€

Pavillon Flottant – Face au 20 Quai de Rive Neuve, 13007 Marseille/France

Located on the first floor of the Pavilion Floating Société Nautique de Marseille, the restaurant Nautique offers a breathtaking view of the Old Port and boats. Once crossed the bridge, you board an institution steeped in history: models and navigation instruments tell more than a century naval presence of the Société Nautique on the legendary Port of Marseilles. The restaurant, with its large windows open to the Mediterranean, offers a panoramic view of the Old Port, the strong St John and St Nicolas, the Palais du Pharo and Canebière. The mahogany floors and designer furniture bring contemporary feel to the space.

Restaurant “La Table du Fort” €€

8 Rue Fort Notre Dame, 13007 Marseille/France

A dynamic young couple runs this colourful and intimate spot. He works in the kitchen, producing modern dishes, and she runs the restaurant floor, always with a smile. The menue includes modern and traditional French dishes with a twist. This distinguished restaurant is located near the the Port of Marseille and in walking distance to Palais du Pharo.

Restaurant “Le Peron” €€€

56 Corniche Kennedy, 13007 Marseille/France

With its harmonious colors, its blazing chandeliers, its architecture of wood and marble, the restaurant Péron is a mixture of exotic and chic atmosphere. Go to this restaurant, ensuring you magnificent culinary delights with delicacies from the sea from lobster to bouillabaisse you will find it there. In Péron, Marseille shows you one of his most beautiful faces: the shores of the Mediterranean.

Marseille sights

Château D’If

The fortress Château D’If is located on an island off the coast of Marseille. Until the 16th century it was uninhabited and was only occasionally visited by fishermen, who wanted to rest there. Francis I decided after a visit in Marseille, in 1516 the construction of a fortress. The building was used as a defensive fortress but only for a short time and then turned into a prison. Most rebels, criminals and slaves were being held at Château D’If. After the period around 1848, the fortress lost its importance as a prison and was finally opened to the public in 1890. One notable person is Edmond Dantes, The Count of Monte Cristo, who was imprisoned in the novel by Alexandre Dumas at the Château D’If.
Château D’If can be visited via a regular boat service.

Port of Marseille

The Port of Marseille is one of the oldest and most important seaports in France. Each year, thousands of commercial and private ships land at the port of Marseille. The harbor was the key to manage the French colonies in the days of the French Empire. The Port of Marseille has a picturesque sight, with hundreds of fishing boats and dozens of small cafes and restaurants along the surrounding streets. Near the port, a fish market that offers the freshest seafood from the waters of the Mediterranean and the Atlantic, takes place regularly. Ideally, if one procures a fish for dinner in the morning. Around the port there is much to see. The status of Marseille, as a cosmopolitan center of southern France is thanks to the port part. Almost all businesses are dependent on the port. Many of the best fashion shops are incidentally not far from the port.

Palais Longchamp

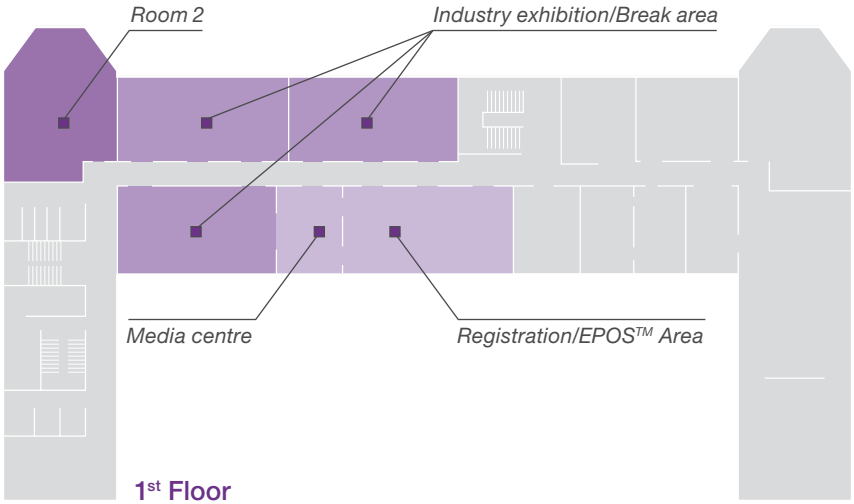
The Palais Longchamp is a historical building and museum and is intended to indicate the importance of water. For centuries there was in the city of Marseille a lack of water. The rich ornamentation of the building are reminiscent of the richness and fertility, which has brought the water of the canal from Marseilles in the city. Many sculptures have a dominant role here. The interior of the museums of the Palais Longchamp is also noteworthy. The main steps of the Museum of Fine Arts are decorated by two large paintings by Puvis de Cavannes. The palace ranks among the architectural highlights of the city and should definitely be visited.

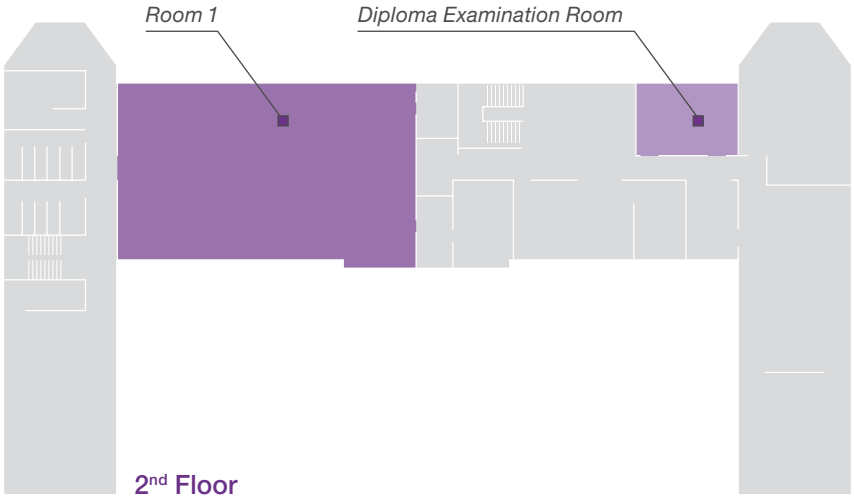
Cathédrale de la Major

The old Cathédrale de la Major dates from the mid 12th century. It is composed of a number of older buildings that were built in the sixth century. The old cathedral is a beautiful example of Provençal Romanesque architecture. It consists of pink stone from the quarry of Couronne. The ancient cathedral covers a huge area, both indoors and outdoors. The interior is also very finely decorated. The newer version of the cathedral was built in the 19th century, that had to do with large social, demographic and economic upheavals in Marseille. Napoleon Bonaparte laid the foundation stone of the new Cathedral on 26 September 1852, and the church was re-opened on 6 May 1896. The new cathedral was built in the Byzantine style and illustrates the shape of a Latin cross with an ambulatory. The total length of the cathedral is 146 meters, the dome is almost 70 meters high with 18 meters in diameter. Also interesting are the jewellery of the facades and the statues of Christ, the apostles and the saints of Provence.

MARSEILLE INFORMATION

FLOORPLAN





PROGRAMME OVERVIEW

Thursday, September 25, 2014

	Room 1	Room 2
08:00		
08:30	Opening ceremony	
09:00	Scientific session 1 Paranasal sinuses	Refresher course 1 Salivary glands
09:30		
10:00		Refresher course 2 Temporomandibular joint
10:30	Coffee break	
11:00	Scientific session 2 Oncologic imaging oro- and nasopharynx	Scientific session 3 What's new in functional imaging?
11:30		
12:00		
12:30	Short oral presentation session 1 Techniques	Short oral presentation session 2 The neck: oncologic
13:00		
13:30	Industry lunch symposium	
14:00		
14:30	Scientific session 4 What's new in temporal bone imaging?	Scientific session 5 Interventional radiology in H&N diseases
15:00		
15:30		
16:00	Coffee break	
16:30	Interactive session 1	Short oral presentation session 3 The neck: non-oncologic
17:00		
17:30		
18:00	Welcome reception	

Friday, September 26, 2014

	Room 1	Room 2
08:00		
08:30	Refresher course 3 Imaging of non-nodal neck masses	
09:00	Scientific session 6 Dento-maxillary imaging	Scientific session 7 Thyroid and parathyroid glands
09:30		
10:00		
10:30	Coffee break	
11:00	Scientific session 8 Lymphatic and vascular pathologies	Scientific session 9 Cochlear implants
11:30		
12:00		
12:30	Short oral presentation session 4 Ears/hearing	Short oral presentation session 5 Mixed topics
13:00		
13:30	Industry lunch symposium	
14:00		
14:30	Scientific session 10 Skull base	Scientific session 11 Salivary glands
15:00		
15:30	Coffee break	
16:00	Interactive session 2	
16:30		
17:00		
17:30		
18:00	ESHNR General assembly	
19:30	Gala dinner	

Saturday, September 27, 2014

	Room 1	Room 2
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08:30		
09:00	Scientific session 12 Larynx/hypopharynx malignancies	Refresher course 4 Traumatic head & neck emergency
09:30		
10:00		Refresher course 5 Non-traumatic head & neck emergency
10:30	Coffee break	
11:00	Scientific session 13 Orbits	Special lecture 1 Top mistakes in head & neck radiology and how to avoid them
11:30		
12:00		
12:30	Closing ceremony	
13:00		
13:30		
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18:00		

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THURSDAY, SEPTEMBER 25, 2014

PROGRAMME THURSDAY, SEPTEMBER 25, 2014

08:45		**Opening ceremony** *N. Martin-Duverneuil, Paris/FR*	**Room 1**
09:00–10:30	**SS 1**	**Paranasal sinuses** *S. Kösling, Halle a. d. Saale/DE, P. Dessi, Marseille/FR*	**Room 1**
09:00	SS 1.1.	Anatomy and variants *S. Kösling, Halle a. d. Saale/DE*	
09:20	SS 1.2.	Inflammatory conditions *J. Olliff, Birmingham/UK*	
09:40	SS 1.3.	Tumours *D. Farina, Brescia/IT*	
10:00	SS 1.4.	Sinus surgery and postoperative imaging *P. Dessi, Marseille/FR*	
09:00–09:45	**RC 1**	**Salivary glands** *S. Golding, Oxford/UK*	**Room 2**
09:45–10:30	**RC 2**	**Temporomandibular joint** *S. Robinson, Vienna/AT*	**Room 2**
10:30–11:00	*Coffee break*		
11:00–12:30	**SS 2**	**Oncologic imaging oro- and nasopharynx** *V. Chong, Singapore/SG, F. Bidault, Villejuif/FR*	**Room 1**
11:00	SS 2.1.	Nasopharyngeal cancer *V. Chong, Singapore/SG*	
11:20	SS 2.2.	Oropharyngeal tumours *S. Espinoza, Le Kremlin-Bicêtre/FR*	
11:40	SS 2.3.	Treatment options and post-treatment imaging *F. Bidault, Villejuif/FR*	

11:00–12:30	**SS 3**	**What's new in functional imaging?** *H. Thoeny, Bern/CH, M. Becker, Geneva/CH*	**Room 2**
11:00	SS 3.1.	Diffusion weighted imaging (DWI) *H. Thoeny, Bern/CH*	
11:20	SS 3.2.	How to acquire and interpret dynamic contrast enhanced MRI *S. Bisdas, Tübingen/DE*	
11:40	SS 3.3.	PET-MRI *M. Becker, Geneva/CH*	
12:00	SS 3.4.	Perfusion CT – pre- and post-treatment value *A. Trojanowska, Lublin/PL*	
12:30–13:30	**SOPS 1**	**Techniques** *N. Martin-Duverneuil, Paris/FR*	**Room 1**
12:30	SOPS 1.1.	In vivo high resolution 7 Tesla MRI of the human inner ear and cochleovestibular nerve: protocol development, clinical application and comparison to 3 Tesla imaging *B. Verbist, Leiden/NL*	
12:40	SOPS 1.2	Functional MRI findings in 2 patients with profound sensorineural hearing loss *F. Wagner, Bern/CH*	
12:50	SOPS 1.3.	MRI-PET in laryngeal cancer *M. Covello, Naples/IT*	
13:00	SOPS 1.4.	Validation of metal artifact correction technique for neuro interventional endovascular coiling in flat detector computed tomography *R. Xu, Beijing/CN*	
13:10	SOPS 1.5.	Diagnostic benefit of automatic metal artifact reduction (O-MAR®) in CT of head and neck *J.M. Hempel, Mainz/DE*	
13:20	SOPS 1.6.	Investigations on the contrast media injection protocol via left ventricle for brain perfusion imaging using flat detector computed tomography *Q. Zhang, Beijing/CN*	

12:30–13:30	**SOPS 2**	**The neck: oncologic** *A. Trojanowksa, Lublin/PL*	**Room 2**
12:30	SOPS 2.1.	Detection of nasopharyngeal carcinoma using MRI: accuracy of MRI compared to that of endoscopy and endoscopic biopsy based on a follow-up study at three years *A. King, Hongkong/CN*	
12:40	SOPS 2.2.	Diagnostic accuracy of DWI to detect cervical lymph node metastases from head and neck squamous cell carcinoma (HNSCC) in the clinically negative neck (cNo) *B.J. de Bondt, Zwolle/NL*	
12:50	SOPS 2.3.	Morphological criteria on MRI to detect cervical lymph node metastases from head and neck squamous cell carcinoma (HNSCC) in the clinically negative neck (cNo) *M. Covello, Naples/IT*	
13:00	SOPS 2.4.	Diagnostic accuracy of Short Tau Inversion Recovery (STIR) MRI to detect cervical lymph node metastases in the clinically negative neck (cN0) *B.J. de Bondt, Zwolle/NL*	
13:10	SOPS 2.5.	Detection of extra nodal spread (ENS) in clinical negative necks(cNo); assessment of MRI morphological criteria and diffusion weighted imaging (DWI) *B.J. de Bondt, Zwolle/NL*	
13:20	SOPS 2.6.	Diagnostic value of CT in the evaluation of laryngeal carcinoma and the effect of cartilage ossification and prior radiation treatment in this assessment *B. Ozgen, Ankara/TR*	

13:30–14:30	*Industry lunch symposium*	*Room 1*

14:30–16:00	**SS 4**	**What's new in temporal bone imaging?** *M. Lemmerling, Gent/BE, F. Veillon, Strasbourg/FR*	**Room 1**
14:30	SS 4.1.	Feasibility of CBCT in the temporal bone: Initial experience *B. Defoer, Antwerp/BE*	
14:50	SS 4.2.	3T MRI of the membranous labyrinth and surroundings *F. Veillon, Strasbourg/FR*	
15:10	SS 4.3.	Post-operative imaging: when and how? *M. Lemmerling, Gent/BE*	
15:30	SS 4.4.	Inner ear malformations: a systematic approach *M. Elmaleh-Bergès, Paris/FR*	

14:30–16:00	**SS 5**	**Interventional radiology in H&N diseases** *A. Bonafé, Montpellier/FR, M. Mack, Munich/DE*	**Room 2**
14:30	SS 5.1.	Epistaxis and pre-treatment devascularisation *A. Bonafé, Montpellier/FR*	
14:50	SS 5.2.	Percutaneous treatment of venous and lymphatic malformations *Ph. Petit, Marseille/FR*	
15:10	SS 5.3.	Biopsies and other image guided interventions in the head and neck *M. Mack, Munich/DE*	
15:30	SS 5.4.	Carotid blowout management *U. Ernemann, Tübingen/DE*	

16:00–16:30	*Coffee break*	

16:30–18:00	**IS 1**	**Interactive session**	**Room 1**
16:30	IS 1.1.	Skull base *J. Casselman, Bruges/BE*	
17:15	IS 1.2.	Deep spaces and visceral space *D. Farina, Brescia/IT*	

16:30–17:30	**SOPS 3**	**The neck: non-oncologic** *Ch. Czerny, Vienna/AT*	**Room 2**
16:30	SOPS 3.1.	Evaluation of the Olfactory Bulb Volume and Olfactory Threshold in patients with nasal polyps and Impact of Functional Endoscopic Sinus Surgery: a longitudinal study *S. Rahavi Ezabadi, Tehran/IR*	
16:40	SOPS 3.2.	Diagnosis of head and neck extracranial arteriovenous malformations using multidetector computer tomography and high resolution ultrasonography *S. Repina, Moscow/RU*	
16:50	SOPS 3.3.	Ultrasound guided injections of Botulinum A into salivary glands in children with neurological disorders suffering from excessive drooling *K. Kluczewska-Zygan, Londonderry/UK*	
17:00	SOPS 3.4.	Head and Neck Paragangliomas – Imaging, Classification and Treatment Outcome *S. Petrovic, Nis/RS*	
17:10	SOPS 3.5.	Using non-echoplanar diffusion-weighted MRI to assess treatment response in active Graves' orbitopathy: initial experience with case series *R. Lingam, London/UK*	
17:20	SOPS 3.6.	Can thyroid surgery be decided based on ultrasonographic findings irrespective of cytopathological findings? *A. Elsayed, Grimsby/UK*	

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PROGRAMME FRIDAY, SEPTEMBER 26, 2014

08:15–09:00	**RC 3**	**Imaging of non-nodal neck masses** *M. Mack, Munich/DE*	**Room 1**

09:00–10:30	**SS 6**	**Dento-maxillary imaging** *N. Martin-Duverneuil, Paris/FR, K. Orhan, Ankara/TR*	**Room 1**
09:00	SS 6.1.	Cone beam CT use for endodontic and periodontal diagnostics *R. Jacobs, Leuven/BE*	
09:20	SS 6.2.	Odontogenic tumours: a daily approach *N. Martin-Duverneuil, Paris/FR*	
09:40	SS 6.3.	Cone beam in implantology *K. Orhan, Ankara/TR*	

09:00–10:30	**SS 7**	**Thyroid and parathyroid glands** *T. Beale, London/UK, M. Tassart, Paris/FR*	**Room 2**
09:00	SS 7.1.	Diagnostic approaches to thyroid nodules *R. Evans, Wales/UK*	
09:30	SS 7.2.	FNAC in thyroid lesions *T. Beale, London/UK*	
10:00	SS 7.3.	Parathyroid – how to depict them with ultrasound *M. Tassart, Paris/FR*	

10:30–11:00	*Coffee break*	

11:00–12:30	**SS 8**	**Lymphatic and vascular pathologies** *A. King, Hongkong/CN, Ph. Halimi, Paris/FR*	**Room 1**
11:00	SS 8.1.	Infectious disease *A. Trojanowska, Lublin/PL*	
11:20	SS 8.2.	Arterio-venous malformations *J. Silvera, Paris/FR*	
11:40	SS 8.3.	Metastatic nodes from HNSCC: assessment of treatment response *A. King, Hongkong/CN*	
12:00	SS 8.4.	What's new in staging metastatic adenopathy? *Ph. Halimi, Paris/FR*	

11:00–12:30	**SS 9**	**Cochlear implants** *F. Dubrulle, Lille/FR, Ch. Czerny, Vienna/AT*	**Room 2**
11:00	SS 9.1.	Clinical indications and surgical procedures *J.M. Triglia, Marseille/FR*	
11:20	SS 9.2.	Pre-therapeutic assessment *J. Casselman, Bruges/BE*	
11:40	SS 9.3.	Post-therapeutic assessment *Ch. Czerny, Vienna/AT*	
12:00	SS 9.4.	Can we perform MRI after cochlear implantation? *F. Dubrulle, Lille/FR*	

12:30–13:30	**SOPS 4**	**Ears/hearing** *S. Golding, Oxford/UK, M. Mack, Munich/DE*	**Room 1**
12:30	SOPS 4.1.	In vivo evaluation of intra-cochlear position of cochlear implants by coregistration of preoperative 7 Tesla MR images and postoperative CT images *A. van der Jagt, Leiden/NL*	
12:40	SOPS 4.2.	Value of routine radiographic position assessment after cochlear implantation *F. Braun, Munich/DE*	
12:50	SOPS 4.3.	The value of HASTE diffusion-weighted MRI in the long-term monitoring for cholesteatoma recurrence following tympanomastoid surgery *S. Pal, London/UK*	
13:00	SOPS 4.4.	Untreated Middle Ear Cholesteatoma: monitoring progression with non- echoplanar diffusion weighted imaging *S. Pal, London/UK*	
13:10	SOPS 4.5.	Middle ear cholesteatoma - Is extent of disease related to disease recurrence following surgery? *R. Lingam, London/UK*	

FRIDAY, SEPTEMBER 26, 2014

12:30–13:30	**SOPS 5**	**Mixed topics** *T. Beale, London/UK, Ch. Czerny, Vienna/AT*	**Room 2**
12:30	SOPS 5.1.	Incidental findings from the sinuses in Cone Beam CT scans dental assessment: a review of 14760 scans *A. Delantoni, Thessaloniki/GR*	
12:40	SOPS 5.2.	Possibility of ultrasonography in high resolution in the diagnosis of diseases of the parotid salivary glands' duct system *Y. Vasilieva, Moscow/RU*	
12:50	SOPS 5.3.	Trabecular bone structure parameters from cone beam computed tomography data *E. Klintström, Linköping/SE*	
13:00	SOPS 5.4.	Age dependent indications of CBCT in head and neck imaging *Ch. Gueldner, Marburg/DE*	
13:10	SOPS 5.5.	Prenatal diagnostics of cleft palate without palate visualisation: new ultrasound signs *A. Nadtochiy, Moscow/RU*	
13:20	SOPS 5.6.	MRI in planning and prognosis of SOAS orthodontic treatment in adults with distal occlusion *A. Nadtochiy, Moscow/RU*	

13:30–14:30	*Industry lunch symposium*	*Room 1*

14:30–15:30	**SS 10**	**Skull base** *F. Benoudiba, Le Kremlin-Bicêtre/FR, A. Borges, Lisbon/PT*	**Room 1**
14:30	SS 10.1.	Skull base foramina, anatomy and pathology *F. Benoudiba, Le Kremlin-Bicêtre/FR*	
14:50	SS 10.2.	Petrous apex lesions *A. Borges, Lisbon/PT*	
15:10	SS 10.3.	Olfactory tracks *V. Chong, Singapore/SG*	

14:30–15:30	**SS 11**	**Salivary glands** *N. Freling, Amsterdam/NL, A. Varoquaux, Marseille/FR*	**Room 2**
14:30	SS 11.2.	Can imaging differentiate between benign and malignant tumours? *A. Varoquaux, Marseille/FR*	
14:50	SS 11.3.	Management of ductal lithiasis and stenosis *C. Chossegros, Marseille/FR*	
15:10	SS 11.3.	Sonoelastography of the salivary glands *C.Z. Karaman, Aydin/TR*	

15:30–16:00	*Coffee break*	

16:00–17:30	**IS 2**	**Interactive session**	**Room 1**
16:00	IS 2.1.	Paranasal sinuses *R. Maroldi, Brescia/IT*	
16:45	IS 2.2.	Temporal bone *F. Veillon, Strasbourg/FR*	

18:00	**ESHNR General assembly**	**Room 1**

PROGRAMME SATURDAY, SEPTEMBER 27, 2014

09:00–10:30	**SS 12**	**Larynx/hypopharynx malignancies** *F. Peyrade, Nice/FR, R. Maroldi, Brescia/IT*	**Room 1**
09:00	SS 12.1.	IMRT in the larynx *M. Ozsahin, Lausanne/CH*	
09:30	SS 12.2.	Chemotherapy: what the oncologist wants to know from the radiologist *F. Peyrade, Nice/FR*	
10:00	SS 12.3.	Imaging findings after surgery *R. Maroldi, Brescia/IT*	
09:00–09:45	**RC 4**	**Traumatic head and neck emergency** *M. Becker, Geneva/CH*	**Room 2**
09:45–10:30	**RC 5**	**Non-traumatic head and neck emergency** *B. Verbist, Leiden/NL*	**Room 2**
10:30–11:00	*Coffee break*		
11:00–12:30	**SS 13**	**Orbits** *P. De Graaf, Amsterdam/NL, O. Berges, Paris/FR*	**Room 1**
11:00	SS 13.1.	Imaging of the eye in children *O. Berges, Paris/FR*	
11:20	SS 13.2.	Eye emergencies *F. Lafitte, Paris/FR*	
11:40	SS 13.3.	Orbital tumours in children *P. De Graaf, Amsterdam/NL*	
12:00	SS 13.4.	Orbital and ocular tumours in the adult *N. Freling, Amsterdam/NL*	
11:00–12:30	**SL 1**	**Top mistakes in H&N radiology and how to avoid them** *R. Kohler, Geneva/CH, S. Golding, Oxford/UK*	**Room 2**
11:00	SL 1.1.	What I missed and why *M. Mack, Munich/DE*	
11:30	SL 1.2.	What I misinterpreted and why *R. Kohler, Geneva/CH*	
12:00	SL 1.3.	How to deal with missed diagnoses or misinterpretation of findings *S. Golding, Oxford/UK*	
12:30		**Closing ceremony** *N. Martin-Duverneuil, Paris/FR*	**Room 1**

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ORAL PRESENTATIONS

Thursday, September 25, 2014

SS 1.1.
Anatomy and variants
S. Kösling; Halle a. d. Saale/DE

Short Summary: In this course, the anatomical knowledge of paranasal sinuses which is mandatory for correct image interpretation will be repeated. Relevant anatomical structures are shown on anatomical drawings, CT and MR-images. One key point is the understanding of drainage and ventilation ways (especially of the infundibular region) - another is the knowledge of perforations because they are preferred ways for spread of lesions. The importance of the small pterygopalatine fossa as major crossing between several extracranial and intracranial spaces will be pointed out. The postnatal development of paranasal sinuses is summarized briefly. The region of paranasal sinuses is rich of variants. Due to narrowing of drainage and ventilation ways variants are discussed as underlying cause of recurrent sinus disease. Some of them can be dangerous for endoscopic endonasal surgery. This is why the individual anatomic situation has to be known before such a procedure in each case. Most known variants, their significance and frequency will be demonstrated on representative examples.

Take Home Points:
- Profound anatomical knowledge is mandatory for correct image interpretation
- Postnatal development of paranasal sinuses has to be taken into consideration in the image reading of children
- Dangerous variants for surgery have to be reported in each case

Keywords: Paranasal sinuses, Imaging, Anatomy, Variants

SS 1.2.
Inflammatory conditions
J. Olliff; Birmingham/UK

Short Summary: Acute Rhinosinusitis <4 weeks duration. It is usually diagnosed clinically. It can be diagnosed on imaging by the presence of an air/fluid level (DD pseudomensicus and blood following trauma), bubbly or stranding secretions with mucosal thickening. It is most common in the ethmoid and maxillary antra. The sinus size, and bone density are normal. Chronic Rhinosinusitis >12 consecutive weeks. Mucosal thickening in non-expanded sinus, may be wall thickening and sclerosis. Sinus size may be decreased. Secretions have variable density depending upon content. Calcification may be present. Complications: Periorbital: preseptal cellulitis and abscess, postseptal abscess, optic neuritis. Intracranial: meningitis, epidural abscess, subdural empyema, cerebritis, brain abscess, cavernous sinus thrombosis. Superficial: osteomylelitis, subgaleal abscess invasive fungal sinusitis: Rapidly invasive in immunocompromised patient. Infection crosses mucosa involving blood vessels, bone, adjacent soft tissues, orbit and intracranial cavity. Complete or partial opacification of sinus. Bone erosion and adjacent soft tissue involvement (retroantral fat).

Maxillary>ethmoid>sphenoid. Allergic fungal sinusitis: Severe chronic rhinosinusitis with eosinophilic mucin containing fungal hyphae. Associated with polyposis. Multiple sinus opacification (E>M>F>S) with hyperdense material on CT. Sinus may be expanded. MRI hypointense T2W SI centrally due to dense fungal concretions and heavy metals. T1 SI low/intermediate. Sinonasal polyposis: Inflammatory swelling of mucosa which forms "polypoid" areas. Multiple polypoid masses are seen within nasal cavity and sinuses. These are mucoid or soft tissue density, cannot differentiate between intra-sinus polyp and retention cyst. Remodelling of bone occurs in severe cases with loss of trabeculae in ethmoid and bulging of walls. Mucosal enhancement around polyps not central. Mucocoeles: Opacified sinus with expansion. Filled with mucous cf pyocoele. Frontal (60-65%) > ethmoid (25%) > Maxillary (5-10%) > sphenoid (2-5%). Bony sinus walls remodelled with thinning (absence) and bowing. Contents may be dessicated, fungal colonisation. Peripheral enhancement with contrast suspicious of superinfection. Wegener's granulomatosis: Non-neoplastic aseptic necrotising vasculitis involving upper and lower respiratory tracts and kidneys. Appears as a soft tissue mass in nose with septal and non-septal (lateral nasal wall) bone destruction. Nasal cavity >maxillary >ethmoid> frontal >sphenoid.

Take Home Points:
High attenuation central region CT (best seen soft tissue settings) separated from sinus wall
- Chronic inspissated secretions
- Mycetoma (usually from aspergillosis)
- Intrasinus haemorrhage

Central intrasinus low SI or void on MR T1 and T2
- Dessicated secretions
- Mycetoma
- Sinolith or tooth

Keywords: Rhinosinusitis, Wegener's granulomatosis, Sinonasal polyposis, Fungal sinusitis, Mucocoele

SS 1.3.
Tumours

D. Farina; Brescia/IT

Short Summary: A wide range of benign and malignat tumours may affect the sinonasal tract, reflecting the diversity of tissues that are normally present in the area. Cross-sectional imaging (MRI more than MSCT) play an essential role in the pretreatment workup. Characterisation of the lesion and sometimes even differentiation between benign and malignant nature are in the majority of cases beyond the potential of imaging techniques, although a limited number of histotypes display quite typical signal/density. More importantly, MRI (or MSCT) is used to define the pattern of spread of the lesion, i.e. intraorbital and intracranial spread as well as extension to the deep spaces of the suprahyoid neck or perineural spread. Detailed assessment of all potentially involved subsites is crucial for the selection of the modality of treatment and, in surgical patients, for correct planning (open vs endoscopic, type of resection).

Take Home Points: Pretreatment assessment of paranasal tumours requires careful scrutiny of orbital, intracranial, perineural or deep spread only in limited cases cross-sectional imaging allows reliable tumour characterisation

Keywords: Paranasal sinus, MRI, Perineural spread

RC 1
Salivary glands

S. Golding; Oxford/UK

Short Summary: Salivary imaging progressed dramatically following the development of cross-sectional imaging. Radiographs and sialograms were largely replaced by ultrasound, CT and MRI. This has allowed investigation to be more closely related to the underlying pathology of salivary disorders and to provide a reliable guide to surgical or medical treatment. Salivary gland masses are now well detected by cross-sectional imaging, which provides accurate guidance on the appropriate approach for surgical management. Providing a clear differential diagnosis of masses may be more problematic but this is rarely a clinical problem because biopsy or resection are generally indicated. While sialography remains a reliable method of showing ductal change in sialadenitis, and also calculi, cross-sectional techniques, in particular ultrasound and MRI, have shown advantages in demonstrating associated stromal lesions: complete sensitivity in detecting ductal change may not be required because in practice patients may be treated symptomatically. Scintigraphy offers the best measure of global salivary gland function but currently is not widely used in practice. A strong case can be made for using MRI as a sole investigation as this has been shown to be sensitive to the both surgical and medical conditions. Operating on this basis, the radiologist may be well placed to offer a primary referral service with triage, directing clinical management of patients or further referral on the basis of findings on MRI. Salivary interventional techniques have more recently extended the potential role of the radiologist. This presentation offers a clinically-orientated approach to imaging salivary gland disease in which the alignment between findings and further management is defined.

Take Home Points: Cross-sectional imaging now provides almost total investigation of salivary gland disorders. Investigation should be closely related to the clinical presentation to deliver the maximum benefit to management of the patient. The greatest strengths of imaging are disease detection and indication of further management; precise differential diagnosis may matter less in practice. The radiologist is well placed to receive primary referrals and direct the patient to appropriate subsequent management.

Keywords: Submandibular, Parotid, Salivary neoplasm, Sialadenitis

RC 2
Temporomandibular joint

S. Robinson; Vienna/AT

Short Summary: The temporomandibular joint is a true synovial joint, where the disk – made up from fibrous cartilage – completely separates the upper from the lower compartment. Orthopantomography gives a good outline of teeth and alveolar process together with the temporomandibular joint and is often made in the pre- and postoperative setting. CT is performed in trauma patients and post therapeutic follow-up. If the disk, synovial proliferation or blastomatous changes are suspected, MRI should be done.
Asymmetries in the musculoskeletal system (different leg lengths, scoliosis, thoracic hyperkyphosis) or misdirected stress management can lead to imbalances of the muscles of mastication and adverse effects of the temporomandibular joint. Normally, the condyle is situated centrally in the fossa, shows smooth delineation and homogenous structure. The anterior third is covered by the disk in a similar way as the visor of a cap protects the eyes from sunrays. During mouth opening, both condyle and disk travel anteriorly underneath the articular eminence ("translation"). In addition, the condyle rotates around its own axis to allow the mandibular angle to go backwards. Traction from the anteriorly attached upper belly of the lateral pterygoid muscle and the posteriorly attached elastic fibrous of the bilaminar zone keep the disk stretched and in place. With progressive tension and stress, intrinsic hyperintensities appear within the disk as sign of mucoid degeneration. Eventually, the disk slips anteriorly and does not protect the condyle from the impact of the fossa during mastication leading to osseous degeneration. In early stages, the disk can still recapture its normal positioning between condyle and fossa ("disk displacement with repositioning"), but not anymore in later stages ("disk displacement without repositioning"). The displaced disk may interfere with condyle movement during mouth opening ("impaired translation"). Different features of this internal derangement may coexist and make treatment more difficult. Synovial proliferation and bony erosions in rheumatoid arthritis or destruction in malignant diseases are rarer.

Take Home Points:
- Appreciate normal anatomy and variants
- Recognise pathologic relationship of disk and other joint structures
- Correctly interpret inflammatory and blastomatous disease

Keywords: Temporomandibular joint, MRI, Internal derangement

SS 2.1.
Nasopharyngeal cancer

V. Chong; Singapore/SG

Short Summary: Nasopharyngeal carcinoma (NPC) is a unique malignancy. It shows high levels of antibodies to EBV antigens (which are very useful diagnostic markers) and is most commonly encountered in Southern China and Hong Kong. NPC may affect children and adolescents but is much more frequently seen in the middle-aged. Most tumours originate in the fossa of Rosenmuller and spread along well-defined routes. Tumours often spread into the nasal and pterygopalatine fossa. From the nasal cavity tumours can infiltrate the pterygopalatine fossa which may lead to perineural infiltration of the maxillary nerve and further extend into the intracranial cavity. Tumours may infiltrate further into the orbital apex and enter the intracranial cavity through the superior orbital fissure. Lateral spread involves the parapharyngeal and masticator spaces. When tumour enters these spaces, there is a risk of perineural infiltration along the mandibular nerve. Perineural spread along the mandibular nerve is a frequent route of intracranial extension. When NPC spreads superiorly, it erodes the skull base with subsequent direct extension into the intracranial cavity. Lesions may also be seen to spread through the foramen lacerum. Cervical nodal metastasis is very common and up to 80% of patients have enlarged nodes at presentation. Nodal metastasis show an orderly inferior spread and the affected nodes are larger in the upper neck. Spread to the supraclavicular nodes has grave prognostic significance. Up to 50% of patients with supraclavicular lymphadenopathy will eventually have distant metastases. NPC shows a high frequency of distant metastasis compared with other tumours of the head and neck. The frequency of distant spread varies between 5% and 41%. Common sites of distant metastases include bone (20%), lung (13%) and liver (9%).

Take Home Points:
- NPC is an infiltrative malignancy with tendency to spread into the intracranial cavity
- Cervical metastasis is very common
- Unlike other head and neck malignancy distant metastasis is a major cause of death

Keywords: Intracranial spread, Nasopharyngeal Carcinoma, Cervical nodal metastasis

SS 2.2.
Oropharyngeal tumours

S. Espinoza[1], Ph. Halimi[2]; [1]Le Kremlin-Bicêtre/FR, [2]Paris/FR

Short Summary: Oropharyngeal tumours consist in epidermoid carcinomas. Most often, they were related to alcohol and tobacco consumption. But recently, they also appear in young adults in a context of HPV16 infection. This new kind of cancer has a better prognosis than the previous with better response to radio chemotherapy and fewer recurrences. The first imaging protocol should consist in MRI and PET-CT. The role of MR Imaging is to determine the deep extensions of the lesion (base of tongue, uvula) and the nodal involvement, to establish the TNM staging which determines the therapeutic choice. The role of PET-CT is to reveal metachronous or secondary lesions (pulmonary or oesophagus neoplasms). MRI should consist in T2 weighted sequences without fat sat to assess muscular extensions to the tongue or uvula and constrictors muscular plane involvement; T1 weighted sequences for parapharyngeal fat assessment and bone marrow; T1 weighted sequences after gadolinium injection with fat saturation to specify the lesion boundaries and potential necrotic areas. Careful analysis of lesion boundaries and extensions is essential to make the optimal treatment choice, and, in case of radiation therapy, it leads the manual contouring of the lesion to be treated. Functional imaging with diffusion and perfusion may play a role in predicting the response to radio-chemotherapy. Clinical and radiological monitoring after treatment is based on MRI and

PET-CT. Most often, MRI allows distinguishing areas of fibrous scar and suspicious areas of recurrence. But for unreliable cases, PET-CT can provide precious information.

Take Home Points:

- Recently, oropharyngeal epidermoid carcinomas affect young adults in a context of HPV16 infection.
- The first imaging protocol should consist in MRI and PET-CT.
- MRI protocol includes T2 weighted sequences without fat sat, T1 weighted sequences and T1 weighted sequences post gadolinium injection with fat saturation
- Careful analysis of lesion boundaries and extensions is essential to make the optimal treatment choice
- Monitoring after treatment is based on clinical and radiological follow-up using MRI and TEP-CT

Keywords: Epidermoid carcinoma, MR imaging, HPV 16 infection

SS 2.3.
Treatment options and post-treatment imaging

F. Bidault; Villejuif/FR

Short Summary: Undifferentiated carcinoma is the most frequent nasopharynx cancer during adulthood (UCNT). Its treatment is based on radiotherapy with previous and/or concomitant chemotherapy. Various pathologies occur in oropharynx (carcinoma, lymphoma). Surgery, radiotherapy and chemotherapy are therefore mandated according to pathology and tumour spread. Human Papilloma Virus (HPV) presence in the tumour has been integrated in oropharyngeal carcinoma treatment decision for a few years. Post-treatment imaging is complementary to physical examination. Its first goal is to identify recurrence at an early stage to perform salvage therapy. Some complications can occur after treatment, such as brain or bone necrosis, ulceration, fistula and vascular injury. They can also be seen in imaging scans. Alterations after treatment (post radiotherapy aspects, post-surgery modifications) are the main problems for radiologist. Imaging (CT and/or MRI) performed 3 months after treatment is recommended. It represents a follow-up baseline and helps to avoid false positive or false negative diagnoses of recurrence during survey. FDG-PET is also a good tool thanks to its good negative predictive value of tumour recurrence. In rare cases a second treatment is mandated according to imaging alone even if pathology is normally needed, for example when recurrence occurs in an unreachable location (base of the skull).

Take Home Points: Carcinoma is the main pathology in adulthood nasopharynx and oropharynx cancer radiotherapy is the base of UCNT treatment The presence of Human Papilloma Virus is taken into account for oropharynx treatment decisions Post-treatment imaging performed 3 months after treatment is helpful for survey.

Keywords: Computed tomography, Magnetic resonance imaging, Positron emission tomography, Cancer treatment, Cancer recurrence

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ORAL PRESENTATIONS

SS 3.1.
Diffusion weighted imaging (DWI)

H. Thoeny; Bern/CH

Short Summary: Diffusion-weighted MRI gained increasing importance in recent years and is now part of most clinical exams also in the Head & Neck. This region is very challenging due to multiple air tissue interfaces as well as breathing, swallowing and patient movement leading to artefacts. Good image quality as well as knowledge of image interpretation are the prerequisites of successful application in the Head & Neck. Image interpretation can be performed qualitatively by visual assessment of lesions on high b-value images, the corresponding ADC map as well morphological images, whereas quantitative image analysis is based on Apparent Diffusion Coefficient (ADC) measurements. The main clinical applications include lesion detection and interpretation, differentiation between malignant and benign tumours and inflammation, predicting and monitoring treatment response as well as differentiation between posththerapeutic changes and recurrence. Although several publications showed lower ADC values in malignant compared to benign lymph nodes, its real value has to be shown in larger prospective studies. The various applications of DWI in the Head & Neck will be discussed and practical tips and tricks for image interpretation will be explained.

Take Home Points: DWI should be part of any clinical Head & Neck exam, however qualitative image interpretation has to be performed thoroughly including high b-value images, the corresponding ADC map as well as morphological images. When performing quantitative image interpretation attention has to be paid to the choice of b-values (these should be standardised) and has to be taken into account when comparing measured ADC values to those published in the literature.

Keywords: Diffusion-weighted MRI, Tumour, Tissue characterisation

SS 3.2.
How to acquire and interpret dynamic contrast enhanced MRI
S. Bisdas; Tübingen/DE

Short Summary: Dynamic contrast-enhanced MRI (DCE-MRI) is a functional MRI method where T1-weighted MR images are acquired dynamically after bolus injection of gadolinium. Since DCE-MRI is based on the quantification of the tissue signal intensity change over time, acquisition parameters providing sufficient temporal and spatial resolution as well as accurate estimation of the "baseline" T1 tissue properties prior to arrival of the contrast agent are of major importance for deriving reliable data that characterise the state of the microcirculation. The data can be interpreted in terms of physiological tissue characteristics by applying the principles of tracer-kinetic modelling. DCE-MRI is suitable for tumour imaging in head and neck region and enables measurement of blood flow, intra- and extravascular (interstitial) volume and permeability-surface area product. Different available models may also provide other kinetic parameters such as the volume-transfer constant K(trans) , the extraction fraction E and the contrast-agent mean transit times through the intra- and extravascular spaces. The choice of the right tracer kinetic model as well as the interpretation of the results is largely based on the prior knowledge of the tissue pathophysiology and the underlying theoretical assumptions/approximations and constraints of the applied methodology.

Take Home Points:
- Theoretical principles of DCE-MRI
- Acquisition techniques and protocols for DCE-MRI
- Post-processing of the data and principles of tracer kinetic modelling
- Methodological "pearls and pitfalls" of DCE-MRI
- Interpretation of DCE-MRI-based parameters in head and neck oncology

Keywords: DCE-MRI, Permeability imaging, Tracer kinetic modelling, Head and neck oncology

SS 3.3.
PET-MRI
M. Becker; Geneva/CH

Short Summary: The information provided by PET/CT and MRI is often complementary and the recent implementation of hybrid MR/PET systems in clinical settings holds promise because it can combine morphologic, functional and molecular information. This lecture focuses on the clinical applications of PET/MRI in the head and neck. First, the principles of PET/MRI are summarised, then clinical feasibility, quantification issues and protocol optimisation are discussed. Current knowledge regarding the diagnostic performance of PET/MRI in the head and neck are subsequently reviewed. Typical radiologic findings of tumour manifestations are demonstrated with particular emphasis on the early detection of lesions, their appearance on different imaging modalities and the added value of hybrid imaging techniques for the T, N and M stage. The variable appearance of functional phenomena mimicking disease, as well as the potential pitfalls of image interpretation and how to avoid them are equally addressed. Emphasis will be put on how to interpret multiparametric imaging thus helping to avoid unnecessary biopsy.

Take Home Points:
1. To learn what additional information is acquired by PET/MRI in head and neck tumours.
2. To appreciate the clinical utility of this examination in complex situations.

Keywords: Head and neck tumours, PET/MRI, PET/MR, Function imaging, Head and neck tumours

SS 3.4.
Perfusion CT – pre- and postteatment value
A. Trojanowska; Lublin/PL

Short Summary: Currently, the major clinical applications of body CT perfusion are to be found in oncology. Interestingly, these applications have been stimulated by the development of new therapeutic options, like anti-angiogenesis therapy for tumours.
Changes in tumour perfusion and permeability have also been observed following radiotherapy. However, perfusion CT may be of particular value in monitoring the response to emerging ''anti-angiogenesis'' drugs, which aim to halt cancer progression by suppressing the tumour blood supply. As these agents produce disease stabilisation rather than tumour regression, conventional imaging strategies that rely on changes in tumour size are not appropriate. By depicting tumour vascularity in a non-invasive and sensitive manner, perfusion CT offers a novel imaging strategy for monitoring tumour angiogenesis in vivo and its response to non-surgical treatment.

Take Home Points: A familiarity with neck anatomy, the imaging modalities used for investigation of such conditions, as well as common findings on imaging are critical to the care of affected patients and willbe discussed during the presentation.

Keywords: Perfusion CT, Oncology, Pre- and postreatment value

SOPS 1.1.
In vivo high resolution 7 Tesla MRI of the human inner ear and cochleovestibular nerve: protocol development, clinical application and comparison to 3 Tesla imaging
B. Verbist, W. Brink, M. Van Der Jagt, M. Versluis, J. Briaire, J. Frijns, A. Webb; Leiden/NL

Short Summary: We present development of high-field-MRI (7T) in vivo inner ear imaging and its results in patients in comparison to 3T.

Purpose/Objectives: Aim of this study was to investigate the feasibility of human in vivo inner ear imaging with 7 Tesla (T) MRI and to compare the visibility of inner ear structures and the cochleovestibular nerve with 3 Tesla MRI.
The increased intrinsic signal-to-noise ratio afforded by high field MRI offers an opportunity for improving the depiction of fine inner ear structures and cranial nerves. However, imaging quality is potentially hampered due to strong inhomogeneities in both the static (B0) and the radiofrequency (RF; B1) magnetic fields. Due to this technical complexity specific, anatomy-tailored protocol development is needed for high field scanners.

Methods and Materials: A high resolution T2-weighted spin–echo sequence for the inner ear was developed in healthy volunteers on a 7T MRI system (Philips Healthcare, The Netherlands), with an isotropic resolution of 0.3mm, resulting in an acquisition duration of 10 minutes. Two high-permittivity-pads, which consisted of a deuterated suspension of barium titanate, were designed using numerical simulations and positioned next to the ears to enhance the signal at the location of the inner ear. The optimised protocol was applied to 13 patients with sensorineural hearing loss, who also underwent 3T imaging. To compare 7T with 3T results two observers assessed 24 anatomical structures using a 4-point-grading scale for degree of visibility and the overall image quality.

Results: Numerical and in vivo results in volunteers showed a substantial local improvement in the B1 field, which resulted in an improved contrast homogeneity from the inner ear when using dielectric pads. Simulations showed that the local tissue power deposition was not increased. All patients successfully underwent 7T MRI. The visibility of 11 out of the 24 anatomical structures was rated higher at 7T in comparison with 3T. There was no significant difference in overall quality rating, which was mainly due to a higher incidence of susceptibility-related image artifacts in 7T images.

Conclusion: In vivo human inner ear imaging at 7T is feasible by using geometrically tailored dielectric pads, and provides higher anatomical detail than 3T.

Keywords: 7 Tesla, High field MRI, Human inner ear, In vivo

SOPS 1.2.
Functional MRI findings in 2 patients with profound sensorineural hearing loss

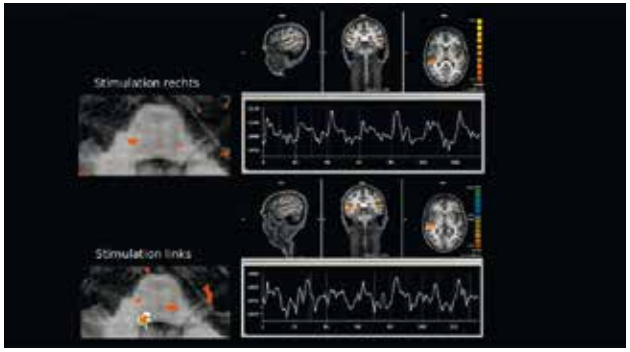
F. Wagner, R. Wiest, P. Senn, C. Weisstanner, S. Weder; Bern/CH

Short Summary: We report 2 cases of bilateral sensorineural hearing loss where an auditory fMRI paradigm was used to identify the less impaired ear for cochlea implantation (CI). Both patient lacked subjective perception. Preserved hemodynamic responses (HRs) along the primary auditory cortex (PAC) were investigated by exposure to intermittent clicking tone stimulation (2 kHz). FMRI consisted of repetitive auditory stimuli at the PAC at a tresholded level of t>3.1 were used to identify the less impaired hemisphere. Secondary to the PAC, we investigated the presence of hemodynamic responses in the brain stem at a less conservative significance level of p<0.05. To prove hemodynamic responses to auditory stimuli, we performed a perfusion analysis (ASL) with the same stimulation protocol. Taking into account the fMRI results the CI implantation was recommend for the less impaired side correlating to a greater extend to the stimulation paradigm. Postoperatively both patients showed a significant hearing improvement.

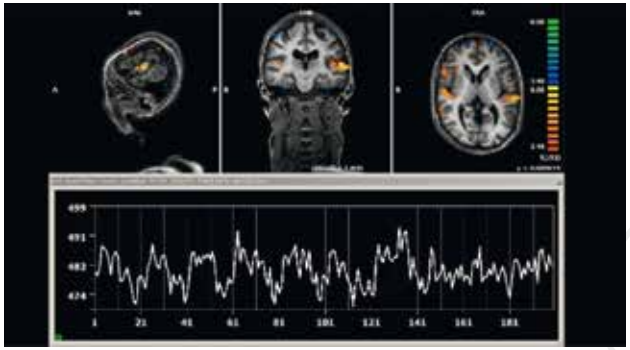
Purpose/Objectives: The purpose was to compare laterality of hemodynamic responses by fMRI and ASL in the PAC and brainstem to pure tone audiometry.

Methods and Materials: Preserved HRs along the CAP were investigated by exposure to intermittent clicking tone stimulation at 2 kHz. FMRI consisted of repetitive auditory stimuli contrasted against baseline, the peak intensity and clusters size extension at the primary auditory cortex (PAC) at a tresholded level of t>3.1 (corr. for family wise errors) were used to identify the less impaired hemisphere. Secondary we investigated the presence of hemodynamic responses in the brain stem at a less conservative significance level of p<0.05. To prove hemodynamic responses to auditory stimuli, we performed a perfusion analysis (ASL) with the same stimulation protocol.

Results:
- Asymmetry and peak activation lateralised the integer CAP.
- Low threshold analysis at p>0.05 identified the integrity of HR along the brain stem.
- CBF increase, as analysed by ASL, confirmed the fMRI.
- Patient 1



- Patient 2



Conclusion: Functional MRI responses evoked by BOLD and ASL may aid in the identification of the less impaired CAP in patients with bilateral sensorineural hearing loss. These findings were in keeping with the pure tone audiometry and confirmed by excellent outcome after surgery.

Keywords: BOLD, ASL, Central auditory pathway, MRI

SOPS 1.3.
MRI-PET in laryngeal cancer

M. Covello, V. Romeo, C. Cavaliere; Naples/IT

Short Summary: Head and neck cancers account for approximately 4-5% of all malignant disease.
Diagnosis of head and neck cancer (HNC), and mainly of larynx carcinoma, is usually achieved by a combination of physical examination, and laryngoscopy with directed biopsies. Accurate staging is critical for selection of the appropriate treatment strategy, and is generally based on positron emission tomography (PET), computed tomography (CT) and magnetic resonance (MR) findings. The recent commercial introduction of hybrid PET/MR scanners offer new possibilities for oncologic imaging, combining the wide range of physiological information (glucose metabolism, hypoxia, receptor expression) achievable by PET with the high spatial, contrast and temporal resolution of MRI.
The aims of the study were to evaluate the role and to assess relative benefits and difficulties of simultaneous hybrid PET/MR imaging in patients with larynx carcinoma in staging, correlating histological findings to metabolic data obtained by PET and morphologic and functional data (DWI, DCE) obtained by MRI.

Purpose/Objectives: To evaluate the role of simultaneous hybrid PET/MR imaging in patients with laryngeal cancer, and to correlate histological findings to metabolic PET data and to morpho-functional parameters derived by MRI.

Methods and Materials: Twenty patients, with histologically confirmed larynx malignancy were studied. The patients underwent whole body PET/CT followed by PET/MR of head/neck region. PET and MRI studies were separately evaluated by two blinded groups in order to define the presence/absence of lesions and the infiltration on local structures. Regions of interest analysis was carried out over the primary lesion at the level of maximum size on metabolic (SUV and MTV), diffusion (ADC) and perfusion (Ktrans, VE, kep and iAUC) parameters and compared to histological findings.

Results: PET/MR examinations were successfully performed in all patients. Agreement between the two independent observers groups was found in anatomic allocation of lesions by PET/MR (Cohen's kappa 0.93). CTSUV measures highly correlate with ones during MR. Several significant correlations among the different parameters have been also detected.

Conclusion: Our study demonstrates the promising role of PET/MR imaging for staging of laryngeal carcinoma, allowing simultaneous collection of multiparametric metabolic and functional data that could play a crucial role in prognosis and treatment evaluation.

Keywords: PET-MR, Head-Neck Cancer, Larynx, MR-DCE, MR-DWI, PET-SUV

SOPS 1.4.
Validation of metal artifact correction technique for neuro interventional endovascular coiling in flat detector computed tomography

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Short Summary: In this study, based on flat detector computed tomography, the reliability and the efficacy of the metal artifact correction technique have been evaluated for neuro interventional endovascular coiling.

Purpose/Objectives: Flat detector computed tomography (FDCT) is capable of providing detailed vascular information in three dimensional (3D) space and has been increasingly used during neuro interventions for diagnosis and follow-up evaluations in the angiographic suite. However, metallic implants of high density such as coils lead to streak artifacts in the reconstructed 3D images, and therefore obscure their surrounding anatomical structures, and make the images difficult to interpret. In this study, we aimed to validate the reliability and evaluate the efficacy of metal artifact correction (MAC) technique, which uses non-linear interpolation and optimisation methods for the correction of the metal contributions to the projection images.

Methods and Materials: For 13 patients with cerebral aneurysms confirmed by diagnostic angiography, 3D CT-like cross sectional images were acquired before the treatment, which served as ground truth (GT), and after the coil treatment with and without being processed by MAC technique (Siemens Healthcare, Forchheim, Germany). For each of the 3 image dataset, four regions of interest were defined in the metal surroundings in the same transversal plane, in which artifact were visually found to be severest from the uncorrected post treatment images. Image co-registration was performed, which ensured the examined regions of interest covered the same anatomical structures in the 3 image dataset. The mean CT values were then extracted and the image quality was evaluated by comparing GT, uncorrected and corrected images.

Results: The metal artifacts that appeared as bright and dark streaks in uncorrected images were significantly reduced or even eliminated in the corrected images for all the cases, improving the visualisation of the parent vessel, stent, as well as adjacent anatomy previously obscured by the artifacts. Good agreement was found between the GT and the corrected images, with deviations of CT values substantially reduced compared to that between the GT and the uncorrected images (7.9 ± 5.9 vs. 75.1± 52.8).

Conclusion: The MAC technique reliably reduced metal artifacts and significantly improved image quality, leading to improved diagnostic confidence and accuracy.

Keywords: Flat detector computed tomography, Endovascular coiling, Metal artifact correction

SOPS 1.5.
Diagnostic benefit of automatic metal artifact reduction (O-MAR®) in ct of head and neck

J.M. Hempel, R. Kloeckner, K. Oberholzer, C. Düber, P. Mildenberger; Mainz/DE

Short Summary: Does it provide useful information in CT of head and neck in patients with dental metal artifacts?

Purpose/Objectives: To evaluate the diagnostic benefit of automatic metal artifact reduction (O-MAR®) in CT of head and neck.

Methods and Materials: A total of 39 consecutive patients underwent CT of head and neck with dental metal work. All examinations were performed on a 256-slice CT scanner (iCT®, Philips, The Netherlands). Scans were acquired with a field of view of 21cm, a tube voltage of 120 kV and a tube current of 200mAs. 110ml of contrast medium (Imeron 400®, Bracco, Italy) were administered using a power injector (Accutron, Medtron, Germany). Axial slices both in 3mm and 0.67mm were reconstructed, each with and without O-MAR® algorithm. Images were analysed by 3 independent radiologists, followed by a consensus reading. Improvement of detectability and assessment of expansion of a tumorous or inflammatory lesion by additional O-MAR® corrected series were evaluated and categorised (not better, better, considerably better).

Results: Overall lesion detectability could be improved in 2 patients (5 %). Lesion expansion was better assessable in 13 patients (33 %) and considerably better in 1 patient (3 %). In summary, additional O-MAR® series were beneficial in 14 of 39 patients (36%).

Conclusion: O-MAR® provides useful additional information for correct diagnosis in CT of head and neck in patients with dental metal artifacts. As it has no disadvantages for the patient, we suggest implementing an additional reconstruction with O-MAR® in all CTs of head and neck.

Keywords: Neck, Metal, O-MAR, Artifact, Reduction, CT

SOPS 1.6.
Investigations on the contrast media injection protocol via left ventricle for brain perfusion imaging using flat detector computed tomography

Q. Zhang[1], C. Song[1], R. Xu[1], Q. Sun[1], H. Zhang[1], T. Shan[1], W. Pan[1], M. Wang[1], Y. Deuerling-Zheng[2], J. Beilner[3]; [1]Beijing/CN, [2]Forchheim/DE, [3]Shanghai/CN

Short Summary: Feasibility of using left ventricle injection to acquire symmetric perfusion maps is tested and confirmed.

Purpose/Objectives: It has been shown cerebral blood volume (CBV) acquired with flat-detector computed tomography (FDCT, syngo DynaPBV Neuro, Siemens Healthcare, Germany) using intra-arterial contrast media (CM) injection protocol at ascending aorta could provide valuable functional information of the brain during interventions with minimised CM usage. However, due to individual vasculature variations at aortic arch, high blood flow speed and limited length of the ascending aorta, non-uniform CM distribution was observed for certain patients without cerebral circulatory disorders, causing unexpected asymmetric perfusion in two hemispheres. This work tested feasibility of injecting CM into left ventricle (LV) to achieve symmetric perfusion.

Methods and Materials: Eight patients without perfusion-related cerebral abnormities were enrolled into this study. CBV maps were acquired using a FDCT system (Artis zeego, Siemens Healthcare, Germany) with a 4F pigtail catheter in the LV and 40ml CM (320mgI/ml) was injected. Color-coded quantitative digital subtracted angiography (CCQ-DSA, syngo iFlow, Siemens Healthcare, Germany) at aortic arch with CM injected at ascending aorta was acquired for perfusion symmetry prediction. Time intensity curves (TIC) were extracted from regions of interest (ROI) defined on bilateral common carotid arties (CCA) and area under curves (AUC) were calculated. To evaluate brain perfusion symmetry on CBV maps, ROI were defined on bi-frontal lobes on two selected transversal planes, where asymmetric perfusion most likely to appear. The mean CBV value was extracted from ROI.

Results: No adverse physiological changes caused by LV injection were detected for any patient. Relative AUC of right/left CCA in CCQ-DSA was 0.98+/-0.01 for 5 patients. Significant non-uniform CM distributions were detected for 3 patients with relative AUC 1.59+/-0.17, indicating asymmetric perfusion using previous ascending aorta injection protocol. In contrast, with LV injection, all the patients demonstrated good perfusion symmetry with relative CBV 1.03+/-0.07 (1.00 for perfect symmetry).

Conclusion: The feasibility of using LV injection to acquire symmetric CBV maps has been preliminarily tested. This offered an approach to acquire brain functional information in the angiographic suite for patients who are limited by asymmetric perfusion using ascending aorta injection protocol and are sensitive to CM dose.

Keywords: Flat-detector computed tomography, Cerebral blood volume, Digital subtracted angiography

SOPS 2.1.
Detection of nasopharyngeal carcinoma using MRI: accuracy of MRI compared to that of endoscopy and endoscopic biopsy based on a follow-up study at three years

A. King, L. Vlantis, W.C.T. Yuen, B.K.H. Law, K. Bhatia, A. Ahuja; Hongkong/CN

Short Summary: MRI had a higher sensitivity for detection of nasopharyngeal carcinoma (NPC) than endoscopy or biopsy (100%, 88% and 94% respectively). MRI also correctly identified the majority of patients who did not have NPC, and these patients can be spared from undergoing invasive biopsy.

Purpose/Objectives: In a previously reported prospective study we compared the diagnostic accuracy of MRI, endoscopy and biopsy (targeted biopsy or random deep biopsies) for detection of nasopharyngeal carcinoma (NPC), and found MRI had the highest sensitivity. However, at the close of that study there were subjects without a diagnosis of NPC who nevertheless had MRI and endoscopic abnormalities suspicious of early NPC. NPC may grow slowly and biopsy confirmation of small/submucosal NPC can be difficult to obtain, therefore the aim of this study was to re-calculate the diagnostic accuracy of the original investigations,

based on three year follow-up of patients without an initial diagnosis of NPC, to ensure all patients with NPC were identified.

Methods and Materials: Patients without a diagnosis of NPC at the end of the previous study, underwent evaluation by MRI and/or endoscopy at least three years after the initial set of investigations. The diagnosis of NPC was made by histology.

Results: In the original cohort of 256 patients, 77 had NPC and 169 did not have NPC. NPC follow-up data was obtained in 122/169 of the patients without a diagnosis of NPC using MRI & endoscopy (n= 110), endoscopy (n= 11) or MRI (n=1), of which one patient was found to have NPC and 121 had no NPC. The combined sensitivity, specificity and accuracy in the 78/199 (39%) patients with NPC and 121/199 (61%) patients without NPC, were 100%, 92% and 95% for MRI, 88%, 94% and 92% for endoscopy and 94%, 100% and 97% for endoscopic biopsy. Benign disease was mistaken for NPC in 10/121 (8%) patients by MRI and 8/121 (7%) patients by endoscopy.

Conclusion: MRI was the most sensitive investigation for NPC detection and detected subclinical cancers missed by endoscopy and endoscopic biopsy. MRI correctly identified the majority of patients who did not have NPC and these patients can be spared from undergoing invasive biopsy.

Keywords: Nasopharyngeal carcinoma, Detection, MRI

SOPS 2.2.
Diagnostic accuracy of DWI to detect cervical lymph node metastases from head and neck squamous cell carcinoma (HNSCC) in the clinically negative neck (cNo)

B.J. De Bondt, L. Sijbrandij, M. Bol; Zwolle/NL

Short Summary: Diagnosis of cervical lymph node metastases in patients with a clinically negative neck (cNo) in HNSCC is a main challenge. To completely rule out lymph node metastases by radiological imaging implies that there is a risk that occult metastases remain undetected and that the patient is undertreated, “wait-and-see policy” has the advantage that unnecessary morbidity due to surgery can be avoided. Aim: to determine the diagnostic accuracy of DWI to detect lymph nodes metastases in HNSCC in the clinically negative neck (cNo). In this study, restricted to clinically negative necks (cNo), the ADC criterion is the strongest independent predictor of presence of lymph node metastasis. Combination of ADC values with other MRI criteria significantly improves discrimination malignant versus benign lymph nodes.

Purpose/Objectives: To determine the diagnostic accuracy of diffusion-weighted imaging (DWI) to detect lymph nodes metastases in head and neck squamous cell carcinoma (HNSCC) in the clinically negative neck (cNo).

Methods and Materials: Fourteen consecutive patients with cN0 were evaluated on MRI at 1.5T. Lymph nodes were evaluated for maximum short axial diameter, morphological criteria and apparent diffusion coefficient (ADC) values (b=0 and b=1000 sec/mm2). Sensitivity, specificity, and diagnostic odds ratios (DORs) and areas under the curves (AUCs) of ROC curves, were calculated for the MRI criteria individually and in combination. Histological examination of lymph nodes in the neck dissection specimen was the gold standard.

Results: 191 lymph nodes (rang 3 – 12 mm maximum short axis), were evaluated. Histology revealed 22 metastases (prevalence 12%). The optimal ADC threshold to differ benign from malignant lymph nodes was 1.0 x 10-3 mm2/sec; sensitivity and specificity were 90.4% and 82.7%, respectively. When used in combination with size and morphological criteria, ADC value <1.0 x 10-3 mm2/sec was the strongest predictor of presence of metastasis (DOR=96). A model which added ADC values to the other MRI criteria performed significantly better than a model without ADC values: AUC=0.96 versus AUC=0.89 (p=0.038), respectively.

Conclusion: In this study, restricted to clinically negative necks (cNo), the ADC criterion is the strongest independent predictor of presence of lymph node metastasis. ADC values in combination with other MRI criteria significantly improves the detection of lymph node metastases.

Keywords: Metastases, DWI, Clinically negative necks, MRI, Lymph nodes

SOPS 2.3.
Morphological criteria on MRI to detect cervical lymph node metastases from head and neck squamous cell carcinoma (HNSCC) in the clinically negative neck (cNo)

B.J. De Bondt, L. Sijbrandij, M. Bol; Zwolle/NL

Short Summary: Diagnosis of cervical lymph node metastases in patients with a clinically negative neck (cNo) in head and neck squamous cell carcinoma (HNSCC) is a main challenge. To completely rule out lymph node metastases by radiological imaging implies that there is a risk that occult metastases remain undetected and that the patient is undertreated, which has negative repercussion for the prognosis. A “wait-and-see policy” has the advantage that unnecessary morbidity due to surgery can be avoided. The aim of this study was to evaluate morphological criteria on MRI to improve the detection of cervical lymph node metastases in HNSCC in cNo. Morphological MRI criteria Borders and Signal Intensity are highly correlated to detect cervical lymph node metastases from HNSCC in the clinically negative neck (cNo).

Purpose/Objectives: The aim of this study was to evaluate morphological criteria on MRI to improve the detection of cervical lymph node metastases in HNSCC in cNo.

Methods and Materials: Two radiologists evaluated the MRI scans of 42 consecutive patients with cN0, lymph node characteristics were assessed with histopathological correlation as gold standard. Assessed criteria were the maximum short axial diameter and morphological criteria border irregularity and homogeneity of signal intensity on T2-weighted images. Multivariate logistic regression analysis was performed: diagnostic odds ratios (DOR) with 95% confidence intervals and areas under the curve (AUCs) of receiver-operating characteristic (ROC) curves were determined.

Results: A total of 214 lymph nodes (size range 3 - 12 mm in maximum short axial diameter) was evaluated. Histological examination revealed 69 metastases (prevalence 32%). Border irregularity and heterogeneity of signal intensity on T2-weighted images showed significantly

increased DORs. AUCs increased from 0.68 (95% CI: 0.62–0.74) using size only to 0.82 (95% CI: 0.75–0.88) using all criteria for observer 1 and from 0.68 (95% CI: 0.62–0.74) to 0.95 (95% CI: 0.93–0.97) for observer 2 (p<0.001).

Conclusion: Morphological MRI criteria Borders and Signal Intensity are highly correlated to detect cervical lymph node metastases from HNSCC in the clinically negative neck (cNo).

Keywords: Lymph nodes, Metastases, MR imaging, Clinically negative neck, HNSCC

SOPS 2.4.
Diagnostic accuracy of short TAU inversion recovery (STIR) MRI to detect cervical lymph node metastases in the clinically negative neck (cN0)

B.J. De Bondt; Zwolle/NL

Short Summary: Diagnosis of cervical lymph node metastases in patients with clinically N0 necks is a main challenge. To improve detection of metastatic lymph nodes there has to be searched for better or new techniques. Sixteen patients with cN0 were evaluated by MRI for size and aspect on STIR preceding neck dissection. 218 lymph nodes were evaluated (range in maximum short axial diameter 3-11 mm). Histology revealed 25 metastases. Sensitivities, specificities, NPV, PPV and κ were determined. STIR MRI is a strong sequence to predict lymph node metastases in the clinically negative neck (cN0).

Purpose/Objectives: To determine the diagnostic accuracy of STIR MRI for detection of malignant lymph nodes in HNSCC in the clinically negative neck (cNo).

Methods and Materials: Sixteen consecutive patients with a head and neck squamous cell carcinoma (HNSCC) with clinically negative neck (cN0) were evaluated by MRI at 1.5T (two readers) preceding neck dissection. Lymph nodes were evaluated for maximum axial diameter and hypo-intense signal intensity on reversed STIR images. Statistical analysis: inter-observer agreements (κ) for detecting normal and metastatic lymph nodes; sensitivities and specificities, NPV and PPV for detecting lymph node metastasis. Histology was the reference standard.

Results: A total of 218 lymph nodes were evaluated (range in maximum short axial diameter 3-11 mm). Histology revealed 25 metastases (disease prevalence 11,5 %). Sensitivities were 68% (95% CI 46.5 – 85) and 64% (95% CI 42.5 – 82), specificities were 99% (95% CI 96.3 – 99.8) and 96% (95% CI 96.3 – 99.8). Negative predictive values were 0.32 (95% CI 0.18 – 0.57) and 0.37 (95% CI 0.22 – 0.62), positive predictive values were 89.5% (95% CI 66.8 – 98.4) and 84% (95% CI 60.4 – 96.4). κ=0.98 for detection of all lymph nodes, κ=0.96 for detection of metastatic lymph nodes.

Conclusion: Morphological MRI criteria Borders and Signal Intensity are highly correlated to detect STIR MRI is a strong sequence to predict lymph node metastases in the clinically negative neck (cN0).

Keywords: STIR MRI, Lymph nodes, Metastases, HNSCC

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ORAL PRESENTATIONS

SOPS 2.5.
Detection of extra nodal spread (ENS) in clinical negative necks(cNo); assessment of MRI morphological criteria and diffusion weighted imaging (DWI)

B.J. De Bondt, L. Sijbrandij, M. Bol; Zwolle/NL

Short Summary: Extra nodal spread (ENS) in cervical lymph node metastases in HNSCC has consequences regarding prognosis (local control and distant metastases) and therapy. Detection is difficult especially in the clinically negative neck. This study evaluates diagnostic accuracy morphological criteria on MRI and diffusion weighted imaging; border irregularity and heterogeneity of signal intensity significantly improve detection of ENS in the cN0 neck in HNSCC. DWI has no additional value.

Purpose/Objectives: Evaluation of diagnostic accuracy of morphological MRI criteria and DWI for the detection of extra nodal spread (ENS) in the cN0 neck in HNSCC.

Methods and Materials: A total of 56 consecutive patients with cN0 were evaluated on MRI at 1.5 Tesla. Two radiologists evaluated the images. Lymph nodes were evaluated for maximum short axial diameter, apparent diffusion coefficient (ADC) values (b=0 and b=1000 sec/mm2) and morphological criteria such as border irregularity and homogeneity of signal intensity on T2-weighted images. Multivariate logistic regression analysis was performed: diagnostic odds ratios (DOR) and areas under the curve (AUCs) of receiver-operating characteristic (ROC) curves were determined for the MRI criteria individually and in combination. Histological examination of lymph nodes in the neck dissection specimen was the gold standard to determine extra nodal spread (ENS).

Results: A total of 405 lymph nodes (range 3 – 12 mm) were evaluated. Histological examination revealed 91 metastases (prevalence 22%), ENS was determined in 36 lymph nodes (prevalence 39 %). Border irregularity and heterogeneity of signal intensity on T2-weighted images showed significantly increased DORs and were highly correlated with ENS. AUCs increased from 0.67 using size only to 0.93 using all criteria for radiologist 1 and from 0.68 to 0.96 for radiologist 2 (p<0.001). The use of DWI for the detection of ENS shows no additional value.

Conclusion: Morphological MRI criteria border irregularity and heterogeneity of signal intensity on T2-weighted images significantly improve detection of ENS in the cN0 neck in HNSCC. DWI has no additional value.

Keywords: Lymph nodes, Metastases, Extra nodal spread, HNSCC, MRI morphology, MRI DWI

SOPS 2.6.

Diagnostic value of CT in the evaluation of laryngeal carcinoma and the effect of cartilage ossification and prior radiation treatment in this assessment

B. Ozgen, O. Unal, O. Akca, N. Suslu, S. Parlak, Y.G. Guler Tezel; Ankara/TR

Short Summary: Our study investigated the diagnostic value of CT in the evaluation of laryngeal carcinoma especially the impact of cartilage ossification and prior RT in this assessment. In patients who received radiotherapy preoperatively, CT scans have limited value in the evaluation of exolaryngeal spread and thyroid cartilage invasion. For the CT assessment of cartilage invasion, the incomplete cartilage ossification results in decreased sensitivity and specificity.

Purpose/Objectives: The T staging of larynx carcinoma is performed with a combination of endoscopy and cross sectional imaging, that can be performed with CT or MRI. We wanted to assess the diagnostic value of CT in the evaluation of laryngeal carcinoma and the impact of cartilage ossification as well as the effect of prior radiation treatment in this assessment.

Methods and Materials: 51 larynx carcinoma patients who had undergone total laryngectomy in our institution between 2003 and 2013 and who had a close interval preoperative CT imaging in our PACS database were included in the study. 17 patients had received prior radiation treatment (RT) and were evaluated for disease progression. The preoperative CT scans were reviewed retrospectively, in terms of exolaryngeal spread, thyroartenoid widening and involvement of pre-epiglottic space and paraglottic space. Thyroid cartilage invasion was evaluated and graded. The degree of cartilage ossification was also noted. All results were compared with the pathological findings.

Results: The sensitivity of CT for exolaringeal spread in patients who did not receive radiotherapy preoperatively was 86% with a NPV of 83%. The sensitivity of exolaringeal spread evaluation in patients with prior RT was %43 with a NPV of %69. The sensitivity for the detection of thyroid cartilage invasion was 90% for non-RT patients and was %87 for patients with prior RT. For patients in whom cartilage ossification was incomplete the sensitivity was 81% and the specificity was 60%. For patients who had complete ossified cartilages the sensitivity was 100% and specificity was 85%.

Conclusion: In patients who received radiotherapy preoperatively, CT has limited value in the evaluation of exolaryngeal spread and thyroid cartilage invasion. For the CT assessment of cartilage invasion, the incomplete cartilage ossification results in decreased sensitivity and specificity.

Keywords: Computed tomography, Laryngeal cancer, Tumour staging

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ORAL PRESENTATIONS

SS 4.1.

Feasibility of CBCT in the temporal bone: initial experience

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Short Summary: CBCT is a rather new radiological technique using a flat panel CT configuration to produce high resolution images. Radiation dose is depending on the scanned region lower than in multidetector CT. Slice thickness can be -dependent on the type of machine- as low as 0,1 mm. CBCT produces high resolution images of bony structures. Its value has been known for dental and sinonasal imaging for quite some time but the use of CBCT in temporal bone imaging is gaining importance due to its high resolution and low dose. In this lecture, the differences between CBCT and CT will be illustrated and advantages and disadvantages of CBCT will be highlighted. The use of CBCT in temporal bone imaging will be illustrated and the differences between CBCT and CT will be documented in various types of temporal bone pathologies.

Take Home Points: CBCT is a low dose high resolution flat panel CT technique enabling imaging and evaluation of almost all temporal bone pathologies. In several conditions such as otospongiosis and superior semicircular canal dehiscence it seems to be superior to CT.

Keywords: CBCT, CT, Temporal bone

SS 4.2.

3T MRI of the membranous labyrinth and surroundings

F. Veillon; Strasbourg/FR

Short Summary: The vestibule contents the utricle, the saccule, filled with endolymph surrounded by the perilymphe. The amount of the perilymphe is particularly important between the inner part of the footplate laterally, the lateral wall of the saccule medially and the floor of the utricle in the upper part. The maccula of the utricle is located in its anterior inferior wall. The maccula of the saccule is very close to the medial wall of the inferior part of the vestibule. 3 structures have to be considered in MR imaging : the utricle, the saccule, the perilymphatic cistern. The normal membranous cochlear duct is not usually visible. The 3 D high resolution T2 W sequence allows a good analysis of the structure, size and shape of the utricle, saccule and the perilymphatic cistern. Considering the size of the different structures the saccule is the most interesting element. It appears in a coronal high resolution T2 (HRT2) as a rugby shaped balloon in a vertical position located in the inner, lower and anterior part of the vestibule. The maximum height of the saccule in an anterior coronal view is 1.6 mm. Its latéral wall doesn't go through the middle part of the vestibule. The knowledge of the normal size of the saccule leads to the easy diagnostic of the saccular distensions or hydrops. Inflammation. The HRT2 W is able to diagnose the inflammation of the perilymphe (the perilymphatic cistern) and or the endolymphe (utricle, rarely the saccule) demonstrated by a low signal of the fluid content. It's possible to precise the position of a teflon prosthesis in the perilymphatic cistern considering also the utricle and the saccule.

Take Home Points: The knowledge of anatomy of the utricle, saccule and perilymphatic cistern is important in MRI. It's possible to diagnose a dilatation of the saccule (hydrops) in 7 minutes. It's possible to diagnose the inflammation of the perilymphatic cistern and/or the utricle rarely the saccule which it not often concerned. It's possible in postoparative otosclerosis to diagnose the position of a prosthesis in the vestibule considering the perilymphatic cistern, the utricle, the saccule.

Keywords: Temporal bone, Ear, CT, MRI

SS 4.3.
Post operative imaging: when and how?

M. Lemmerling; Gent/BE

Short Summary: Postoperative temporal bone imaging is performed after a wide range of surgical procedures. Repeated imaging on a regular basis is most often performed after cholesteatoma surgery and after resection of a vestibular schwannoma. In the former subgroup follow up imaging is best done after 1, 3 and 5 years using an MRI protocol with non-EPI diffusion weighted images, and no need for gadolinium injection is present if no complications are suspected. Only in cases where a residual or recurrent cholesteatoma is seen complementary CT/CBCT of the temporal bone is performed in view of a new surgical procedure. In the latter subgroup imaging follow up is also recommended, and T1-weighted images after injection of gadolinium are mandatory. If the first scan performed after schwannoma surgery shows no residual tumour at all further follow up imaging is not strictly necessary, since the chance for recurrence is very small. In all other circumstances follow up is recommended. The interval between these follow up exams can increase over time if no evolution is noted. In patients developing complaints after middle ear surgery only CBCT or CT are able to give an accurate and detailed view on the ossicular chain status (status of the reconstruction, prosthetic position, …). To confirm the correct position of the electrode array after cochlear implantation conventional radiography is routinely used, with a potential increasing role for CBCT, due to its low dose and high resolution. Postoperative imaging studies are also performed in some other rarer circumstances, e.g. after BAHA placement, petrosectomie, ...

Take Home Points:
1. Follow up after cholesteatoma surgery is initially done with MRI, using non-EPI DWI.
2. Postoperative evaluation of the ossicular chain is done with CT/CBCT.

Keywords: Temporal bone, Postoperative, DWI

SS 4.4.
Inner ear malformations: a systematic approach

M. Elmaleh-Bergès, A. Tanase, M. François, T. Van Den Abbeele, G. Sebag; Paris/FR

Short Summary: Imaging ability to detect inner ear abnormalities has tremendously increased with high resolution CT and MRI, which provide new insights in the anatomy of the labyrinth. CT detects osseous labyrinth and IAM malformations, and with careful analysis of the cochlear nerve bony canal (CNBC), can raise suspicion of cochlear nerve hypoplasia. MRI detects, as well as CT, labyrinth and IAM anomalies but is the only method to look at the cochlear nerve, the brainstem and the brain parenchyma. MRI can also detect isolated abnormalities of the membranous labyrinth. Evaluation of cochlear implant candidates includes both CT and MRI.
A segmental structured analysis of the inner ear components is essential. The cochlea is evaluated for size, shape, partition, modiolus aspect and CNBC dimensions; shape and size of the vestibule are observed; presence / absence of one or more of the semicircular canals as well as the diameter of their arch and surface of their central bony island are checked. Vestibular aqueduct diameter is compared to the one of the adjacent posterior SCC. This segmental approach not only helps to recognize known syndromes or known genetic defects to guide the genetic testing, but also allows defining new patterns, possibly related to specific genetic defects. Moreover, this "step by step" analysis of the labyrinth may detect subtle isolated abnormalities that are not always associated with SNHL, but may predict a further deterioration of hearing. Cochlear nerve is studied by MRI, for presence / absence / hypoplasia. Both CT and MRI must be also analysed for adjacent structures: skull base and middle ear for CT, brain parenchyma, posterior fossa, midline structures for MRI.

Take Home Points: segmental analysis of the labyrinth is useful to narrow the spectrum of etiologies and guide the genetic work up. Subtle abnormalities of the labyrinth are more and more incidentally detected, their signification is unclear but they may predict a further deterioration of hearing. Evaluation of the inner ear and cochlear nerve are part of a comprehensive analysis of the skull base and/or brain structures.

Keywords: Inner ear, Children, Genetic, Malformation

SS 5.1.
Epistaxis and pre-treatment devascularisation

A. Bonafé, G. Gascou; Montpellier/FR

Short Summary: Endovascular devascularisation techniques take place either in emergency settings like epistaxis or as a pre-planned procedure like vasculartumours or arterio-venousmalformations. Microcatherisation of carotid external branches using distal access catheter will emphasize as well as dangerous anastomosis to be remembered. The use of embolisation particles such as embospheres or liquid embolic agents such as glubran or onyx will be cases illustrated.

Take Home Points: Epistaxis embolisation in non tumoral cases requires bilateral sphenopalatine branches particles obliteration.

Keywords: Head and neck vascular tumours, Embolisation, Epistaxis

SS 5.2.
Percutaneous treatment of venous and lymphatic malformations

Ph. Petit; Marseille/FR

Short Summary: Vascular venous or lymphatic malformations (VM and VL) are developmental anomalies clearly separate (ISSVA 1996) from hemangiomas which are benign tumours characterised by cells proliferations. Treatment must be planed after thorough clinical and imaging explorations (US-Doppler and MR imaging). In case the lesion remains atypical either clinically or on imaging then a biopsy and a histological control are needed. Under local or general anesthesia, symptomatic or unaesthetic VM and VL can be efficiently treated by injection through butterfly needles (VM, VL) or drains (VL), placed under ultrasound guidance, of sclerosing products. The first step of treatment can consist to inject contrast medium within the lesion. For venous malformation, the goal is to establish the aspects and number of the draining veins and the ways they can be controlled during sclerosis. For lymphatic malformation, this opacification is also not always performed but can be helpful in order to calculate the exact volume of the lesion and to ascertain the absence of systemic communication (hemolymphangioma).Venous malformations are preferentially treated by Polidecanol (liquid or foam) and Sodium Tetradecyl Sulfate. Macrocystic lymphatic malformations are either treated by Doxycycline or Alcohol. OK 432 and Ethibloc are no more available in our country. Microcystic forms are less likely to be efficiently treated. Therapeutic agents used include Doxycycline and Bleomycine. Treatment can be repeated as much as necessary to obtain satisfactory results.Overall results are considered good to excellent in over 90% of cases for VM. Thes results are excellent in 70% of cases for macrocystic ML but only around 25% when the lesions are mixte or microcystic. Radiogical treatment can be the first or the second step of a therapeutic program in association with surgery. Complications rate of sclerotherapy have been reported from 4% up to 25%. They include, skin necrosis, neurolysis, infection, transient hemoglobinuria and oliguria, and death with alcohol.

Take Home Points:

- Multidisciplinary approach and informed consent are needed;
- The ratio benefice/risk of treatment must be explained;
- Histological study is mandatory if diagnosis is uncertain;
- Clinical improvement is different than imaging improvement;
- There is always a need for long term follow up to insure successful treatment.

Keywords: Interventional radiology, MR imaging, US - Doppler, Vascular malformation

SS 5.3.
Biopsies and other image guided interventions in the head and neck

M. Mack; Munich/DE

Short Summary: The head and neck region is a complex anatomical region with many important anatomical structures which can be affected by malignancy. Most of the lesions can be diagnosed by clinical examination in combination with imaging, including CT, MRI and angiography. Biopsies are mainly done in clinical practice by the ENT or the maxillo-facial surgeons. The first treatment choice for head and neck malignancy is surgery, often followed by radiation therapy or combined radiochemotherapy. If surgery is not possible due to extensive tumour infiltration or general contraindications for surgery the treatment of first choice is radiation therapy or chemotherapy or a combination of both. So far there is no indication for image-guided therapy modalities in the primary treatment of head and neck cancer. However, there are some situations were interventional radiology plays an important rule. This presentation will focus on image guided biopsies, image guided ablation of tumours in the head and neck region and other image guided interventions in the head and neck. Different approaches as the subzygomatic approach, the retromandibular or retromaxillar approach and a variety of different direct approaches are available to puncture head and neck lesion. Most of the interventions are done under CT-guidance. However there are also some interventions, which can be performed under MR-guidance or ultrasound guidance. Later on, especially, if the palliative treatment options for recurrent head and neck cancer are limited by the proximity of vital vascular and neural structures and the aggressive nature of these tumours. Depending from the localisation of the recurrent tumour a minimally invasive treatment modality such as radiofrequency ablation or MR-guided laser-induced thermotherapy offers a number of potential treatment benefits.

Take Home Points: To learn the basic principles of head and neck interventions

Keywords: Interventional radiology, Biopsy, Ablation

IS 1.1.
Skull base

J. Casselman[1], B. Defoer[2]; [1]Bruges/BE, [2]Antwerp/BE

Short Summary: In this interactive session on skull base the different appearance (signs) of pseudotumours and tumours will be illustrated. The most frequent pathology involving the skull base will also be shown as well as some less frequent pathology one must have seen once, before it is possible to make the correct diagnosis. Some pathology or lesions can only be detected when the right imaging techniques are used (non-EPI DWI, intrathecal Gd etc.). However, sometimes it is only possible to make the diagnosis when biopsies are taken and this can be performed under CT-guidance. Different congenital malformations, pseudotumours and tumours can be found in the anterior, central and posterior skull base leading to a different differential diagnosis depending on the location of the lesion. Finally, the complex anatomy of the skull base must be known if one wants to be able to recognise the exact extension of the skull base lesions. In most cases, the clinicians in the first place want to know this extension and the potential involvement of important structures (brain,orbit, nerves...). The above will be illustrated and discussed in an interactive way – “case presentations”.

Take Home Points:

- Distinguish pseudotumours from real tumours of the skull base
- Know the imaging characteristics of the most frequent skull base tumours
- Are aware which imaging technique should be used
- Recognise the exact extension of the skull base lesions and potential involvement of vital structures

Keywords:
Skull base tumours, Pseudotumours, Central skull base, Skull base pseudotumours, Posterior skull base, Anterior skull base

IS 1.2.
Deep spaces and visceral space
D. Farina; Brescia/IT

Short Summary: Accurate assessment of visceral space and neck lumps is a process in four steps, each essential to get to the right diagnosis. Detailed collection of clinical data is the first, as the differential diagnosis changes with the age of the patient and may change related to specific symptoms. Optimised imaging technique is the second: although demanding, MRI is more efficient than MSCT because of higher contrast resolution and for the possibility to interrogate tissue with different helpful strategies (fat suppression, DWI, etc.). The third step is the definition of the gross appearance of the lesion (hypervascular, solid, cystic or fatty content) which is easily obtained with both MSCT and MRI. Finally, identification of the space of origin (based on location of the lesion, pattern of growth and pattern of dislocation of adjacent structures). In many cases this process allows to come up with a short list of differential diagnoses, if not with the right one. Even in uncertain cases, however, the information that may be obtained with imaging allows safe completion of the treatment workup and proper treatment planning.

Take Home Points: The space based model is an easy and efficient way to describe the neck anatomy and it allows speaking a common language easily understood by the clinicians.
A systematic approach (clinical data, gross appearance at imaging and space of origin) is extremely helpful in reporting neck and visceral space lesions

Keywords: Neck Spaces, MRI, MSCT

SOPS 3.1.
Evaluation of the Olfactory Bulb Volume and Olfactory Threshold in patients with nasal polyps and impact of functional endoscopic sinus surgery: a longitudinal study
S. Rahavi Ezabadi, A. Amali; Tehran/IR

Short Summary: Evaluation of the Olfactory Bulb Volume and Olfactory Threshold in patients with nasal polyps and Impact of Functional Endoscopic Sinus Surgery: a longitudinal study

Purpose/Objectives: Debate still persists on the relation between olfactory bulb volume (OBV) and olfactory function. Many studies suggest that olfactory deprivation decreases the OBV.
Yet, more studies are needed. The aim of this study was to compare the olfactory threshold and olfactory bulb volume of patients with nasal polyps to healthy individuals and to evaluate the impact of functional endoscopic sinus surgery (FESS) on OBV and olfactory threshold.

Methods and Materials: A longitudinal study was carried out in Imam Khomeini and Amir Alam hospitals of Tehran between 2011 -2012. Twenty two patients with nasal polyps were compared with thirty seven healthy individuals. Olfactory threshold test and magnetic resonance imaging (MRI) were performed on all participants and age, gender, left OBV, right OBV, total OBV and olfactory threshold were recorded. Twenty two patients in case group were followed up for 6 months after FESS .OBV and olfactory threshold were measured after 6 months.

Results: There was no significant difference between the age, gender and olfactory bulb volume of the two groups (P > 0.05). However, the difference between olfactory threshold was significant (P=0.005). The olfactory threshold showed no significant relation with olfactory bulb volume (P > 0.05). The correlation between Lund-Mackay score and the mean total OBV and left OBV was significant (r=-0.15 P =0.045 and r=-0.22 P =0.047 respectively)
The decrease in olfactory threshold measured after FESS was statistically significant.
Right, left and total olfactory bulb volume significantly increased after FESS.

Conclusion: Conclusion: The results of our study show that FESS have a significant impact on OBV increment and olfactory threshold decrement. OBV is a plastic structure and improvement in peripheral olfactory function results in enlargement of OBV. However, further studies are mandated, in order to establish this result. Also, considering the duration of olfactory dysfunction may be helpful in future studies.

Keywords: Nasal polyps, Olfactory bulb, Magnetic resonance imaging, Functional endoscopic sinus surgery

SOPS 3.2.
Diagnosis of head and neck extracranial arteriovenous malformations using multidetector computer tomography and high resolution ultrasonography
S. Repina, E. Privalova, A. Grishin, N. Nikiforuk, M. Smyslenova; Moscow/RU

Short Summary: Ways to improve diagnostic strategy in patients with extra cranial arteriovenous malformations (AVM) of head and neck by application of multidetector computer tomography angiography (MDCT-angiography) and high resolution ultrasonography were studied. MDCT-angiography allowed defining size and depth of the lesion, vessel diameter, bone tissue involvement and participation of intracranial vessels in blood supply of the AVM. Diagnostic data acquired by MDCT-angiography and ultrasonography is complementary and allows to measure and to visualise most important parameters of AVM

Purpose/Objectives: Improvement of diagnostic strategy in patients with extra cranial arteriovenous malformations (AVM) of head and neck by application of multidetector computer tomography angiography (MDCT-angiography) and high resolution ultrasonography

Methods and Materials: 20 patients with AVM of soft tissues of head and neck aged 15-58 years were examined. 64-slice MDCT-angiography and high resolution ultrasonography were performed in all patients. Digital subtraction angiography was applied in 4 patients who were to undergo preoperative embolisation. Treatment was planned on the basis of acquired diagnostic data and included radical surgical excision in 14 cases, subtotal surgical excision in 5 cases and electrochemical lysis in 1 case. Preoperative embolization with Onyx 18 and N-butil-cyanoacrilate was performed in 4 cases.

Results: AVM were localised in one or several regions including frontal, temporal, palpebral, labial, nasal, submental, occipital, post auricular, infraorbital and buccal regions. Ultrasonography has shown a lesion with regular or irregular contours, heterogeneous structure with high and low echogenic sites. Turbulence sites were detected in 6 cases. Linear blood flow velocity ranged from 10 to 60 cm/sec, increasing up to 80-100 cm/sec according to arteriovenous shunts. MDCT-angiography allowed to define size and depth of the lesion, vessel diameter, bone tissue involvement and participation of intracranial vessels in blood supply of the AVM. Topography of arteries and veins was visualised. Diagnostic efficiency and sensitivity of method was 100%.

Conclusion: Diagnostic data acquired by MDCT-angiography and ultrasonography is complementary and allows to measure and to visualise most important parameters of AVM.

Keywords: Arteriovenous malformation, Multidetector computer tomography angiography, Ultrasonography

SOPS 3.3.
Ultrasound guided injections of Botulinum A into salivary glands in children with neurological disorders suffering from excessive drooling

K. Kluczewska-Zygan, P. Stewart, L. Zygan, H. Mccluggage; London/UK

Short Summary: Sialorrhea or excessive drooling is often associated with paediatric neurological disorders and causes a significant hygienic and social problem for the little patients and their parents or caregivers. An USS-guided injection of Botulinum A into the salivary glands is an effective and safe method to reduce drooling in paediatric patients with neurological disorder.

Purpose/Objectives: The aim of this study was to evaluate efficacy and safety of injection of Botulinum A into the submandibular and parotid glands performed under ultrasound guidance in reduction of excessive drooling.

Methods and Materials: A 3-year retrospective review of local practice of USS-guided procedures was performed in 13 patients; some of them underwent multiple injections. The procedures were performed in Day Case Unit under general anaesthesia with pre and post procedure assessment. The drooling rate pre and post injection was analysed.

Results: The study results demonstrated reduction of the sialorrhea. All performed USS-guided procedures were technically successful with no prompt complications encountered. All patients demonstrated improvement with reduction of drooling. Minor swallowing difficulty was observed in number of patients after the procedure. No other side effects were observed in the reviewed group.

Conclusion: The study confirmed reduction of salivary secretion in all children and subsequent improvement of the live quality. The USS-guided injection of Botulinum into the salivary glands is effective and safe method to reduce drooling in paediatric patients with neurological disorder.

Keywords: Drooling, Botulinum A, Cerebral palsy

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SOPS 3.4.
Head and neck paragangliomas – imaging, classification and treatment outcome

S. Petrovic; Nis/RS

Short Summary: Paragangliomas are highly vascular lesions originating from paraganglionic tissue, located at four typical locations: the carotid bifurcation, along the vagus nerve, in the jugular fossa and tympanic cavity. In this retrospective study composed of 25 patients with paragangliomas author discuss imaging findings, classifications and treatment outcomes. Special emphasis is given on specifities of carotid, vagal, tympanic and jugular paragangliomas regarding their localisation, extension and relationship with surrounding structures demonstrated by imaging.

Purpose/Objectives: The purpose of this study is to review the imaging characteristics of head and neck paragangliomas by different imaging modalities, to classify them and to investigate treatment outcome.

Methods and Materials: In this retrospective study, the patient population was composed of 9 male and 16 female patients (mean age 46 years) with head and neck paragangliomas. Different clinical symptoms, most important was low cranial nerve deficit, suggested the diagnosis. A proposed diagnostic algorithm in management of head and neck paragangliomas included B-mode sonography with colour-coded Doppler sonography, computed tomography, magnetic resonance imaging and digital subtraction angiography.

Results: Eleven patients had carotid body paragangliomas, 7 jugular , 5 jugulotympanicum and 2 tympanicum paragangliomas. Imaging studies depicted the location and extent of tumour involvement, helped determination of the type of head and neck paraganglioma and their classification. Each imaging modality had its own role in establishing diagnosis. MDCT was sensitive in evaluation of bony destruction which demonstrated jugulotympanic paragangliomas. MRI was the important imaging technique for tissue characterisation and it showed the typical “salt and pepper” appearance of paragangliomas. DSA showed the specific vascular supply of the paraganglioma and it was required preoperatively in larger paragangliomas for surgical planning and preoperative embolisation. Imaging based classifications are necessary for treatment planning; widely used are Shamblin classification for carotid body tumours and Fisch and Glasskock-Jackson classifications for glomus jugulotympanicum tumors. Gross-total resection was achieved in 20 patients.

Conclusion: For safe and accurate diagnosis and treatment planning of head and neck paraganglioma it is necessary to be familiar with clinical presentation, classification, and multimodalities imaging findings.

Keywords: Imaging, Neck, Head, Paraganglioma

SOPS 3.5.
Using non-echoplanar diffusion-weighted MRI to assess treatment response in active graves' orbitopathy: initial experience with case series

R. Lingam, V. Lee; London/UK

Short Summary: We describe a novel use of non-echoplanar diffusion weighted imaging in monitoring treatment response of Grave's orbitopathy, demonstrating our inital experience with a small case series.

Purpose/Objectives: To demonstrate our initial experience of the novel use of non-echoplanar HASTE diffusion weighted imaging in monitoring treatment response in active Grave's orbitopathy (thyroid eye disease).

Methods and Materials: A small series of patients with active Grave's orbitopathy treated with steroids underwent non-echoplanar half-Fourier acquisition single-shot turbo spin-echo (HASTE) diffusion weighted imaging (DWI) to monitor treatment response. This was done in conjunction with STIR (short-term inversion recovery) MRI sequence and clinical activity scores (CAS). The pre- and post- treatment ADC values on the DWI images were interpreted together with the STIR signal intensity ratios and CAS.

Results: Our initial experience with our small case series demonstrates that non-echoplanar DWI ADC values is useful in monitoring treatment response in Grave's orbitopathy, correlating well with STIR signal intensity ratios.

Conclusion: Our initial experience suggests that non-echoplanar HASTE DWI may be a useful tool in assessing treatment response in Grave's orbitopathy. Further studies are required to assess its diagnostic performance.

Keywords: Non-echoplanar Diffusion weighted imaging, Grave's orbitopathy, Thyroid eye disease

SOPS 3.6.
Can thyroid surgery be decided based on ultrasonographic findings irrespective of cytopathological findings?

A. Elsayed; Grimsby/UK

Short Summary: Ultrasound is the gold standard for the imaging evaluation of thyroid nodules. Ultrasound criteria to suggest benignity and malignancy have been described in the literature. Currently, management of thyroid nodules depend mainly on cytopathological results.

Purpose/Objectives: The purpose of this study is to evaluate whether surgery can be decided on sonographic citeria of the nodule(s) irrespective of the cytopathological findings.

Methods and Materials: We retrospectively looked at the histopathological findings of resected thyroid lobes and correlated these findings to the pre-operative sonographic and cytopathological findings.

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Results: Preliminary results suggest that the decision to operate on thyroid lesions based on suspicious sonographic findings was correct in a significant number of patients irrespective of the pre-operative cytopathological findings.

Conclusion: Sonographic features suspecting malignancy should be taken seriously even if the cytopathological results are inconclusive or even suggesting benignity.

Keywords: Thyroid, Ultrasonography, Thyroid nodules, Thyroid cytopathology

Friday, September 26, 2014

RC 3
Imaging of non-nodal neck masses

M. Mack; Munich/DE

Short Summary: MR and CT imaging plays an important role in the evaluation of patients with non-nodal neck masses. The clinical history, physical examination, and imaging characteristics of these lesions are often complimentary. MRI, CT and sometime PET imaging defines the size, location, and extent of these lesions more accurately than physical examination. The CT and MR characteristics are often sufficiently specific to define the correct preoperative diagnosis in these patients. The classical radiographic and clinical features of several non-nodal neck masses will be presented.

Take Home Points: To learn the imaging features of non-nodal neck masses

Keywords: MRI, CT, Neck lesions

SS 6.1.
Cone beam CT use for endodontic and periodontal diagnostics

R. Jacobs; Leuven/BE

Short Summary: Imaging is the most important diagnostic tool in dentistry. In many countries, a quarter or more of all radio diagnostic images even derive from dentomaxillofacial radiology. Until today, this remains predominantly focused on two-dimensional diagnostics. Yet, since the introduction of the first dental CBCT in the nineties, the market has been exponentially growing. The inherently low costs, its compact size and its simple operation, render dental CBCT actually into a popular must-have machine. More than 60 different devices are nowadays available and this exponential growth has created a gap between scientific literature and available hardware. Indeed, research evidence for one CBCT machine may not automatically apply to other equipment. The huge range in dose and performance still demands optimisation and justification for appropriate use. This should surely also be considered for endodontic and periodontal diagnostic applications of CBCT. In endodontic, CBCT may be useful for imaging of canal morphology of upper molars overlapping the maxillary sinus region, and for therapy-resistant peri-apical infections. In periodontology, the use of CBCT is evidenced in implant surgery, not only to explore the planned implant sites, yet also to evaluate the periodontal prognosis of the neighbouring teeth.

Take Home Points: There is a use range in performance and radiation dose of the available CBCT machines.
The latter has to be considered for applications in endodontic and periodontal diagnostics. In endodontic, artefact-less and high resolution CBCT may be useful for imaging of canal morphology of upper molars overlapping the maxillary sinus region, and for therapy-resistant peri-apical infections. In periodontology, the use of low dose CBCT is evidenced in implant surgery, not only to explore the planned implant sites, yet also to evaluate the periodontal prognosis of the neighbouring teeth.

Keywords: Periodontology, Endodontics, Cone beam CT

SS 6.2.
Odontogenic tumours: a daily approach

N. Martin-Duverneuil, B. Ruhin-Poncet; Paris/FR

Short Summary: Imaging for missing tooth on the dental arch is a frequent request. Its absence can correspond to a non erupted tooth or sometimes to a supernumerary tooth or other anatomic variants. However, non eruption of such a tooth can also reveal one of the frequent odontogenic benign tumours. So, the development of a cyst around the crown of an included tooth is quite frequent and is the definition of the dentigerous cyst. But numerous others odontogenic tumours can contain an included tooth. It's quite important to know them as if most of them are rare and so unfortunately poorly known, they are very common in total. Knowledge of their variability of presentation as well as that of possible associated lesions is essential that will be ultimately confronted with the histopathological data. Missing tooth must last be related to an impacted tooth, a normal tooth whose eruption is mechanically blocked; so, mechanical barriers but also authentic tumoral lesions should be carefully searched.

Take Home Points:
- Missing tooth on the dental arch can be related to a non erupted, an included or an impacted tooth.
- Evaluation of a **non erupted tooth** is a frequent imaging request: non erupted definitive, lacteal or supernumerary tooth… CBCT is the most suitable imaging modality, in addition to standard views, preferentially to CT. Be aware to use not too small FOV to avoid missing out adjacent lesions.
- Evaluation of **an included tooth** is another frequent request. But cyst + included tooth are not always synonymous of dentigerous cyst. Numerous even if infrequent tumours can contain included tooth. Correlation with clinical data is necessary as well as the histopathological correlation that can depict intricate lesions. Such data are essential for assessing the prognosis and monitoring of these lesions, many of them being recurrent even if benign tumours.
- **Impacted tooth** is a normal tooth whose eruption is mechanically blocked. It can also be related to authentic odontogenic or non-odontogenic tumours that otherwise not contain included tooth.
- **Thus, the analysis of a missing tooth can lead to consider almost all the odontogenic tumours listed in the WHO classification.**

Keywords: Maxilla, Mandible, Tooth, CBCT, CT, Tumour

SS 6.3.
Cone beam in implantology

K. Orhan; Ankara/TR

Short Summary: Implants have become part of routine treatment plans in many dental offices because of their increasing popularity and acceptance by patients. Appropriate pre-placement planning, in which imaging plays a pivotal role, helps to ensure a satisfactory outcome. The development of precise pre-surgical imaging techniques and surgical templates allows physician to place these implants with relative ease and predictability. Implant treatment planning involves gathering as much information as possible. Key tools to successful treatment planning are the appropriate radiographic techniques, allowing visualisation of a site in all three dimensional aspect with less ionising radiation as possible. In this presentation, based on the literature and own experience, an overview is given of the current potential of CBCT in implant and maxillofacial imaging. Moreover, imaging protocols for site assessment with emphasis on selection criteria will be discussed. The anatomy and the variations of the anatomical structures which can influence the implant and other maxillofacial surgery will also be discussed with cases.

Take Home Points:
- CBCT has a low effective dose in the same order of magnitude as medical CT.
- CBCT has numerous potential applications in the diagnosis and management of maxillofacial pathologies and implant imaging.

Keywords: Cone beam CT, Implantology, Dental implant, Maxillofacial anatomy

SS 7.1.
Diagnostic approaches to thyroid nodules

R. Evans; Wales/UK

Short Summary: Thyroid nodules are highly prevalent on imaging, their presence is virtually universal. A diagnostic approach is mandatory in order to allow effective diagnostic triage and effective management of patients with thyroid nodules/thyroid masses.
The British thyroid Association have recently issued a new set of guidelines, outlining a classification based on ultrasound appearances of thyroid nodules. This evidence based approach will be discussed with relevant examples. The use of such a system should allow a rational approach to the use of ultrasound guided biopsy in patients, with a more appropriate use of imaging being developed.
There will also be a short discussion on the approach used in other countries, notably the USA, looking at the apparent rise in incidence of papillary carcinoma-which can be correlated to the increased use of imaging amongst the population.

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Take Home Points:
1. Thyroid nodules are commonplace on imaging
2. Ultrasound appearances allow cost-effective triage and appropriate selection of patients ultrasound guided FNA/ultrasound guided core biopsy.
3. Use of the BTA classification, with a grading of U1 -U5-facilitates the decision as to when and when not to biopsy patients with thyroid nodules.
4. An ultrasound grading system when used in conjunction with (where appropriate) the cytology or histology findings, following biopsy and the clinical history/findings allow the patient with a suspected thyroid cancer to be correctly managed.
5. Imaging has created an increased incidence of thyroid papillary carcinoma; however the mortality from papillary carcinoma of the thyroid remains minimal and is unchanged.

Keywords: Thyroid, Biopsy, Nodules, Ultrasound

SS 7.2.
FNAC in thyroid lesions

T. Beale; London/UK

Short Summary: FNAC OF THE THYROID I will discuss the differing techniques used to perform FNAC of the thyroid and in which clinical scenario a particular technique may be appropriate. The reasons for performing a repeat FNAC or rarely a tru-cut biopsy will be highlighted and the role of the cytologist and the advantages and disadvantages of a “one - stop” service discussed. Finally the role of audit in thyroid FNA will be mentioned

Take Home Points: FNAC requires close collaboration with the cytology department Audit your results Understand which thyroid nodules require FNAC and which may be left alone.

Keywords: Thyroid, Cytology, Technique

SS 7.3.
Parathyroid – how to depict them with ultrasound

M. Tassart; Paris/FR

Short Summary: For the success of MIP, 2 concordant localising studies (functional, sesta MIBI, and morphologic) should be available: US best approach for thyroid and parathyroid gland (PTG). First part of the exam with the superficial linear transducer for thyroid: concurrent nodules should be addressed preoperatively. Parathyroid adenomas present as a round hypoechogenic mass found on the posterior aspect of thyroid lobe: the middle (lower) third for superior (inferior) PTG, sometimes closely adherent, misdiagnosed as a thyroid nodule. Even If an Hypertrophic PTG is found, full examination has to exclude multigland disease. In the absence of PTG found in normal position, crucial place of US for non invasive localization of atypical or ectopic PTG: True intrathyroidal, internal or external position maximum within the carotid sheath, Undescended superior PTG above (angle of the jaw) or at the level of the upper pole of thyroid. Migration of superior PTG is rare, posterior: retroesophageal region or in the Tracheo esophagien groove and posterior mediastinum. Majority of inferior PTG are found on the level of the inferior thyroid lobe: PTG and thymus migrate together as deep as the mediastinum. Second part of the exam with Small convex wide band 5-9 Mhz, used for transvaginal Ultrasound, suitable for sus sternal approach: most of ectopic PTG are located to the upper anterior mediastinum. Bifurcation of the innominate artery has to be detected: right non recurrent inferior laryngeal nerve (risk factor of nerve injury during surgery), associated with the right aberrant subclavian artery, can be diagnosed. In difficult cases, US-guided fine needle aspiration is performed for cytology, and parathyroid hormone assay. For secondary (renal) hyperparathyroidism, ectopic and supernumerary PTG has to be diagnosed.

Take Home Points: Thyroid examination is crucial. Exclude multigland disease For the success of MIP surgery for primary hyperparathyroidism. Parathyroid adenoma: round hypoechogenic mass found on the posterior aspect of thyroid lobe. Small convex wide band 5-9 Mhz, used for transvaginal Ultrasound, suitable for sus sternal approach: evaluation of upper anterior mediastinum and the bifurcation of the innominate artery. In difficult cases, US-guided fine needle aspiration.

Keywords: Parathyroid, Thyroid, US, Cervical, Mediastinum

SS 8.2.
Infectious disease

A. Trojanowska; Lublin/PL

Short Summary: Imaging the head and neck presents a unique challenge because of the dense concentration of complex anatomy and the importance of lesion localisation in formulating the differential diagnosis and prognosis.

In head and neck infections, critical imaging features such as the ability to define fascial borders of soft tissue neck compartments, the demonstration of intricate anatomy and the noninvasive assessment of vascular integrity are crucial and have improved greatly in recent years in parallel with the rapid technologic advances in multidetector CT and MRI.

Moreover, eck infections are fairly common in the emergency setting, affecting a broad spectrum of the patient population. Care should be taken not only to distinguish these conditions from other noninfectious origin such as malignancy but also to guide acute clinical management.

Take Home Points: A familiarity with neck anatomy, the imaging modalities used for investigation of such conditions, as well as common findings on imaging are critical to the care of affected patients and willbe discussed during the presentation.

Keywords: Head and neck, Infectious, Diseases

SS 8.2.
Arterio-venous malformations
J. Silvera, A. Bisdorff, Ph. Halimi; Paris/FR

Short Summary: Soft tissue Vascular anomalies (VA) frequently involve head and neck. Radiologist must be familiar with their appearance. ISSVA group clarify the nomenclature and classification of VA, subdivided into two groups: vascular malformation (lymphatic, arterio-venous, capillary and venous) and vascular tumours. The first are considered to be localised defects of vascular morphogenesis, the second grow by cellular hyperplasia. They often represent a diagnostic challenge. Differential diagnosis could be difficult between vascular anomalies but also with other tumours of the head and neck (pleomorphic adenoma) MRI is the most valuable modality for classification and characterisation of vascular anomalies. Most have a characteristic appearance on conventional MR Sequences and Dynamic time-resolved contrast material–enhanced MR angiography provides information about the hemodynamic and allows differentiation of high-flow and low-flow vascular malformations. -Venous malformation has an elevated signal intensity on the T2-weighted images, heterogeneous enhancement lobulated margins and could contain phlebolithis. -Lymphatic malformations are macro or microcystic pouch with a peripheral enhancement. Internal fluid-fluid levels are common -AV malformations are high flow malformations and shows serpentine signal voids. Early venous filling is typically seen. MRI allows also appreciation of the depth of extension of these lesions and their delimitation from normal tissue. Finally, despite the good performance of MRI some cases remain difficult. Shear-wave elastography could be a promising technique for distinguishing vascular malformations from tumours.

Take Home Points: Soft tissue Vascular anomalies (VA) frequently involve head and neck. MRI is the most valuable modality for classification and characterisation of vascular anomalies and must be associated with dynamic MR angiography. MRI allows also appreciation of the depth of extension of these lesions and their delimitation from normal tissue. Shear-wave elastography could be a promising technique for distinguishing vascular malformations from tumours.

Keywords: Vascular anomalies, Shear wave elastography, Venous malformations, Dynamic MRA

SS 8.3.
Metastatic nodes from HNSCC: assessment of treatment response
A. King; Hongkong/CN

Short Summary: Patients with head and neck squamous cell carcinoma (HNSCC) who have residual malignant cervical nodes following chemo radiotherapy benefit from salvage neck dissection. However, the assessment of nodal response on the post-treatment scan can be problematic, especially in the early post-treatment period. Reported morphological criteria on CT/MRI for identifying nodal treatment response vary but most frequently involve size (>1- 1.5cm) ; % size reduction (<50%-90%); focal abnormalities such as necrosis; extranodal neoplastic spread (ENS). These criteria are often combined and report high NPVs which is

valuable for excluding residual malignant nodes, but low PPVs which means that in cases of an incomplete nodal response the ability to discriminate between residual sterile and malignant nodes is poor. The poor diagnostic performance of these morphologic criteria is partly because necrosis and ENS are not accurate signs for residual nodal cancer, and their presence reduces the accuracy of size measurements. Of note post-treatment necrotic nodes with thin rims are often sterile and take longer to decrease in size than solid sterile nodes. Cases will be shown to illustrate the difficulties encountered in post-treatment MRI nodal assessment and possible ways to improve assessment will be discussed. Functional MRI, including DWI, ultrasound guided FNAC and FDG PET-CT at 3 months are options for the further investigation of suspicious residual nodes, but all have some drawbacks which will be discussed briefly. Therefore, surveillance imaging remains an important tool for detecting regional failures. Most regional failures occur within 2-3 years, especially the first year, and surveillance imaging aims not only to follow-up indeterminate residual nodal masses but also detect the emergence of metastatic nodes that were occult at presentation.

Take Home Points:
1. Reported MRI/CT morphological criteria for identifying residual metastatic nodes after chemo radiotherapy have high NPVs but low PPVs in the early post treatment period.
2. Necrosis and ENS are not accurate signs for malignancy and reduce the accuracy of size measurements.
3. Further investigations include, DWI, ultrasound guided FNAC and FDG-PET/CT after three months, but MRI/CT surveillance, to follow-up indeterminate residual nodes or detect previously occult nodal metastases, is often required.

Keywords: Treatment response, MRI, Metastatic nodes, HNSCC

SS 9.1.
Clinical indications and surgical procedures
J.M. Triglia; Marseille/FR

Short Summary: The success of cochlear implantation (CI) as an auditory rehabilitative tool requires a thorough knowledge of the devices, indications, limitations and potential risks. CI is a well-defined and safe surgical procedure which enable the auditory rehabilitation of individuals with severe to profound bilateral sensorineural hearing loss. These implants are electronic devices, aiming at electrically stimulating the auditory nerve fibres, in such a way to replace cochlear function. All CI have two major components: the internal component consist of several electrodes that implanted into the scala tympani of the cochlea, the external component consist of a microphone, an external transmitter and a signal processor. Since the standard surgical technique for CI was first performed by House in the sixties, this approach has been characterised by rapid and continuous evolution, with the improvement of minimal invasive surgical techniques and biocompatible implants. Advantages such as a shorter operation time, a reduced risk of facial nerve injuries with the use of neuro-monitoring had decreased intra-operative and post-operative complications. Reflecting the improved capabilities of the technology, patient candidacy has expanded over time. Most candidacy selection criteria, such as degree of hearing loss (severe hearing losses), degree of benefit

received with hearing aids, age (young children), and medical and radiological status have increased the potential candidate base. Indications for CI in children have expanded significantly in the past decade as remarkably positive outcomes have been documented. The minimum age for CI has decreased from 24 to 12 months (even less than 12 months), although, decision of CI in children requires a systematic multidisciplinary evaluation, particularly neuropaediatric evaluation and radiographic assessments. CI improves the hearing, speech perception and speech production. Greater benefits are derived from earlier implantation and a shorter duration of deafness before implantation. Experience has shown that children implanted at a younger age (< 2 years) perform better than children implanted when they are older. Moreover, bilateral CI increases the ability to hear clearly, detect the direction of the sound in noisy conditions and understand speech, and may improves quality of life.

Take Home Points: Electronical auditory rehabilitation. Minimal invasive surgery. Multidisiplinary evaluation. Educational benefits.

Keywords: Hearing loss, Electronic device, Sound stimulus, Multidisciplinary evaluation

SS 9.2.
Pre-therapeutic assessment

J. Casselman[1], E. Offeciers[2], B. Defoer[2]; [1]Bruges/BE, [2]Antwerp/BE

Short Summary: Congenital and acquired sensorineural hearing loss (SNHL), bilateral and unilateral, can be treated by placement of cochlear implants. Before implantation is considered on must verify if 1) the cochlea is accessible/implantable 2) The cochlear branch of the VIIIt nerve is normal 3) The auditory pathways and cortex are normal 4) Concomitant pathology is excluded. In every candidate the brain must be verified on 2D T2Wimages, the morphology and the fluid inside the cochlea can be checked on submillimetric heavily 3D T2 weighted images and the same sequence can be used to check the presence of the VIIIth nerve and its cochlear branch. Submillimetric 3D T1 weighted images after intravenous gadolinium administration are needed to exclude enhancing pathology or concomitant lesions. CT is used to distinguish fibrotic and ossified obliteration of the cochlea and can also be used to exclude concomitant pathology (e.g. stapedial artery) and provides the surgeon with a road map. The above techniques can detect the most important anomalies of the inner ear and today the most used classification is the one by Sennaroglu as it links the different cochlear anomalies with the best suited type of cochlear implant and the most frequently associated surgical hazards. The presence of a normal cochlear branch is crucial and hence the highest possible spatial resolution is needed to confirm the presence, absence or even hypoplasia of this branch. Direct (not reformatted) images in the axial plane and perpendicular on the nerve in the parasagittal plane are mandatory to check the branch in a reliable way. It is also obvious that the auditory pathways and auditory cortex must be intact to guarantee good results after CI placement and lesions like important white matter disease or cortical dysplasia/polymicrogyria/pachygyria must be excluded. Acquired pathology (pneumococcus/meningococcus meningiis or labyrinthitis, pachymeningitis, trauma...) and concomitant pathology (e.g. schwannomas, cholesteatoma...) must also be excluded.

Take Home Points:
- MR and CT are complementary
- Check if the cochlea is accessible/implantable
- Verify on MR if the cochlear branch of the VIIIth nerve is normal
- Make sure that the auditory pathways and cortex are intact
- Exclude concomittant pathology

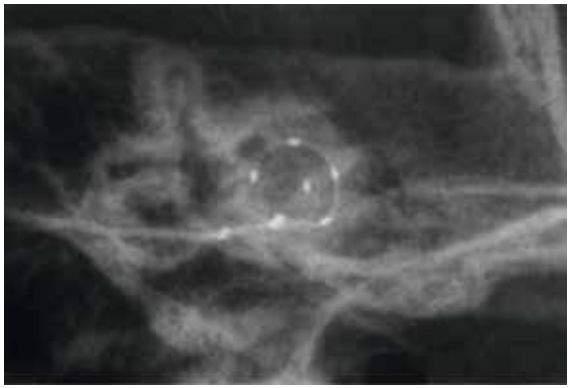
Keywords: Cochlear implant, Inner ear anomalies, Cochleovestibular nerve aplasia

SS 9.3.
Post-therapeutic assessment

Ch. Czerny; Vienna/AT

Short Summary: *Introduction:* To describe the imaging findings of the correctly and improper inserted implant electrode on conventional radiographs and computed tomography (CT). Furthermore, the accuracy, radiation dose, and economic efficiency of digital radiographs in one projection (modified Chausse III) and computed tomography in the postoperative assessment of multichannel cochlear implants are presented.
Imaging Methods: Patients having received multichannel cochlear implants undergo digital radiography or in unclear cases CT to delineate the postoperative imaging appearance of the implant electrode. The position and insertion depth of the cochlear implant electrodes of all patients are examined by digital radiography and in some cases by CT, and these findings were compared with the surgical findings. The radiation dose and time of investigation of digital radiography and the CT examinations were measured, and the costs of each modality were calculated. These data are presented in this manuscript.
Imaging findings: Radiographic findings are found to be similar to the CT findings regarding the detection of the correct and incorrect electrode position. The number of windings and the angle of insertion covered by the electrode measured on the x-rays corresponded well to the findings of CT (r=0.90). Excellent correlation exists between the radiological and surgical results with regard to insertion depth (r=.92). The radiation dose of one CT examination is about 230 times higher than that of one radiographic examination, and the examination time of one CT was 20 times longer than that of one x-ray. The costs for one CT examination are about 5.5 times higher than those of one x-ray in Austria.
Conclusion: As the data and the descriptions clearly delineate, digital radiographs enable accurate assessment of the cochlear implant electrode position and insertion depth correlated to surgical results and compared to CT. The radiation dose and the costs of the examination are considerably lower than those of CT, and these facts might favour the use of digital radiographs for the postoperative assessment of multichannel cochlear implants.

Take Home Points:
- Computed tomography
- Plain radiograph
- Multichannel cochlear implant



Digital radiograph in modified Chausse III projection of multichannel cochlear implant shows incomplete inserted implant electrode.

Keywords: Computed tomography, Plain radiograph, Multichannel cochlear implant

SS 9.4.
Can we perform MRI after cochlear implantation?

F. Dubrulle; Lille/FR

Short Summary: The number of patients with a cochlear implant increases considerably every year. These patients can, in the majority of cases, benefit from a MR examination (up to 1.5-T), after indispensable agreement of the manufacturer of the implant and of a medical staff. All the external equipment must be removed. The internal equipment can be left in position, maintained by an external contention for the 3 main manufacturers of cochlear implant devices implanted in Europe representing 85% of implants. In the last 15 years, several studies have shown no major incidents in MRI examinations using field strengths up to 1.5T: no significant temperature changes or electronic malfunction, no pathologic level of phenomenon of force, torque or currents induced in the implant Strict instructions are however to respect, in particular the location of the head in the magnet and within the zone of 30 centimetres before the entry to the magnet, to minimise the risk of demagnetisation. The factors influencing this demagnetisation are explainable and are found in relation to the angle between the two magnetic fields (of the implant bi and of the main MRI field b0), directly related to the lateral tilting of the head. As soon as the angle b0/bi is greater than 90°, the risk of demagnetisation exists. A single manufacturer, representing around 15% of the cochlear implants set up in Europe, requires the surgical removal of the internal magnet before authorizing a 1.5 MR Imaging. The preliminary results on cochlear implants with non-removable magnets indicate the need to maintain the contraindication of passage through 3-T MRI because of a very high risk of demagnetisation. At 3-T MRI scanner, if the angle bi/b0 is >90°, there is demagnetisation in almost 60% of the cases. When the angle is around 90°, which corresponds to the normal position of the head during an examination, the risk of demagnetisation is low but well present (around 7%).

Take Home Points: With a cochlear implant, patients can benefit from 1.5-T MRI with manufacturer's and medical staff's agreement. 3-T MRI is counter indicated nowadays for non removable magnet.

Keywords: Cochlear implant, MRI, Recommendations

SOPS 4.1.
In vivo evaluation of intra-cochlear position of cochlear implants by coregistration of preoperative 7 Tesla MR images and postoperative CT images

A. Van Der Jagt, R. Koning, W. Brink, A. Webb, J. Briaire, J. Frijns, B. Verbist; Leiden/NL

Short Summary: A successful evaluation of electrode array localization in 8 cochlear implant patients was performed using registrated preoperative 7 Tesla MR images and postoperative CT images.

Purpose/Objectives: To investigate the evaluation of cochlear implant (CI) localisation using fused preoperative 7 Tesla (T) MR images and postoperative CT images. A growing interest exists in defining the occurrence of intra cochlear trauma and its precise extension in individual patients. A dislocation of the electrode array can cause damage to the basilar membrane and may affect speech perception outcomes. An important anatomical landmark to determine the localisation of the electrode array is the osseous spiral lamina, which indicates the boundary between the scala vestibuli and scala tympani, the latter being the intended location for the electrode array. This structure is well defined on high resolution 7T MRI of the cochlea, but not visible on postoperative CT images. Combining the complementary information of CT and MRI could improve evaluation of the localization and possible dislocation of the electrode array.

Methods and Materials: Eight patients with sensorineural hearing loss (SNHL) eligible for CI underwent a preoperative MR-examination of the inner ear on a 7T scanner. After cochlear implantation patients underwent a CT-scan. Registration of the pre- and postoperative images of these different modalities was performed using a rigid volume registration method carried out with AMIRA software. After registration a segmentation of the electrode contacts was performed and localisation of each electrode contact was determined.

Results: Registration of preoperative 7T MR images and postoperative CT images was successful in all cases using this rigid volume registration method. Surface renderings of the three semicircular canals were used for registration. Their dimensional shape was determined to be well suited for rigid body registration. Since the boundaries of the cochlear walls remain visible, a direct indication of accurate registration is available. The position of each electrode contact relative to the osseous spiral lamina was clearly visible.

Conclusion: Evaluating the localisation of cochlear implant electrode arrays can be accurately performed using a rigid volume registration method for fusion of 7T MR and postoperative CT images and allows for in vivo evaluation of intra-cochlear trauma following cochlear implantation.

Keywords: Cochlear implantation, Intra-cochlear trauma, High resolution 7T MRI, Rigid volume registration

SOPS 4.2.
Value of routine radiographic position assessment after cochlear implantation

F. Braun, T. Braun, J.M. Hempel, E. Krause, J. Müller, B. Ertl-Wagner; Munich/DE

Short Summary: We analysed the value of a routine radiographic position check after cochlear implantation and investigated whether an increased resistance during electrode insertion is a sufficient predictor of electrode misplacement. Our results indicate that nearly half of the cases of electrode misplacement would have been overlooked if radiographic position checks would have been performed only in patients with intraoperative conspicuities during electrode insertion. This finding advocates routine postoperative radiographic position assessment, although electrode misplacements are relatively rare in patients with regular inner ear anatomy.

Purpose/Objectives: To analyse the value of a routine X-ray position check after cochlear implantation and to investigate whether an increased resistance during electrode insertion is a sufficient predictor of electrode misplacement.

Methods and Materials: In a retrospective approach, plain X-rays (Stenvers projection) and the respective surgery reports of 243 ears having received cochlear implantation were analysed for possible electrode misplacements and intraoperative conspicuities during electrode insertion. Electrode displacements were categorized into severe and minor categories; within the minor category, tip over, loop, kinking, scalar transition and incomplete insertion of the electrode was differentiated.

Results: In the entire cohort, minor forms of electrode misplacement (tip over, loop, kinking, scalar transition, incomplete insertion) were found in 8 %. When patients with inner ear dysplasia or labyrinthine ossification were excluded, minor forms of electrode misplacement were seen in 5 %. No cases of severe misplacement were observed. Intraoperatively, an increased resistance during electrode insertion was found in 16 %, but only in 6 % when cases with inner ear dysplasia or labyrinthine ossification were excluded. Intraoperative findings had a sensitivity of 55 % and a specificity of 88% for predicting radiographically confirmed electrode misplacements; thus, the positive predictive value was 29 %, and the negative predicting value 96 %. When excluding the cases with inner ear dysplasia or labyrinthine ossification, the sensitivity was even lower.

Conclusion: Nearly half of the cases of electrode misplacement would have been overlooked if radiographic position checks would have been performed only in patients with intraoperative conspicuities during electrode insertion. This finding advocates routine postoperative radiographic position assessment, although electrode misplacements are relatively rare in patients with regular inner ear anatomy.

Keywords: Cochlear implant, Electrode misplacement, Position check, X-ray

SOPS 4.3.
The value of HASTE diffusion-weighted MRI in the long-term monitoring for cholesteatoma recurrence following tympanomastoid surgery

S. Pal, P.Y. Wong, R. Lingam, A. Singh; London/UK

Short Summary: Non – echoplanar diffusion-weighted MRI (DW MRI) has an established role in the detection of post-operative cholesteatoma and has replaced second look surgery in many institutions. Our aim is to provide further evidence to support long-term DW MRI surveillance in patients following surgery in cases where initial follow-up DWI was negative. This study supports the use of DW MR imaging as a non-invasive method of monitoring patients who have undergone tympanomastoid surgery for cholesteatoma, especially with negative DWI at 9-12 months post -operatively.

Purpose/Objectives: Non – echoplanar diffusion-weighted MRI (DW MRI) has an established role in the detection of post-operative cholesteatoma and has replaced second look surgery in many institutions. Its main limitation is in its sensitivity to detect small cholesteatoma less than 3mm. Our aim is to provide further evidence to support long-term DW MRI surveillance in patients following surgery in cases where initial follow-up DWI was negative.

Methods and Materials: We performed a retrospective observational study between 2009 and 2014. All patients that underwent HASTE DW MRI imaging following tympanomastoid surgery (n>150) for cholesteatoma were included. DW MRI was performed at 12 months post operatively and further re-look surgery was planned according to clinical, otoscopic and radiological findings. DW MRI was also performed annually thereafter to monitor disease recurrence.

Results: Our results reconfirmed the high sensitivity (88%) and specificity (93%) in the detection of post –operative cholesteatoma. Those who had negative DW MRI 12 months following surgery and did not have relook surgery for various reasons, the true positive rate was 86% and false negative rate was 14% at interval scanning at 2 year, 3 year and 4 years.

Conclusion: This study supports the use of non –echoplanar HASTE DW MR imaging as a non-invasive method of monitoring patients who have undergone tympanomastoid surgery for cholesteatoma, especially with negative DWI at 9–12 months post -operatively. This is especially useful in older patients with extensive co-morbidities. Currently we recommend, as a safe approach, a 3 years of annual post-operative imaging using DW MRI following an initial negative scan (at 9–12 months) to accurately detect any disease recurrence.

Keywords: Cholesteatoma, Surveillance, Diffusion weighted MRI

SOPS 4.4.
Untreated middle ear cholesteatoma: monitoring progression with non-echoplanar diffusion weighted imaging

S. Pal, P.Y. Wong, A. Singh, R. Lingam; London/UK

Short Summary: This is a small observational study of 6 cases of untreated middle ear cleft cholesteatoma monitored radiologically with non-echoplanar HASTE DWI over a period of time to evaluate disease progression. This study demonstrates variable outcome in disease progression, with less than half of the cases demonstrating disease progression, therefore suggests a possible role for the use of non-echoplanar DWI in the monitoring disease in patients who did not have surgery for various reasons.

Purpose/Objectives: To evaluate disease progression of primary cholesteatoma in a cohort of patients who did not have surgery and underwent serial monitoring with non-echoplanar diffusion-weighted magnetic resonance imaging (DW MRI)

Methods and Materials: Retrospective review of 6 cases of middle ear cleft cholesteatoma diagnosed between 2009 and 2011 where surgery was not performed (medically unfit for surgery). All cases were monitored radiologically with non-echoplanar HASTE DWI annually for a median period of 22 months (between 7 to 35 months) to evaluate for changes in size and extent.

Results: Of the 6 patients, 2 patients had radiological evidence of cholesteatoma regression in terms of size and extent, with one case having negative follow-up DWI scans as early as 7 months. The other patient had a reduction of 7mm in size of the cholesteatoma on imaging after 35 months. In two cases, the DWI appearance remained unchanged. The remaining 2 cases progressed with mean increase in size of 2mm over 22 months extending from epitympanum to mesotympanum.

Conclusion: This small observational study demonstrates variable outcome in disease progression, with less than half of the cases demonstrating disease progression. This study therefore suggests a possible role for the use of non-echoplanar DWI in the monitoring disease in patients who did not have surgery for various reasons.

Keywords: Management, Diffusion-weighted imaging, Monitor, Cholesteatoma

SOPS 4.5.
Middle ear cholesteatoma – is extent of disease related to disease recurrence following surgery?

R. Lingam, P.Y. Wong, S. Pal, A. Singh; London/UK

Short Summary: This observational study aims to evaluate the association between the extent of primary cholesteatoma and the risk of recurrence following surgery. 24 cases of primary middle ear cleft cholesteatoma diagnosed between 2009 and 2011 that were treated with middle ear surgery were monitored initially at 9 -12 months, and if negative, for up to 36 months to detect disease recurrence with non-echoplanar HASTE diffusion weighted magnetic resonance imaging (DWI MRI). Disease recurrence was correlated with the extent of primary disease. The results of this study demonstrates that extent of primary disease is related to disease recurrence, suggesting a need for risk stratification in selecting patients for longer term monitoring for disease recurrence.

Purpose/Objectives: To evaluate the association between the extent of primary cholesteatoma and the risk of recurrence following surgery.

Methods and Materials: Retrospective review of 24 cases of primary middle ear cleft cholesteatoma diagnosed between 2009 and 2011 that were treated with middle ear surgery. The initial location and extent of disease was recorded operatively. All cases were imaged with non-echoplanar HASTE diffusion weighted magnetic resonance imaging (DWI MRI) post-operatively, initially at 9 -12 months, and if negative, for up to 36 months to detect disease recurrence. Disease recurrence was correlated with extent of primary disease.

Results: Of the 24 patients, 33% (8) had radiological evidence of recurrence. 75% of those with recurrence had initial extensive disease involving both the middle ear cavity and mastoid. The remaining 25% had disease confined to the middle ear cavity only. The remaining 67% (16) had no evidence of radiological recurrence. 44% had initial extensive disease involving the middle ear cavity and mastoid, 12% had disease in the middle ear cavity and mastoid aditus and the remaining 44% had disease confined to the middle ear cavity only.

Conclusion: This observational study demonstrates that extent of primary disease is related to disease recurrence, suggesting a need for risk stratification in selecting patients for longer term monitoring for disease recurrence.

Keywords: Middle ear, Cholesteatoma, Extent of disease, Recurrence risk, Diffusion weighted MRI

SOPS 5.1.
Incidental findings from the sinuses in cone beam CT scans for routine dental assessment: a review of 14760 scans

A. Delantoni, A. Kondylidou, C. Angelopoulos; Thessaloniki/GR

Short Summary: A large number of CBCT scans which were made for general dental assessment (pre-implant assessment, TMJ assessment, dental pathology etc) were studied to evaluate and record the presence of findings from the para-nasal sinuses

Purpose/Objectives: The aim of the present study is to detect the incidence of para-nasal sinuses' pathology on a large number of CBCT scans which were made for general dental assessment (pre-implant assessment, TMJ assessment, dental pathology etc).

Methods and Materials: The radiologic findings of a total of 14760 CBCT scans were included in this investigation. These scans were sent for a radiologic consultation/interpretation to a Board certified oral and maxillofacial radiologist in a period of 4 yrs (2010-2012). 2523 scans were partially only including the sinuses (mostly maxillary and ethmoid) and 739 scans did not include the any of the para- nasal sinuses.

Results: In 1281 scans, there were inflammatory changes reported in the maxillary sinuses (873 unilateral and 408 bilateral). In 308 scans the inflammatory changes were rather extensive (the inflammation occupied more than 2/3 of the maxillary sinuses' volume). In 1873 scans, there were inflammatory changes reported in the ethmoid sinuses (mostly mild and

moderate). In 118 out of these scans, extensive ethmoid sinus inflammation was reported (the classification was based on the number of the ethmoid air-cells blocked by inflammation). In the frontal sinuses inflammatory changes were reported in a total of 53 scans (15 were extensive). Last, as far as it concerns the sphenoid sinuses there were 141 cases with reported inflammatory changes, 29 of which were rather extensive. Other reported findings included maxillary sinus aplasia (10 unilateral and 3bilateral), frontal sinus aplasia (96) and sphenoid sinus aplasia (12).

Conclusion: The data reported above show a high incidence rate of occult disease in the para-nasal sinuses which are frequently included in routine dental scans. This is in agreement with a number of published works. It is imperative that the entire diagnostic volume of CBCT scan be reviewed to assure that no significant findings are missed. The dentists should be aware of the pathology of the area and the radiologist should also review the pathology in dental scans.

Keywords: CBCT, Sinus pathology, Occult disease

SOPS 5.2.
Possibility of ultrasonography in high resolution in the diagnosis of diseases of the parotid salivary glands' duct system

Y. Vasilieva, M. Smyslenova, E. Privalova: Moscow/RU

Short Summary: The diagnosis, treatment and prevention of diseases of the parotid salivary glands are an important problem medicine. According to some authors, the prevalence of diseases of the parotid salivary glands' ranges from 3 to 24 % of the pathology of the maxillofacial region. The described method of ultrasonography allows assessing the condition of the duct system of gland, the presence of additional elements and inclusions, differential diagnosis between different types of pathological process.

Purpose/Objectives: The aim of this study was to identify opportunities of ultrasonography in high-resolution in the diagnosis of the duct system of the parotid glands (PSG).

Methods and Materials: A study was conducted in 48 patients aged 21 to 76 years with suspected disease of PSG. All patients were identified hemilesion of parotid gland. All patients were received high-resolution ultrasound (7-15 MHz transducer). In order to clarify the diagnosis and differential diagnosis (31 cases) it was performed tight contrasting of duct system of PSG with saline.

Results: This technique allowed us to expand the gland ducts and improve their visualisation. Ultrasonography of the PSG's ducts was performed during contrast administration and in deferred phase (after 1–5 minutes after drug administration). To confirm the results of the study patients were underwent multislice computed tomography (MSCT-sialography) with the introduction of radiopaque agent (Omnipaque). These methods revealed: angiosialitis - 13 patients, stricture of ductless - 2 patients, parenchymal sialoadenit - 11 patients, stones - 10 studied. In addition, in 12 cases there was diagnosed pathologies that didn't related to diseases of the duct system, namely lymphadenitis (5 cases), and the mass lesions of salivary glands (7 cases). Holding only ultrasonography in high-resolution was informative for 35 % of patients. Ultrasonography of PSG's duct system with contrast administration in 65 % of cases made it possible to obtain additional information and to verify the diagnosis. This technique is able to visualise the ductal tree to the capsule, which was confirmed by MSCT-sialography in 100 % of cases.

Conclusion: Method of choice in the diagnosis of diseases of the PSG's duct system may be ultrasound with contrast administration if there are contraindications to MSCT and to avoid radiation exposure.

Keywords: Ultrasonography, High-resolution, Parotid salivary glands, Duct system, MSCT-sialography, Contrast

SOPS 5.3.
Trabecular bone structure parameters from cone beam computed tomography data

E. Klintström[1], R. Moreno[1], T. Brismar[2], Ö. Smedby[1]; [1]Linköping/SE, [2]Stockholm/SE

Short Summary: 15 bone samples from the radius were examined by CBCT. Micro CT was used as reference when quantifying trabecular bone structures. All parameters from CBCT were strongly correlated to µCT, with correlation above 0.90. CBCT overestimated BV/TV and Tb.Th more than three times compared to µCT. Tb.Nd, Tb.Sp and Tb.N were underestimated.

Purpose/Objectives: CBCT is a clinical equipment, used in mandible, maxillofacial and temporal bone imaging. As the mandible is known to be involved in osteoporosis, objective calculations of bone structure parameters in the mandible may be useful in diagnosing osteoporosis. The aim of this in vitro study was to develop a method for quantitative assessment of trabecular bone micro architecture by using three-dimensional image processing to data acquired with CBCT using micro-computed tomography (µCT) as reference.

Methods and Materials: 15 bone samples from the radius, which like the mandible consists of trabecular bone enclosed in compact bone, were examined in the CBCT device Accuitomo FPD.Imaging protocols differed in tube current and voltage settings, rotation degree, voxel size, imaging area and rotation time. After segmentation, bone structure parameters; bone volume (BV/TV), trabecular thickness (Tb.Th), trabecular separation (Tb.Sp), trabecular number (Tb.N), trabecular nodes (Tb.Nd) and trabecular termini (Tb.Tm) were quantified. The calculations were performed on an ordinary PC with a MATLAB code developed in-house. Radiation doses were measured using a KAP-meter.

Results: CBCT overestimated BV/TV and Tb.Th more than three times compared to µCT. On the other hand Tb.Nd, Tb.Sp and Tb.N were underestimated. Tb.Tm was overestimated by the 80 µm voxels and underestimated by the 125 µm voxels. All parameters from CBCT were strongly correlated to µCT, with correlation coefficients above 0.90 for all studied parameters. The protocol with 180 degree rotation and 80 µm voxels showed the weakest correlation parameters. The radiation doses varied between 269 and 1153 mGycm².The protocol most often used in our clinical practice; 80 µm voxels, 40x40 mm volume, 85 kV, 5 mA and 360 degree rotation showed strong correlations with µCT and low dose.

Conclusion: The strong correlation between CBCT and micro CT regarding bone structure parameters indicates the possibility to quantify and monitor changes of trabecular bone microarchitecture by CBCT also in vivo.

Keywords: CBCT, Trabecular bone, Image processing, Micro CT, Osteoporosis

SOPS 5.4.
Age dependent indications of CBCT in head and neck imaging

Ch. Gueldner, M. Stutzki, I. Diogo, R. Leppek, M. Mandapathil, J. Werner; Marburg/DE

Short Summary: Indications of CBT with special focus on age dependent differences are analysed on 1808 patient images from 2012 and 2013.

Purpose/Objectives: Cone beam CT (CBCT) has been introduced in imaging of head and neck region about ten years ago. There is still no clarity about the indications and the differences to conventional computed tomography (CT). Weather CBCT is enough, is still unclear. Especially in paediatric group, relevance of CBCT is not evaluated.

Methods and Materials: Our department has experience with CBCT of 11 years. We are performing about 1100 examination per year and have no reviewed the data base of the years 2012 and 2013 looking for indications in dependence of the age. Additionally, the patient records were analysed for previous or additional imaging as well as clinical indication for CBCT imaging.

Results: 1808 patients could be evaluated. A previous imaging of the later visualised anatomic region was found in 53 cases (2.9%). These were CT (9), MRI (24) and conventional X-ray (20). Main region of interest was paranasal sinus (1458) and temporal bon (355). A scout imaging was performed in 988 cases (54.6%). A repetition of imaging due to technical difficulties or moving artefacts had to be done in 52 cases (2.9%). An additional imaging of the previous visualised anatomic region had to be performed in 50 cases (2.8%). These were CT (8), MRI (17) and conventional X-ray (25). Main indications were chronic rhinosinusitis (48.2%), simple midfacial traumatology (10.6%), and radiological control after cochlear implantation (9.0%) as well as chronic otitis media (5%). Significant differences could be seen between paediatric (< 18 years, 122 cases) and adult (> 18 years, 1686 cases) patients: chronic rhinosinusitis (26.2% vs. 49.8%), simple midfacial traumatology (41.0% vs. 8.4%), postoperative control after cochlear implantation (4.1% vs. 5.0%) and chronic otitis media (6.6% vs. 3.4%). Regarding the patient records, the imaging was basis for a following operation in 65.2% of the cases.

Conclusion: Visualisation of bony structures before surgery in chronic rhinosinusitis or chronic otitis media is still main goal of CBCT usage. In paediatric group, simple midfacial trauma is a frequent indication too. The need of additional imaging is rare.

Keywords: Cone beam CT, Imaging head and neck, Imaging paediatric ENT

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ORAL PRESENTATIONS

SOPS 5.5.
Prenatal diagnostics of cleft palate without palate visualisation: new ultrasound signs

A. Nadtochiy, M. Ageeva, N. Starikova; Moscow/RU

Short Summary: Based on the results of prenatal ultrasound examination of 37 foetuses with different forms of cleft lip and palate (CLP) on 19-24 weeks of gestation the new ultrasound symptoms of CP in foetus were described.

Purpose/Objectives: The improvement of prenatal diagnostics of cleft palate (CP) based on evaluation of foetuses tongue position and motility.

Methods and Materials: 37 foetuses with different forms of cleft lip and palate (CLP) on 19-24 weeks of gestation were undergone prenatal ultrasound examination: cleft lip and palate (CLP) foetuses – 29, cleft lip (CL) foetuses – 5, cleft palate (CP) foetuses – 3. 50 foetuses without CLP formed the control group. Tongue position and motility of foetuses were the objects of special study.

Results: In comparison with control group all of foetuses with CLP and CP had the abnormal tongue position and motility. All of foetuses with CL had the normal tongue position and motility.

Conclusion: Abnormal tongue position and motility in foetuses on 19-24 weeks of gestation testifies to the CP presence: with or without CL. Normal tongue position and motility in CL foetuses indicates the absence of CP. These signs are the new symptoms in foetuses CP ultrasound diagnostics.

Keywords: Prenatal ultrasound diagnostics, Cleft palate, Prenatal ultrasound diagnostics, Ultrasound diagnostics of cleft palate

SOPS 5.6.
MRI in planning and prognosis of SOAS orthodontic treatment in adults with distal occlusion

A. Nadtochiy, N. Khubulava; Moscow/RU

Short Summary: Based on the retrospective study of the results of orthodontic treatment of SOAS in 72 patients with distal occlusion the opportunities of MRI in panning and prognosis of treatment effectiveness were defined.

Purpose/Objectives: Specification of indications and contraindications for the SOAS orthodontic treatment of adults with distal occlusion based on MRI-data.

Methods and Materials: 72 patients (21-58 years old) with distal occlusion were undergone standard clinical examination and MRI before and after SOAS treatment. All patients were divided into 2 groups: Group 1 - 35 patients with distal occlusion and without SOAS; Group 2 - 37 patients with distal occlusion and with SOAS (I-II); 45 patients without significant occlusion abnormalities and without SOAS were undergone standard clinical examination and MRI and were included in Group C (control group). Following parameters of MRI-data

in central sagittal plane were analysed: Width (W) and Width Regularity (WR) of pharynx on the levels of Soft Palate (WSP) and Radix of Tongue (WRT). The orthodontics treatment was applied with FNTA and Damon bracket-system.

Results: Group C: range W = 6,0-11,9mm (in the interval 8,0-9,9mm = 55,6%); WR = 35,6%; WSP narrowing = 46,7%; WRT narrowing = 17,8%. Group 1: range W = 4,0-7,9mm (in the interval 6,0-7,9mm = 74,3%); WR = 25,7%; WSP narrowing = 34,3%; WRT narrowing = 40%. Group 2: range W = 0-5,9mm (in the interval 2,0-3,9mm = 45,9%); WR = 16,2%; WSP narrowing = 32,4%; WRT narrowing = 51,4%. Correlation between W (WSP or WRT) narrowing and severity of SOAS (I-II): W=0-1,9mm (I=44,4%; II=55,6%); W=2,0-3,9mm (I=70,6%; II=29,9%); W=4,0-5,9mm (I=72,2%; II=27,8%). Correlation between W (WR, WSP or WRT) narrowing and the effectiveness of SOAS orthodontic treatment (PR-positive result, NR-negative result): WR: PR=66,7%, NR=33,3%; WSP: PR=25%, NR=75%; WRT: PR=78,9%, NR=21,1%.

Conclusion: The effectiveness of SOAS orthodontic treatment of adults with distal occlusion depends on the variant of pharynx narrowing: in cases of WRT narrowing it gives 78,9% of positive results. MRI-data gives the possibilities for SOAS orthodontic treatment planning and prognosis.

Keywords: Sleep apnoe orthodontic treatment, Sleep obstructive apnoe syndrom, Magnetic resonance imaging, Sleep apnoe

SS 10.1.
Skull base foramina, anatomy and pathology

F. Benoudiba, J.L. Sarrazin; Le Kremlin-Bicêtre/FR

Short Summary: The main foramina and their containing are described. The anatomy will be divided into 3 levels of the skull base: the anterior level with the cribriform plate, and the foramen caecum, the middle level with the optic canal, the superior orbital fissure, the round and the oval foramen, the foramen spinosum and the foramen lacerum, the posterior level with the internal acoustic meatus, the jugular foramen, the hypoglossal foramen and the foramen magnum. Both CT scan and MRI will be used to study skull base foramen: CT scan showing the presence of the absence of the foramen and the bone modifications and MRI studying the contain and the pathology of the nerve or the vessel. A foramen can be missing, usually secondary to vascular abnormality, It can be enlarged usually due to a tumour location. The combination of multiple symptoms has a great value to locate the pathology

Take Home Points: A foramen exists only if the containing exists (vessel, nerve). The skull base is lined by meninges which explain all the meninges' pathologies. The couple CT and MRI is fundamental to explore foramen and nerves' pathologies. It's important to explore skull base foramen in case of nerves' pathologies.

Keywords: Skull base, Anatomy, Foramen, CT, MRI, Pathology

SS 10.2.
Petrous apex lesions

A. Borges; Lisbon/PT

Short Summary: The petrous apex is a complex anatomical region lying close to critical neuro-vascular structures, including the petrous carotid canal, cavernous sinus, Meckel's cave, geniculate ganglion and inner ear. Imaging is crucial for patient care as management depends on the specific disease process and neighbouring structures involved. Tailored imaging is mandatory to improve the diagnostic accuracy and for treatment planning, particularly when surgery or focused radiation is the treatment of choice and CT and MR are often used complementarily for this purpose. Radiologists should be aware of the main surgical approaches to the petrous apex and recognise the impact of lesion location upon surgical approach. The petrous apex is prone to a number of common anatomical variations and pseudolesions that can mimic pathology and should be readily recognised by radiologists. Disease processes may be intrinsic, originating primarily from the petrous apex proper or extrinsic arising from nearby structures, involving the petrous apex secondarily. Whereas expansion, remodelling and scalloping of bone feature slow growing processes, bone erosion and destruction are associated to rapidly growing, aggressive diseases. Most common petrous apex lesions are infectious/ inflammatory or developmental in nature and include apicitis, mucocele, cholesteatoma, cholesterol granuloma and osteomyelitis which can be differentiated on the basis of imaging and clinical presentation alone. Benign and malignant tumours follow in frequency and are only rarely intrinsic to the petrous apex. These can originate from bone, synchondrosis, meninges, cranial nerves and embryonic remnants and span a wide range of differential diagnoses. Metastatic disease should always be considered, particularly in the appropriate clinical setting. Cephaloceles and petrous carotid aneurysms although rare should be readily recognised on imaging grounds to avoid potentially harmful invasive procedures. Imaging features of common and uncommon apical lesions, appropriate tailoring of imaging technique and important issues in radiological reporting will be highlighted using a clinical case oriented format.

Take Home Points:
1. CT and MR have a complimentary role in the evaluation of petrous apex lesions
2. Tailored imaging is mandatory to increase the diagnostic yield 3. Lesion relationship with neighbouring structures impacts surgical approach

Keywords: Petrous apex anatomy, Petrous apex imaging, Petrous apex lesions

SS 10.3.
Olfactory tracks

V. Chong; Singapore/SG

Short Summary: The olfactory tract is seldom a topic of a lecture. This probably reflects the fact that olfaction is least appreciated of all the special senses. The olfactory system is often neglected in clinical examinations and this in turn makes the olfactory tract seldom a subject of special interest to radiologists. The olfactory epithelium is located in the upper part of the nasal cavity. The axons of these primary bipolar cells nerves pass through the cribriform

plate to synapse in the olfactory bulb. From the olfactory bulb, fibres travel along the olfactory tract to enter the brain just lateral to the optic chiasma. The central projections of these fibres are very widespread. The list of conditions that can cause olfactory disturbances is long. The most common causes include sino-nasal inflammatory diseases, allergic reactions and trauma. The incidence of traumatic anosmia is between 24% to 30% for severe head injuries and 15% to 19% for moderate injuries. The mechanism of injury is usually due to the shearing effects to the olfactory tract (and less commonly due to injuries in the central projection areas of smell). Esthesioneuroblastoma is the primary tumour arising from the olfactory tract. It is an uncommon malignancy. The tumour shows two peak incidence groups (between the age of 11 to 20 years and 51 to 60 years). It shows a high tendency for intracranial spread. Intracranial cystic changes are highly characteristic of this tumour. Apart from intracranial spread esthesioneuroblastoma may also metastasise to cervical lymph nodes. A wide variety of tumours can cause secondary involvement of the olfactory tract. The most common benign tumour to cause anosmia is meningioma. Sino-nasal malignant neoplasms frequently invade the olfactory tract. Surgical treatment of these lesions leads to total and permanent anosmia. MRI is the preferred imaging modality in the evaluation of olfactory tract lesions.

Take Home Points:
- Esthesioneuroblastoma is locally invasive and may spread to regional nodes
- The olfactory tract is often involved in shearing head injuries
- A wide variety of conditions can result in anosmia

Keywords: Esthesioneuroblastoma, Olfactory nerve, Olfactory tract, Anosmia

SS 11.1.
Can imaging differentiate between benign and malignant tumours?

A. Varoquaux, A. Reyre, T. Boussemart, N. Fahkry, J. Michel, G. Moulin; Marseille/FR

Short Summary: Parotid tumour incidence rate is under 3% of all ENT tumours. The WHO counts a large variety of histological types: 16 benign and 27 malign tumours types. Benign tumours are four times more frequent than malignant tumours. Among these, the pleiomorphic adenoma is the most common histological type, followed by the Warthin's tumour. Within the different malignant types, mucoepidermoid carcinomas are the most frequent followed by other carcinomas, lymphomas and sarcomas. Clinical assessment, imaging and fine needle cytology (FNAC) is the cornerstones of pre-treatment planning: radical parotidectomy with neck dissection is usually required for carcinoma, whereas benign tumours are usually treated by exofacial parotidectomy or polar parotidectomy. Furthermore salivary gland lymphomas and pseudo-tumours are not treated by surgery. Magnetic Resonance Imaging (MRI) is the pre-treatment imaging standard for salivary tumours. Its excellent contrast to noise ratio for soft tissue using conventional sequences (spin echo T1, T2 and T1 after gadolinium injection) is routinely used to describe macroscopic extension to deep spaces (eg. parapharyngeal), peri-neural spread (eg facial nerve), and nodal spread. Recently advanced imaging using T1 dynamic contrast enhancement (DCE), conventional diffusion weighted echoplanar imaging (DWI) and intravoxel incoherent motion (IVIM) were tested to help conventional MRI and clinical approaches for tissue characterisation. In this session, we will discuss what radiologist needs to know about salivary tumours, with special focus on added value of advanced imaging to predict malignancy and different histological subtypes.

Take Home Points: Non tumoural salivary lesions (pseudo-tumours) are usually diagnosed by clinical and US assessment. MRI prior to FNAC is used for extension and characterisation of salivary tumours. Advance MRI seem useful for salivary gland characterisation prior to treatment.

Keywords: Salivary gland, DWI MRI, DCE MRI, Pre-treatment assessment

SS 11.2.
Management of ductal lithiasis and stenosis

C. Chossegros, A. Varoquaux, G. Moulin; Marseille/FR

Short Summary: Salivary glands obstruction is a frequent symptom, with pain, swelling and infection. The challenge for the radiologist is to find the cause and to help the surgeons to perform the less invasive treatment. Lithiasis is the main cause, in more than 90% of submandibular obstruction and in 50% of parotid obstruction. Ductal stenosis is less frequent with 10% of submandibular obstruction and 50% of parotid obstruction. US has insufficient sensitivity and gives poor topographic results for the surgeon. CT scan gives over 90% of sensitivity on lithiasis with acuity for localisation and diameter evaluation. When CT is negative there is a high probability of stenosis. In such cases, sialoMRI or cone beam CT sialography are interesting. Sialendoscopy can be an alternative. When the cause of obstruction has been evaluated, it is time for treatment. For lithiasis, mini-invasive treatment is recommended in most cases: extra-corporeal lithotripsy, sialendoscopy and combined approach are firstly recommended with a decisional tree that helps to choose the best treatment in submandibular lithiasis and in parotid lithiasis. For stenosis, we prefer dilatation with sialography because the balloon that can be inserted is smaller, even if some cases cannot be dilated because of the ductal diameter that is too narrow. Balloon dilatation through sialendoscopy can be an alternative. In conclusion, radiologists and salivary gland surgeons must word hand in hand in order to know what the cause of the obstruction is and how to treat it as conservatively as possible

Take Home Points: Salivary glands obstruction is a symptom concerning 1% of population. Lithiasis is very well known as a cause of salivary obstruction. In some cases, no lithiasis is found because the cause is a ductal stenosis. CT scan is the best exam to localise and appreciate lithiasis. The main problem is to diagnose stenosis. Sialography, 3D sialography, sialoMRI and sialendoscopy are the only examination that help for stenosis diagnosis. Stenosis are found in 50% of parotid obstructive cases. Submandibular stenosis is unfrequent. For lithiasis, mini-invasive treatment such as extra-corporeal lithotripsy, sialendoscopy and combined approach are recommended in most cases For stenosis, we prefer high pressure balloon dilatation under sialography or sialendoscopy

Keywords: Salivary, Gland, Lithiasis, Mini-invasive, Stenosis, Obstruction

SS 11.3.
Sonoelastography of the salivary glands

C.Z. Karaman; Aydin/TR

Short Summary: Sonoelastography is a relatively new technique which depends on the elastic properties of soft tissues. With the implementation of elastography to the conventional ultrasonography systems, the technique became attractive for daily ultrasonography practice and research.
The technique of sonoelastography relies on the sonographic evaluation and characterisation of the degree and distribution of tissue changes, in respect to the applied mechanical force by the ultrasonographic probe to the area of interest. Images obtained from sonoelastography may be shown in different shades of grey or in colour.
Sonoelastography has been used in different parts of the body, such as breast, prostate, lymph nodes and thyroid. With the idea of malignant lesions being stiffer than benign or normal tissue, in these studies sonoelastography was mostly used to differentiate benign from malignant. There are relatively few publications regarding the use of sonoelastography in salivary gland imaging, focusing mostly on neoplasia.
The results of initial studies dealing with the value of sonoelastography in salivary gland tumours were somehow disappointing. In these studies most of the malignant lesions were found to be stiffer, but some benign lesions, a remarkable numbers of pleomorphic adenomas also showed malignant characteristics on sonoelastography. The reduced specificities of the method were discouraging. In another study with shear wave elastography, a recently developed technique which also allows quantitative analysis, there was significant overlap between the shear values obtained from benign and malignant lesions and the technique was accepted unreliable.
In another clinical study the authors tried to establish characteristic elastographic patterns for different types of lesions. In some but not all of the malignant lesions in their cohort they defined the “garland sign”, a reticular pattern of stiff areas covering the mass. This study also defined some other elastographic patterns which were observed frequently in specific benign lesions.

Take Home Points: To date sonoelastography seems to be inadequate alone in the diagnosis of salivary gland lesions. The technique needs further validation with new cohorts with large series. However it can be used as a supplementary to enhance ultrasounds diagnostic accuracy.

Keywords: Sonoelastography, Salivary glands, Head and neck

IS 2.1.
Paranasal sinuses

R. Maroldi; Brescia/IT

Short Summary: The interactive session on paranasal sinuses imaging will deal with:
1. technical aspects related to the use of CBCT
2. significant anatomy findings that need to be underlined as potentially increasing the risk of the endoscopic approach
3. imaging landmarks for endonasal surgery
4. complications of acute and chronic rhinosinusitis
5. imaging features of aggressive rhinosinusitis and fungal disease
6. the check list of findings to be reported in case of benign/malignant sinonasal neoplasms extending towards the frontal recess, the medial orbital wall, the sphenoid sinus, the anterior and central cranial fossa
7. post-treatment imaging survey: expected changes, late complications, recurrent disease.

Take Home Points:
- to learn the anatomical landmarks for endonasal simple and complex surgical approaches,
- to understand the basic signals of the bony framework (laminae & spongiotic bone), mucosa, secretions, fungal disease and tumour tissue on both CT and MR,
- to learn how to assemble a check-list based report for non-neoplastic and neoplastic lesions before endoscopic resection, open or hybrid approaches.

Keywords: Paranasal sinuses, CBCT, Chronic rhinosinusitis, Fungal disease, Sinonasal neoplasms

IS 2.2.
Temporal bone

F. Veillon; Strasbourg/FR

Short Summary: The way of reading the pathology of the temporal bone in imaging is new through and improvement of the spatial resolution in CBCT and most current CT scans. The 3 T MR units allow a better analysis of the posterior membranous labyrinth. The new CT and CBCT permit to diagnose the very small foci of otosclérosis (20 % of the cases). They appear with an increased thickness of the anterior part of the footplate associated with a small prevestibular hypodensity. A good knowledge of the normal CT variants of the anterior labyrinthine capsule allows diagnosing the small nests of hematopoietic tissues not to be mixed up with foci of otosclérosis. A simple CT knowledge of the position of the saccule and utricle in the vestibule permits to precise the position of prosthesis in the vestibule considering the posterior membranous labyrinth. In postoperative secondary cholesteatomas it is important to consider the T1 W and the diffusion W to avoid diagnosing false positive keratomas related to granulomas which can present a hypersignal in both sequences. An association beetween malformation, chronic otitis media and otosclérosis is possible and must always be checked. In MRI a new way of reading the inner ear analyses the perilymphatic cistern, the utricle and the saccule.

Take Home Points: The thickness of the footplate must always be studied with CT or CBCT in conductive hearing loss. It's possible to localise very simply the saccule and utricle in CT (even with old machines). It's easy to study the size and structure of the utricle and saccule with a 3T MR unit.

Keywords: Paranasal sinuses, CBCT, Chronic rhinosinusitis, Fungal disease, Sinonasal neoplasms Temporal bone, Ear, CT, MR

Saturday, September 27, 2014

SS 12.1.
IMRT in the larynx

M. Ozsahin; Lausanne/CH

Short Summary: Early-stage (T1,2 N0 M0) glottic squamous-cell carcinoma (SCC) is a highly curable disease when treated with simple parallel-opposed small-field radiotherapy (RT). There is no need of elective nodal irradiation given the low incidence of nodal disease. Acute and late radiation-induced toxicity is low. However, little attention has been given to vascular effects that can develop more than 10 years after radiotherapy. Carotid arteries are located near the clinical target volume (CTV), and receive high radiation doses when treated with 3D conformal RT. The major consequence of carotid irradiation is direct potential injury. Radiotherapy can be an independent risk factor for accelerating carotid atherogenesis, and increased rates of cerebrovascular incidents in those patients. The use of intensity-modulated RT (IMRT), volumetric modulated arc therapy (VMAT), or helical Tomotherapy makes it possible to create radiation treatment plans with sharp dose gradients between the glottic CTV and the carotid arteries. "Carotid-sparing" IMRT for early-stage glottic carcinoma can significantly reduce unnecessary radiation dose to the carotid arteries compared with conventional lateral fields while maintaining the same CTV coverage.

Take Home Points:
- Early-stage (T1,2 N0 M0) glottic squamous-cell carcinoma (SCC) is a highly curable disease treated with either surgery or radiation therapy (RT).
- High local control is obtained using conventional (3D) conformal RT techniques but it can be an independent risk factor for accelerating carotid atherogenesis, and increased rates of cerebrovascular incidents in those patients.
- The use of intensity-modulated RT (IMRT), volumetric modulated arc therapy (VMAT), or helical Tomotherapy makes it possible to create radiation treatment plans with sharp dose gradients between the target volume (glottis) and the carotid arteries.

Keywords: Early-stage larynx cancer, Imrt, Carotid sparing

SS 12.3.
Imaging findings after surgery

R. Maroldi; Brescia/IT

Short Summary: At present, a wide choice of surgical procedures has been conceived and validated to treat malignant neoplasm of the larynx or/and hypopharynx. The surgical techniques range from less invasive approaches, like trans-oral laser excision, to partial laryngectomies sparing laryngeal functions to demolitive procedures like total laryngectomy or pharyngo-laryngectomy, the latter requiring the reconstruction of digestive tract by mean of flap harvesting. A part from the immediate post-surgical complications that may require conventional imaging or CT for defective anastomoses or infection, imaging techniques are usually required to confirm and map relapsing disease which has already been demonstrated by endoscopy or to assess a newly formed submucosal bulging. With the exception of early glottic carcinoma where regional spread is unlikely, supraglottic or transglottic laryngeal neoplasm and hypopharyngeal neoplasm require to include in the follow up neck nodal stations and the lung (metastasis, metachronous neoplasm). According to the ELS guidelines for the follow up of laryngeal cancer, it is the tumour characteristics and the surgical margins that dictate the intensity of follow up. When the risk of loco-regional relapse is high a properly timed clinical follow up and a good patient's adherence are fundamental parts of care. MR has demonstrated to be superior to CT in detecting submucosal recurrences after conservative surgery, particularly after laser excision. The combination of T2 weighted sequences, DWI and surface coils may increase the reliability of MR. Partial laryngeal resection with complex reconstruction is generally associated with a poor patient's compliance. CT may provide information on cartilage unexpected abnormalities but may be insufficient to discriminate fibrosis from recurrences still confined within an intact residual cartilage framework. PET-CT should be employed to detect early recurrences after radical laryngeal and pharyngeal resection.

Take Home Points:
- to understand the soft/hard tissue changes and expected anatomy after conservative and radical surgical resection and reconstruction
- to learn the expected soft tissue and cartilage framework changes on CT and MR after laser excision and supracricoid laryngectomies
- to learn the expected imaging findings after crico-tracheal resection for chondrosarcoma
- to learn the pattern of neoplastic recurrences after total laryngectomy and pharyngo-laryngectomy

Keywords: Cancer of the larynx, Cancer of the hypopharynx, Laser excision, Supracricoid laryngectomy, Post-surgical findings, MR

RC 4
Traumatic head and neck emergency

M. Becker; Geneva/CH

Short Summary: The purpose of this lecture is to review the most common types of traumatic injuries seen in the extracranial head and neck. First, practical aspects of CT and MRI in the emergency situation will be discussed, followed by a brief discussion of priorities when dealing with fractures and soft tissue injuries. A systematic discussion will include key radiologic features of the most common types of facial fractures (blow-out fractures, tripod fractures, Le Fort type I, II and III, latero- facial fractures, mandibular fractures, as well as pan-facial fractures). Associated injuries of the ocular muscles, globe, lacrimal sac, arterial and venous vascular structures, base of the skull and dura, as well as cranial nerves will be discussed with an emphasis on the early detection of lesions. The detection of foreign bodies with CT or MRI will also be briefly addressed. In the neck, vascular injuries and laryngeal and hypopharyngeal trauma will be discussed focussing on the added value of 3D reconstructions. Major emphasis is put on what the clinician needs to know and how to report the findings in a comprehensive way.

Take Home Points:

1. To become familiar with common presentations of neck trauma presenting in the emergency situation.
2. To learn to describe the pertinent radiologic findings and to identify related complications.
3. To be able to adapt the examination protocol depending on the type of lesion suspected.

Keywords: Head and neck, Trauma, Injury

RC 5
Non-traumatic head and neck emergency

B. Verbist; Leiden/NL

Short Summary: Non-traumatic head and neck emergencies may be life-threatening or cause severe functional deficits if not appropriately diagnosed and treated. This lecture will focus on infectious and inflammatory diseases of the face and neck. Clinical presentations warranting emergent imaging will be discussed. Imaging findings, patterns of spread and complications of acute diseases of the paranasal sinuses and the neck will be discussed

Learning objectives:

- To understand patterns of spread in infectious-inflammatory disease of the face and neck
- To become familiar with imaging features of possible complications
- To recognise findings requiring emergent action

Keywords: Emergency radiology, Head and neck, Infection, Oropharynx, Paranasal sinus

SS 13.1.
Imaging of the eye in children

O. Berges[1], M. Elmaleh-Bergès[1], P. De Graaf[2], P. Dureau[1], H. Brisse[1]; [1]Paris/FR, [2]Amsterdam/NL

Short Summary: MRI is best for evaluating anophthalmos, since it provides good information about the microscopic vesicle, but also about the other orbital structures, optic nerve and chiasm. Cataract (congenital, but also post-traumatic) is the domain of US. As in the adult, biometry is indicated if implantation is considered and posterior segment evaluation (vitreous, retina, ocular wall, papilla and optic nerve) as soon as fundoscopy is limited. If associated with microphthalmos, Persistent Fetal Vasculature (PFV) is frequent. Congenital Corneal Opacities (CCO) are well explored by Very High Frequency Ultrasound (VHFU - 50 MHz) of the anterior segment. Leucocoria, white pupil, may be related to malignant retinoblastoma, but also to other conditions: pseudo-retinoblastoma or pseudo-gliomas. US assisted by Colour Doppler Imaging (CDI) settle down diagnosis after fundoscopy under General Anesthesia. In case of Retinoblastoma, MRI confirms diagnosis but is mostly essential for analysing extension to optic nerve and localization to brain parenchyma. MRI well discloses PFV, retinal detachment and vitreal-retinal dysplasia, but US and CDI performed after clinical examination in the operating room provides in addition vascular and functional evaluation. Other intra-ocular tumours (angiomas, medullo-épitheliomas, juvenile xanthogranulomas and rare choroidal melanomas) beneficiate of US (± VHFU) ± MRI before treatment. US ± CT scan is useful in case of ocular traumatisms (contusion, perforation, foreign body). They often are more severe than in adults.

Take Home Points: MRI and echography (US) are the two main imaging modalities of the eye. Information given in the report must help therapy planning. US is often the first procedure, and resolves most of problems, especially if associated with CDI or HFU. Multi-purpose units with broad band frequency probes allow more definition and are often more informative than ophthalmological units. US is essential in case of cataract, CCO, leucocoria and in the work-up of any ocular mass: Therefore, it is worthwhile to learn and master orbital US MRI brings a lot, if of excellent quality: mainly for retinoblastoma, the other causes of leucocoria and the work-up of an ocular mass. Sometimes, CT can be used in case of ocular traumatisms (foreign body).

Keywords: Magnetic resonance imaging, Echography, Tumours, Disorders, Eye, Child

SS 13.2.
Eye emergencies

F. Lafitte; Paris/FR

Short Summary: For a matter of time, only the post-traumatic emergencies will be detailed in this presentation. Orbital lesions will be also presented with eyeball injuries, since they are often associated. Secondary complications will be also discussed. In case of orbital traumatism, CT is the best imaging tool and should be performed in emergency in case of vision lost, diplopia, important contusion of the eyeball, or if a cranial injury is associated. Fractures (especially of the medial and inferior walls) are frequent, as well as pneumo-orbit and muscular incarceration. One must also to overlook orbital hematoma, optic nerve injury

(sometimes with avulsion or rupture), or presence of foreign bodies. Ocular traumatism can be associated with ocular lesions or isolated. Sonography must be performed to search especially for intra-ocular haemorrhage, iris or ciliary body lesions, lens luxation, choroidal or retinal detachment, parietal hematoma, foreign body, scleral rupture, or optic nerve avulsion. Secondary complications can occur as infections or carotido-cavernous fistulae. MRI is sometimes useful.

Take Home Points: Clinical examination is important to choose the best imaging tool (plain CT for orbital screening, sonography for eyeball injuries) and to decide if they are required in emergency. Plain radiographies are not useful any more.

Keywords: Orbit, Eye, Traumatism, Emergencies

SS 13.3.
Orbital tumours in children

P. De Graaf; Amsterdam/NL

Short Summary: The spectrum of tumours and tumour-like lesions of the orbit in children differs from that in adults. Also the distribution of benign vs. malignant tumours varies between paediatric age groups. In newborns and young infants, vasculogenic lesions are the most common primary orbital mass lesions, whereas life-threatening malignant lesions become more prevalent in older age groups. Most of the orbital masses typically manifest with proptosis, and imaging differentiation is desirable because the treatments and prognoses vary greatly. Rhabdomyosarcoma is the most common orbital tumour of childhood. This neoplasm grows quite rapidly, and is fairly vascular. The clinical presentation and imaging characteristics are presented. Infantile haemangioma, a true neoplasm, and venous-lymphatic malformation, a developmental anomaly are the two most common vascular lesions in the paediatric patient. Haemangioma is quite vascular, has a predictable course of proliferation followed by slow involution, and is distinguished on magnetic resonance (MR) images by the finding of flow voids within the mass and at its periphery. Venous-lymphatic malformation in the orbit is an anomaly of venous and lymphatic development that is characterised by unenhancing, cystic lymphatic and enhancing, solid venous components. Intralesional haemorrhage is common and can an acute worsening of clinical symptoms and presents with distinctive fluid-fluid levels within the cystic portions on MRI. Unlike haemangioma, venous-lymphatic malformations grow with the patient and never involute spontaneously.

Take Home Points:
- The imaging features of the most common orbital masses in children are described.
- Features of orbital masses that may allow differentiation from other orbital tumours in children are presented.
- The differential diagnosis of orbital masses and management of paediatric patients with these conditions are briefly discussed.

Keywords: Orbit, Tumour, Paediatric, MRI

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SS 13.4.
Orbital and ocular tumours in the adult

N. Freling; Amsterdam/NL

Short Summary: Orbital tumours are relatively rare. Due to symptoms – proptosis, double vision, loss of vision – relative early detection of an orbital tumour is possible. Imaging plays an important role in decision making regarding further diagnostic and treatment strategies. Clinicians expect primarily careful assessment of the localization of the lesion –to decide whether a biopsy can be performed. Some areas are more prone to complications than others and therefore it is important to identify the quadrant where the centre of the lesion is located and its relationship to the orbital apex. To evaluate the optimal treatment strategy – surgery, medical or radiation treatment or a combination of these – extension of the lesion within and beyond the orbit is important to assess: e.g. involvement of extra-ocular muscles, the optic nerve or the lacrimal system, perineural extension to the cavernous sinus, intracranial extension involving the dura and the bone or extraorbital extension via the inferior orbital fissure into the deep spaces of the face. Localisation and extension will direct the approach for biopsy or surgical treatment but will also influence the choice of the radiation field. The distance between the lesion and the contralateral optic nerve and chiasm or the pituitary gland can be critical. Characteristic aspects on MRI and CT may sometimes lead to a final diagnosis, avoiding potentially devastating complications of an intra-orbital biopsy. MRI before and after contrast enhancement with fat suppression in at least 3 different planes is the imaging method of first choice. For differential diagnosis correlation with age, sex and medical history is mandatory. Good cooperation between orbital surgeon and radiologist is required for optimal patient care. Ocular tumours are mainly seen by the ophthalmologist but may be an incidental finding. Ocular ultrasound, sometimes followed by MRI using dedicated surface coils, may provide a diagnosis but also be a road map for biopsy.

Take Home Points: Define the localisation of the lesion describe the extension within the orbit and beyond describe characteristic aspects: cystic vs. solid, vascular vs non-vascular, bone involvement and correlate with age, sex and medical history look for malignant signs (perineural spread, bone destruction, extra-orbital extension)

Keywords: Orbit, Tumours, Imaging

SL 1.1.
What I missed and why

M. Mack; Munich/DE

Short Summary: This lecture will give you an overview of diagnosis which can be missed easily. The reason for missed diagnosis can be variable and include the following:
- The radiologists know only common disease
- Radiologists are only able to diagnose lesions, which they have seen before.
- Radiologist didn´t get the full clinical information
- Lack of time
- Radiologists can have the “hammer-and-nail” bias

- Radiologists want to save money by not doing an additional examination (e.g. with another modality)
- Radiologists have different skill levels

Take Home Points: To learn strategies to avoid mistakes

Keywords: Head and neck, CT and MR imaging, Mistakes

SL 1.2.
What I misinterpreted and why

R. Kohler; Geneva/CH

Short Summary: Cognitive errors (to be distinguished from perceptual errors) represent findings that are seen by the radiologist but their meaning and significance is incorrectly interpreted, thus leading to wrong conclusions as well as false positive diagnoses. In this lecture we will discuss some situations typically associated with wrong diagnosis: normal anatomical variants and lack of knowledge of normal anatomy, poor clinical information, artefacts and factors related to the practice of radiology like inadequate injection protocol, window setting or field of view. Perfect radiological interpretations are unfortunately illusory owing to the complexity of the anatomy as well as the variety of pathologies and clinical presentations, without speaking of external factors like poor communication between clinicians and radiologists. However, this objective can be approached only when all the above-discussed conditions are avoided or at least improved.

Take Home Points: Cognitive errors lead to wrong conclusions and false positive radiological interpretations. The causes of misinterpretations are multifactorial and either internal or external to the radiologist. Only awareness of the mechanism of misinterpretations may contribute to better radiological diagnoses.

Keywords: Radiological practice, Error, Misinterpretation

SL 1.3.
How to deal with missed diagnoses or misinterpretation of findings

S. Golding; Oxford/UK

Short Summary: The radiologist's best defence against errors of practice is to be well informed and to practice conscientiously. Prevention is better than cure and good practice is underpinned by insisting on accurate referral information and by interviewing the patient if possible. However in spite of these moves it is a fact of radiological practice that even the best radiologist will at times make errors of diagnosis or interpretation. This presentation addresses the issues that arise when errors occur, as follows:

1. How significant is an individual error? How can we allow for justifiable differences of opinion?
2. How best can departments conduct clinical quality assurance to demonstrate their service standards?
3. How best can the individual radiologist monitor their performance and demonstrate their competence?
4. Is there a case for dual reporting of examinations? 5. What action should be taken if a colleague is found to have made an error?
6. How should consistently poor performance be managed?
7. How should detected errors be documented and acted upon? Is there always a responsibility of disclosure? Where does responsibility for this reside?
8. What responsibility has the radiologist to ensure that the clinician acts appropriately on their report? 9. When patients take legal action for alleged negligence, how can the responsibilities of the radiologist best be met?

Take Home Points: All radiologists make mistakes. Not all mistakes are clinically relevant. Departments that conduct clinical audit protect their standard of care. Individual radiologists need to monitor their work. When errors are detected clinical action may be needed. Definite mistakes are best managed openly and honestly.

Keywords: Reporting error, Clinical discrepancy, Radiological audit, Medical malpractice, Peer review

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ORAL PRESENTATIONS

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POSTER

Educational Poster

EP-1 Dental Cone Beam CT: a primer for clinical radiologists
F. Vanhoenacker[1], C. Vanhoenacker[1], L. Vannitsen[1], A. Bernaerts[2], M. Vansevenant[1], F. Catry[1], S. Dekeyzer[1], K. Chapelle[1]; [1]Duffel/BE, [2]Wilrijk/BE

EP-2 Current issues on radiation exposure in head and neck conventional computed tomography examinations
D. Hadnadjev Šimonji[1], S. Stojanović[1], S. Sotirović Seničar[1], D. Arandjić[2], D. Nićiforović[1], M. Basta Nikolic[1]; [1]Novi Sad/RS, [2]Belgrade/RS

EP-3 Related chest pathologies for H&N patients
D. Gibson; LY/UK

EP-4 Diagnostic significance of laryngeal cartilage calcifications
D. Hadnadjev Šimonji, S. Sotirović Seničar, S. Stojanović, A. Spasić, M. Radić; Novi Sad/RS

EP-5 Don't lose sight of the non traumatic orbital emergencies
S. Sureshbabu, R. Vaidhyanath; Leicester/UK

EP-6 How to avoid to be lost in the darkness of the tympanic cavity in MR Imaging
M. De Almeida Cavalcanti, A. Venkatasamy, F. Veillon, S. Riehm; Strasbourg/FR

EP-7 Craniosynostosis: it's more than just sutures
K.A. Eley; Cambridge/UK

EP-8 A Snapshot of facial nerve imaging
T.S. Kumar, P. Mundada, B.S. Purohit, T.Y. Tan; Singapore/SG

EP-9 Evaluating external auditory canal disease – how and when imaging can add value
S. Pal, R. Lingam, P.Y. Wong, A. Singh; London/UK

EP-10 MRI of acute mastoiditis: a pictorial review
R. Saat, G. Mahmood, A. Laulajainen-Hongisto, A. Markkola, J. Jero; Helsinki/FI

EP-11 Intralaminar tumor-like lipomatous lesion of the thyroid cartilage
M.A. Oztek, O. Kizilca, G. Arslan; Antalya/TR

EP-12 How making the body beautiful influences the quality of dentomaxillofacial radiographs
I. Rozylo-Kalinowska, K. Gruszka, T.K. Rozylo; Lublin/PL

EP-13 Rapid prototyping in manufacturing of medical models in maxillofacial applications
I. Rozylo-Kalinowska[1], S. Miechowicz[2], S. Isaryk[3]; [1]Lublin/PL, [2]Rzeszow/PL, [3]Bydgoszcz/PL

EP-14 Understanding imaging in mandibular fracture
N. Chen, A. Somanathan; Kogarah/AU

EP-15 White knight, eggshell, spongiform, colloid cyst and their "zombies"
A. Germano[1], W. Schmitt[2], E. Rodrigues[2] I. Sapinho[3]; [1]Barcarena/PT, [2]Amadora/PT, [3]Lisbon/PT

EP-16 Systemic findings of dental patients on periapical, ortopantomography and Cone Beam Computerised Tomography.
A. Tekin; İstanbul/TR

EP-17 Head and neck lesions with low signal intensity on T2 weighted images – a pictorial essay.
E.M. Santiago Gebrim, B. Casola Olivetti, A. Maia Filho, M. Sarpi, M. Ricardo Taveira Garcia, F. Issa Cevasco, M. Miguel Daniel, R. Lúcia Elia Gomes; São Paulo/BR

EP-18 Peripheral Ossifying Fibroma: case based diagnostic approach using CT and MRI
U. Toprak, D. Ciliz, A. Erdogan, M. Ozcan, S. Guresci; Ankara/TR

EP-19 Surgical approaches and postoperative analysis of the temporal bone – what radiologists need to know.
E. Gebrim, M. Sarpi, M. Garcia, A.C. Fonseca, R. Ferreira, R. Gomes; São Paulo/BR

EP-20 Anatomic variants of the anterior skull base and paranasal sinuses
C. Gueldner, M. Mandapathil, I. Diogo, R. Leppek, J. Werner; Marburg/DE

EP-21 Close cooperation between ENT surgeon and imaging specialist reduced the risks during ultrasound guided biopsy in the management of head and neck masses
M. Dumitru, I. Anghel, A. Costache, A.G. Anghel, C. Sarafoleanu; Bucharest/RO

EP-22 Carcinoma of the larynx – a sonographic pictorial review
M. Dumitru, I. Anghel, A. Costache, A.G. Anghel, C. Sarafoleanu; Bucharest/RO

EP-23 The ligaments of the ossicular chain: review of the anatomy of the middle ear
C. Soares, D. Araujo Jr, D.V. Sumi, M. Garcia, R. Gomes, M. Dalaqua, M. Daniel, M. Funari; São Paulo/BR

EP-24 Nasal anomalies review with CT or MRI: from congenital to malignant.
A. Lo Casto, P. Purpura, F. Lo Russo, C. Gagliardo, G. La Tona, R. Speciale; Palermo/IT

EP-25 Neck abscesses and identification of their location with a CT scan
T. Vadivoulis, V. Mouka, D. Toliopoulos, P. Kosta, I. Papageorgioy, M. Argyropoulou; Ioannina/GR

EP-26 Pitfalls of PET-CT in head and neck imaging
C.R. Soares, J.P.B.C. Lima, D.V. Sumi, R. Gomes, M.R.T. Garcia, M. Dalaqua, M.M. Daniel, M.B.G. Funari; São Paulo/BR

EP-27 Patterns of benign sinonasal disease with anatomic correlation
S. Qureshi, A. Jaly, G. Potter, F. Singh; Manchester/UK

POSTER

Scientific Poster

SP-1 Persistent primitive hypoglossal artery (PPHA) associated with mycotic pseudoaneurysm of the extracranial internal carotid artery (ICA)
C.L. Ho, L. Mcadory; Singapore/SG

SP-2 Soft tissue calcifications with cone beam CT of the maxillofacial region: a retrospective study
E. Izgi, F. Namdar Pekiner; İstanbul/TR

SP-3 Changes of temporal bone in patients with cleft lip and palate in CBCT imaging
I. Ivanova, L. Sangaeva; Moscow/RU

SP-4 Imaging characteristics of ameloblastomas using CT and MRI
S. Apajalahti, J. Kelppe, J. Hagström; Helsinki/FI

SP-5 Major salivary glands elasticity assessed by Acoustic Radiation Force Impulse (ARFI): is there difference in age and gender in healthy population?
A. Samier-Guerin, M. Nonent, M. Ollivier, A. Saraux, L. Bressolette, S. Jousse-Joulin; Brest/FR

SP-6 Radiology diagnosis of certain diseases causes pain syndrome in the dental system
N. Solonskaya, I. Zorina; Moscow/RU

SP-7 Ultrasound examinations of superficial lesions of oral mucosa and maxillofacial soft tissues
I. Rozylo-Kalinowska, T.K. Rozylo; Lublin/PL

SP-8 Nasal septal cyst revealed by CBCT
A. Sinanoglu[1], B. Sacak[2], H.K. Turkoz[2]; [1]Kocaeli/TR, [2]Istanbul/TR

SP-9 Cone-Beam evaluation of styloid process morphology
I. Rozylo-Kalinowska, J. Krawczyk, A. Bozyk, A. Wiktor-Stoma, P. Mieszkowski, J. Borowicz; Lublin/PL

SP-10 Larynx squamous cell carcinoma: radiologic-pathologic correlation
M.L. Fernandes Pita, C. Gomes, M. Roque, S. Palma, A.R. Santos, A.M. Palha, I. Távora; Lisbon/PT

SP-11 Microfocal rontgenography in dynamic control in patients with cleft lip and palate after bone grafting
V. Petrovskaya, N. Blokhina; Moscow/RU

SP-12 An audit of the role '4D' neck CT in the detection of parathyroid pathology
N. Bashar, S. Smith; Ipswich/UK

SP-13 Incidental findings on cone beam computed tomography in dental patients
M. Misirli[1], K. Orhan[2], E. Hincal[1]; [1]Mersin /TR, [2]Ankara/TR

SP-14 Shear wave elastography of head and neck region in healthy volunteers
J. Vomáčka, I. Stárek, R. Salzman; Olomouc/CZ

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SP-15 Combined ultrasound and elastography for the diagnosis of metastatic lymph nodes in papillary thyroid carcinoma: comparison with contrast-enhanced CT
D.M. Kim; Daejeon/KR

SP-16 Detection of extracranial head and neck tumors classified T1 and T2: comparaison of the diagnostic performances of MRI and FDG-PET/CT.
M. Ollivier, J. Rousset, A. Samier-Guerin, V. Tissot, N. Keromnes, P. Robin, R. Abgral; Brest/FR

SP-17 Abscesses of soft tissues of the neck: MDCT findings
T. Kontaki, A. Kotoula, C. Gkizas, D. Siskas, C. Pozoukidis; Kozani/GR

SP-18 CBCT findings of the florid osseous dysplasia of the mandible
D. Helvacioglu-Yigit, F. Coskunses, A. Sinanoglu, B. Yaprak, B. Müezzinoglu; Kocaeli/TR

SP-19 Minor ossicular anomalies in the middle ear: role of submillimeter multislice computed tomography
T. Nakasato, T. Nakayama, M. Nakayama, S. Ehara, H. Ohtsuka, H. Sato; Morioka/JP

SP-20 Simultaneous glomus tympanicum and contralateral cerebellopontine angle meningioma in a case: clinical and radiological findings
H. Yerli, E. Gezmis, E. Eski, E. Aydin; Izmir/TR

SP-21 Osteoblastoma of the mandible: a case report with emphasis of imaging features.
M. Izumisawa[1], T. Nakayama[2], T. Nakasato[2], S. Kogi[2], H. Mizuki[2], S. Ehara[2]; [1]Morioka, Iwate/JP, [2]Morioka/JP

SP-22 Ultrasound-guided Injection of Botulinum Toxin-A in the treatment of sialorrhoea in patient with atypical Parkinson's Disease: case report
H. Yerli, E. Aydin, E. Gezmis, A.M. Agildere; Izmir/TR

SP-23 Thyroid microcarcinomas selection for ultrasound guided fine needle aspiration cytology (FNAC)
A. Germano[1], W. Schmitt[1], L. Lampreia[2], E. Rodrigues[2], P. Otero[2]; [1]Barcarena/PT, [2]Amadora/PT

SP-24 Intraparotid facial nerve schwannoma: target sign
G. Yilmaz Ovali, S. Tarhan, M. Bulut, F. Düzgün; Manisa/TR

SP-25 SINCONAPP: a computerized learning tool for CBCT normal anatomy and variants of the nose and paranasal sinuses.
A. Lo Casto, A. Farruggia, P. Purpura, F. Di Naro, C. Lunetta, G. Valenti, S. Vitabile, G. La Tona; Palermo/IT

SP-26 Unilateral submandibular gland aplasia with sialolithiasis perforating the floor of the mouth
H. Yerli, I.A. Guvenc, E. Eski; Izmir/TR

SP-27 Feasibility of CT-guided percutaneous gastrostomy for advanced head and neck cancer patients.
A. Tamura; Morioka/JP

POSTER

SP-28 CT and MRI findings of the temporal bone in CHARGE syndrome: aspects of importance in cochlear implant surgery
B. Verbist[3], H. Westerlaan[1], A. Vesseur[2], R. Free[1], F. Kloostra[1], R. Admiraal[2], C. Van Ravenswaaij[1], E. Mylanus[2]; [1]Groningen/NL, [2]Nijmegen/NL, [3]Leiden/NL

SP-29 Skull base chondroma misdiagnosed as paraganglioma
N. Pyatigorskaya, F. Ouamer, N. Cornu, B. Magnin, D. Dormont; Paris/FR

SP-30 Patient survey on neck FNA's at a regional head and neck cancer centre
A. Gupta, B. Murray, S. Mcpherson, S. Karthik; Leeds/UK

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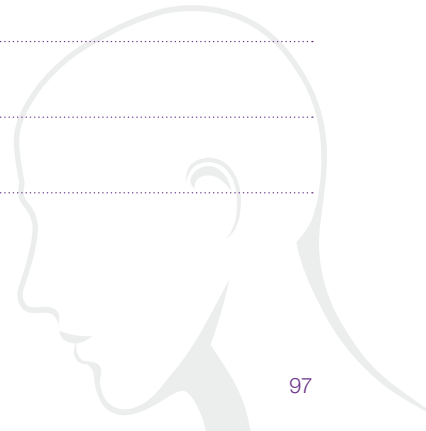

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It is for the audience to determine whether the presenter's external interest may reflect a possible bias in either the work carried out or the conclusions presented.

None of the Local Organising/Scientific Committee members disclosed any relations.

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