Neuroradiology (2012) 54:81–93
DOI 10.1007/s00234-011-0982-8

ABSTRACTS

XL Annual Meeting of the Spanish Society of Neuroradiology (SENR)

20–22 October 2011, Bilbao, Spain

C0032

Do non-enhancing hypointense lesions (black holes) add information to MRI criteria for dissemination in space in clinically isolated syndromes?

Raquel Mitjana Penella[1], Mar Tintoré[1], Cristina Auger Acosta[1], Massimo Filippi[2], Maria Assunta Rocca[2], Frederik Barkhof[3], Chris Polman[3], Franz Fazekas[4], Xavier Montalban[1], Alex Rovira Cañellas[1]

[1]Hospital Universitari Vall d'Hebrón (Barcelona) Spain; [2]San Raffaele Scientific Institute and University (Milan) Italy; [3]VU University Medical Centre (Amsterdam) The Netherlands; [4]Medical University of Graz (Graz) Austria

Introduction/Purpose. To analyze the prevalence of non-enhancing black holes in a large population of CIS patients and its value for predicting early conversion to clinically definite MS (CDMS).
Material and Methods. Observational prospective multicentre study based on MRI data obtained on CIS patients coming from MAGNIMS centres. Inclusion criteria were: (1) a CIS suggestive of CNS demyelination; (2) age between 16 and 50; (3) onset of symptoms within 3 months of clinical examinations; (4) performance of a brain MR examination within the first 6 months after CIS. Patients were classified based on the number of Barkhof-Tintoré (BT) criteria fulfilled, and on the presence or absence of non-enhancing black holes.
Results. We included 520 patients (69% females) followed for a mean of 45.7 months. 219 patients (42,1%) converted to CDMS. 456 patients (87,7%) showed focal brain lesions of the type seen in MS. Criteria for dissemination in space (3–4 BT criteria) were fulfilled in 286 of these patients (62.7%). 189 of these patients showed at least one non-enhancing black hole (41.4%) (mean number 3,19; range:1–23). These proportions varied depending on the number of BT criteria fulfilled: 13% in patients with 0–2 BT criteria and 45% with 3–4 BT criteria.

Patients with non-enhancing black holes had a higher risk of conversion to CDMS (55.2% vs. 44.8%; hazard ratio [HR] 1.3; 95% confidence interval [CI] 1.0–1.8; p=0.031). However no significant increase of conversion to CDMS adjusted by number of BT criteria was associated with presence of non-enhancing black holes (HR 0.8; CI 0.6–1.0; p 0.094).
Conclusion. Presence of hypointense non-enhancing lesions on T1W images, which are frequent in CIS patients, does not increase the risk of early conversion to CDMS independently of number of BT criteria fulfilled.

C0037

3T-MRI diagnostic yield in patients with focal epilepsy

Silvana Sarria Estrada, Manuel Toledo Argany, Raquel Mitjana Penella, Estevo Santamarina Perez, Manuel Quintana, Xavier Salas Puig, Cristina Auger Acosta, Alex Rovira Cañellas

Hospital Universitari Vall d'Hebrón (Barcelona) Spain

Introduction/Purpose. To evaluate the 3T-MRI diagnostic yield to find cerebral lesions in focal epilepsy.
Material and Methods. From a database of 208 patients with epilepsy who consecutively underwent a 3T-MRI from January-2010 to June-2011, we selected those with focal epilepsy. MRI examination included T1 IR, fast T2, 3DFLAIR and 3D-MPRAGE sequences acquired in different orthogonal planes and oriented following temporal lobe axis. Perfusion-weighted imaging with arterial spin labelling was also obtained in the transverse plane. Relative cerebral blood flow in the ASL sequences was quantified over the structural lesions. The epileptogenic focus localization was determined according to the electroclinical data.
Results. We recruited 161 patients with a mean age of 42 years (range 16–84), 56% of them with drug-resistant epilepsy. MRI was normal in 52% of patients. Lesions more frequently observed were vascular lesions (15%), malformation of cortical development (11%), tumours (11%), residual lesions of previous brain injuries (11%) and mesial temporal sclerosis (6%). Undetermined lesions related to epiletogenic focus were seen in 12% of cases. Both the lobar localization and the lateralization of the epileptogenic focus, based on the electroclinical findings, had moderate to weak concordance with the final diagnostic after MRI (kappa 0.71 and 0.59 respectively). Overall, the ASL had a trend to show local hypoperfusion in the epileptogenic lesions (p=0.07). Patients over 71 years old were more likely to have vascular lesions as a cause of the epilepsy (specificity 98%).
Conclusion. 3T-MRI shows lesions in 48% of focal epilepsy. The data obtained from the MRI is relevant to localise the epileptogenic focus. Focal hypoperfusion can be seen in ASL over the epileptogenic lesions. Patients over 71 years old are likely to have vascular epilepsy.

C0038

Giant aneurysms: MRI findings (presentation of three cases)

Cesar Augusto Acevedo Silva, Cristina Auger Acosta, Raquel Mitjana Penella, Laura Frascheri Verzeli, Alex Rovira Cañellas

Hospital Universitari Vall d'Hebrón (Barcelona) Spain

Introduction/Purpose. Giant aneurysms (>2.5 cm) are unusual and represent 5% of all intracranial aneurysms. They have a female predominance and are more common between 30–60 years of age. These lesions usually present as masses and may mimic a slowly growing tumour. We showed our experience on MRI features of three cases of giant aneurysms.
Material and Methods. Three male patients (mean age 46 years), with angiographically and surgically documented giant aneurysms, were studied with contrast-enhanced MR imaging.
Results. The three aneurysms were located in the supraclinoid portion of the left internal carotid artery, at the junction of the left posterior communicating artery with the posterior cerebral artery, and in the left middle meningeal artery (proximal intracranial portion). A rounded polylobulated extraaxial mass was seen in all patients. The maximum diameters were 6.1, 4 and 3.7 cm, and they showed rim enhancement with a combination of central signal void surrounded by concentric layers of alternately high and low signal intensity than produce a heterogeneous laminated appearance representing mural thrombosis. Evidence of blood flow within the lumen of the aneurysm was detected in all patients. Tubular or spherical intraluminal signal void from rapid or turbulent flow was seen in one and two patients respectively. The three patients had good or excellent results post-treatment (endovascular treatment and surgery).
Conclusion. MRI is well study method for the evaluation of these lesions. This imaging modality is specific and non-invasive method than permits the appreciation of MR characteristics and facilitates radiologic recognition of its pathologic components.

C0039

Radiological and clinical manifestations of macrocephaly-capillary malformation (M-CM) syndrome

Paula Andrea Parra Ramírez[1], Angel Sánchez-Montañez García-Carpintero[2], Ignacio Delgado Álvarez[2], Susana Boronat Guerrero[2], Paola Cano Granda[2], Élida Vazquez Méndez[2]

[1]Hospital de Cáceres (Cáceres) Spain; [2]Hospital Universitari Vall d'Hebrón (Barcelona) Spain

Introduction/Purpose. Macrocephaly-Capillary Malformation (M-CM) is a syndrome of unknown etiology whose main clinical symptoms are macrocephaly and capillary malformations, which frequently occur in the philtrum, upper lip and nose, also found in limbs and trunk. Other features include neonatal hypotonia, developmental delay, hydrocephalus, overgrowth, polydactyly, body asymmetry and connective tissue disorders. The most valuable neuroimaging findings include white matter lesions, cerebral asymmetry, ventriculomegaly, cerebellar tonsillar herniation, cortical dysplasia and polymicrogyria. The pathogenesis of hydrocephalus and tonsillar herniation is attributed to a combination of several factors, being the initial event a cerebellar rapid growth difficulting and distorting the dynamics of cerebrospinal fluid.

To this date approximately 130 cases have been reported. The aim of this paper is to review the radiological findings of five patients with M-CM recently studied in our institution, conducting a review of the literature.

Material and Methods. We reviewed the medical records of five patients with M-CM from 2005 to the current date in our institution. We describe their clinical and radiological findings, particularly MRI, comparing with those described in the literature.
Results. The most common radiological findings in the five patients diagnosed with M-CM were tonsillar descent (5/5), ventriculomegaly (5/5), white matter lesions (4/5), dilated Virchow-Robin spaces (3/5), and abnormalities of venous sinuses and / or intracranial veins (3/5), findings consistent with those previously described.

The most frequent clinical manifestations in our series were macrocephaly (5/5), developmental delay (4/5), overgrowth (5/5) and cutaneous manifestations such as midline facial nevus flammeus (5/5).
Conclusions. The recognition of typical imaging findings of this entity is very important, especially in order to an early management of ventriculomegaly.

C0048

Is demyelination a sentinel sign of primary central nervous system lymphoma?

Antonio Mas Bonet[1], Diana Quiñones Tapia[2], Maria José Picado[1], Apolonia Moll[1], Salvador Miralbés[1], Marta Brell[1], Marta Couce[1]

[1]Son Espases (Mallorca) Spain; [2]Hospital del Rosario (Madrid) España

Introduction/Purpose. Primary Central Nervous lymphoma (PCNSL) is a challenging neuroradiological diagnosis with protean presentation and imaging findings. Large areas of demyelination on MRI in some patients with PCNSL have drawn our attention.
Material and Methods. A retrospective review of all pathologic proved cerebral lymphomas from two medical centers from the last 8 years was undertaken. In 9 cases prominent areas of demyelination were present on MRI.
Results. 22 cases were analyzed (20 biopsies and 2 necropsies). Clinical charts and imaging studies were reviewed (CT, MRI, DSA, MRS and other). All were diffuse large B cell lymphomas (CD20+). Immunohistochemical stains included: CD20, CD3, BCL2, BCL6, CD8, CD4, CD10, MIB1, ALK, and MUM1. All presented a variable degree of T-cell infiltrates (CD4+ or CD8+). 7 of the 9 patients with prominent areas of demyelination on MRI had histologic evidence of demyelination on biopsy (rarefaction of white matter, myelin loss, gliosis and axonal loss). 12 patients expressed both BCL6 and BCL2, and 10 of these survived over 6 months.
Conclusion. Enhancing lesions with areas of demyelination should suggest the diagnosis of lymphoma. Demyelination on MRI and biopsy should not exclude PCNSL. Radiologic leukoencephalopathy and histologic evidence of demyelination is more common in lymphomas expressing BCL2 and BCL6.

C0050

Unilateral contrast neurotoxicity after cardiac catheterization

Diana Quiñones Tapia[1], José Angel Cabrera[2], Eva Gonzalez Caballero[2], Beatriz Fuertes[2], Gonzalo Pizarro[2], Vicente Gomez Tello[1], Victoria Barrio Nebreda[1], Juan Viaño[1]

[1]Hospital del Rosario (Madrid) España; [2]Hospital Quirón (Madrid) España

Introduction/Purpose. We studied a case of single hemispheric contrast neurotoxicity after cardiac catheterization.
Material and Methods. A 80 female patient underwent a lengthy cardiac catheterization with 5 coronary stent placement, without

complications. Two hours later a mixed aphasia and right hemiplegic occurred. CT demonstrated cortical and subarachnoid hyperdensity interpreted as HSA. Symptoms subsided over the following hours and a control CT the following day was normal.

To demonstrate streaming and distribution of contrast reflux in the aorta a prospective review of 10 consecutive cardiac catheterizations was undertaken.

Results. Contrast neurotoxicity is related to blood brain barrier alteration and extravasation of contrast to the extracellular space. It occurs most frequently in the vertebro-basilar system. In the carotid circulation it has been described mainly associated with intra-arterial endovascular interventions (aneurysm or AVM), and in these cases the neurotoxicity occurs in that same vascular territory. The unilateral distribution of contrast and symptoms is unusual, since contrast was injected at the coronary ostium. Carotid Doppler revealed mild symetric bilateral arteriosclerotic bifurcation plaque. Hemodynamic streaming of dense angiographic contrast in the aortic arch can explain preferential distribution to the left carotid.

Conclusion. Cardiac catheterization may result in unilateral left hemispheric neurotoxicity related to the hemodynamics of contrast reflux in the supraaortic vessels.

C0059

Nonaneurysmal subarachnoid hemorrhage

Elisa Roldan Romero, Rafael Oteros Fernández, Antonio Cano Sánchez, Manuel José Ramos Gómez, Elvira Jimenez Gómez, Francisco de Asis Bravo Rodríguez, Fernando Delgado Acosta

Hospital Universitario Reina Sofía (Córdoba) Spain

Introduction/Purpose. The origin of the spontaneous subarachnoid haemorrhage (SAH) is variable. In about 80% of cases it is caused by rupture of an intracranial aneurysm, approximately 15% represents benign perimesencephalic SAH and the remaining 5% has diverse aetiologies. The purpose of our study is to analyze these causes of spontaneous nonaneurysmal SAH in our center.

Material and Methods. We retrospectively reviewed the cerebral angiograms performed in patients who suffered spontaneous SAH demonstrated on computed tomography (CT) from 2005 to February 2011 in our hospital.

Results. Two hundred and thirty-six patients with nontraumatic SAH confirmed by CT scan were examinated. All patients subsequently underwent 4-vessel cerebral angiography. One hundred and forty-nine patients (63.13%) were diagnosed to have aneurysms as the cause of bleeding. Nineteen patients (8%) had a nonaneurysmal source of bleeding. Causes of nonaneurysmal sah obtained in our review: Cerebral venous sinus thrombosis: 3; Cerebral cortical vein thrombosis: 3; Arterial disection: 3; Cerebral arteriovenous malformation: 2 ; Spinal arteriovenous malformation: 2; Vasculitis: 2; Intracranial arterial occlusion: 4. The remaining sixty-eight patients (28.8%) were found to have SAH without any identifiable intracranial cause in cerebral angiograms. None of these patients in whom the cause of the SAH has not been identified in the angiogram, has returned for rebleeding.

Many of these angiograms showed incidental findings not related to the SAH, such as atheromatosis, fetal carotid origin of the posterior cerebral arteries and other anatomic variants, infundibular origin of arteries, Takayasu disease, tympano-jugular glomus tumors, etc.

Conclusion. Most cases of spontaneous SAH are caused by rupture of a circle of Willis aneurysm. In our review we have found a nonaneurysmal reason of nontraumatic SAH in 8% of cases and no identifiable cause in 28.8%, higher percentages than what is described in the radiology literature. On the other hand, angiograms demonstrated many incidental findings not related to the bleeding.

C0060

Midbrain pathologic processes: A pictorial imaging review

Cristina Zorzo Sanchez, Maria Angeles Llosa Sanz, Beatriz Gonzalez Garcia, Antonio Barbosa Del Olmo, Alberto Mingo Basail

Hospital La Moraleja (Madrid) Spain

Introduction/Purpose. Midbrain has got an important role in brain because is a point of connection between the encephalus with other brainstem parts and spinal cord.In this exhibition we think over the spectrum of pathologies that can affect to midbrain.

Material and Methods. We make a review of pathologic processes that can affect to midbrain.

Results. The midbrain has got some particular conditions that feature differences respect others cerebral areas. For example, due to situation is specially exposed to traumatic lesions. Vascular ischemia pattern is different too. Midbrain tumours are not frequent, and usually have a benign behavior. Some neurodegenerative and metabolic diseases have predilection for midbrain.

Conclusions. In this exhibition we review the spectrum of pathology that can affect to midbrain, such as trauma, vascular, neurodegenerative, metabolic, toxic and tumoral diseases.

C0061

Combination of conventional MRI with diffusion, perfusion and proton MR spectroscopy in the assessment of brain tumoral grade

Juan Adán Guzmán de Villoria Lebiedziejewski[1], José María Mateos Pérez[2], Pilar Fernández García[1], Enrique Castro Reyes[1], Manuel Desco Menéndez[3]

[1]Hospital General Universitario Gregorio Marañón. Servicio de Radiodiagnóstico (Madrid) Spain; [2]Unidad de Cirugía y Medicina Experimental (Hospital General Universitario Gregorio Marañón). Centro de Investigación Biomédica en Red de Salud Mental (CIBERSAM) (Madrid) Spain; [3]Unidad de Cirugía y Medicina Experimental. (Hospital General Universitario Gregorio Marañón). Departamento de Bioingeniería e Ingeniería Aeroespacial (Universidad Carlos III de Madrid). Centro de Investigación Biomédica en Red de Salud Mental (CIBERSAM). (Madrid) Spain

Introduction/Purpose. The additional predicitive value of Perfusion Weighted Image (PWI), Diffusion Weiighted Image (DWI) of Proton MR Spectroscopy (1H-MRS) over conventional MRI in grading brain tumors is still debatable. Our aim was to quantify the improvement in diagnostic accurcacy for grading brain tumors offfered by the combination of MRI with PWI, DWI or 1H-MRS.

Material and Methods. 191 patient swith untreated intraacial brain tumors prospectively underwent conventional MRI, T2*-weighted PWI, DWI (b=2500 s/mm2) and single voxel 1H-MRS (TE 23/144 ms). Cases were divided into low degree (grades I and II of WHO classification) in 160 cases, confirmed by pathology and evolution. The presence of enhancement, necrosis, edema, neovascularization and haemorrhage was evaluated in conventional MRI. The relative Cerebral Blood Volume (rCBV), relative Apparent Diffusion Coefficient (rADC), Choline (Cho)/ Creatine (Cr); N-Acetyl-Aspartate (NAA)/Cr; Cho/H2O and NAA/H2O ratios and the presence of lipids and lactate were also determined.

Results. Significant differences were found in all conventional MRI features ($p<0.0001$; $p=0.008$ for necrosis), existence of lipids ($p<0.001$) and rCBV ($p<0.001$); rADC ($p<0.0001$); NAA/Cr ($p=0.005$) at short TE; Cho/Cr ($p=0.007$) at long TE. The multivariate analysis of MRI features determined as predictor variables of high degree the presence of enhancement (OR 21.57) and necrosis (OR 6.10), with an. area under the

ROC curve (AUC) of 0.871 (sensitivity 96.9%; specificity 67.6%). The combination that showed the best classification was the presence of enhancement (OR 23.81), necrosis (OR 5.29) and low rADC (OR 6.85) with an AUC of 0.931 (sensitivity 99.3%; specificity 73.3%)
Conclusion. The best model to diagnose high-grade tumors included enhancement, necrosis, and low rADC values when the spectroscopic data was excluded (sensitivity 99,3%; specificity 73.3%). The improvement to respect to the combination of conventional MRI features–enhancement and necrosis- was modest (sensitivity 96,9%; specificity 67,7%).

C0065

Strategies for angioplasty and stenting of carotid stenosis

Fernado Vázquez Herrero, Maria Virginia Trujillo Ariza, Maria Gabriela Tirapu De Sagrario, Alexandra Banguero Gutiérrez, Annelies Coessens, José Manuel Pumar Cebreiro

Hospital Clinico Universitario de Santiago de Compostela (A Coruña) Spain

Introduction/Purpose. To describe techniques and offer practical solutions to critical situations during endovascular treatment of carotid stenosis, directed to professionals with limited experience.
Material and Methods. We revised the clinical histories of all patients who were treated with angioplasty / stenting in our department in the last years. We evaluated all explorations presenting complications during standard procedures and offer strategies that should lead to successful treatment, especially for professionals with limited experience.
Results. In 33 patients out of 110 who were treated with angioplasty/ stenting of the carotid artery, there were difficulties during the standard procedure. Problems were related mainly to severe stenosis and vascular tortuosity. In all these cases we used alternative techniques, like the use of certain materials, previous dilation of the critical stenosis using micro-catheters, specific guiding catheters etc.
Conclusion. The use of certain materials as well as radial artery access contributes to successful endovascular treatment of carotid stenosis, especially in situations of vascular tortuosity or difficult femoral artery access.

C0066

Dual energy computed tomography angiography of the supraaortic arteries: 80/140 versus 100/140 KV-

Eloisa Santos Armentia, Daniel Castellón Plaza, Noelia Silva Priegue, Gonzalo Tardáguila de la Fuente, Raquel Prada González, Francisco Tardáguila Montero

Hospital Povisa (Pontevedra) Spain

Introduction/Purpose. To study the differences of dual energy CT angiography of supraaortic vessels on image quality, on the capability of bone removal and on radiation dose using different tube potentials (80/140 kV and 100/140 kV).
Materials and Methods. CTA performed between September, 2009 and April, 2011 were retrospectively reviewed. 13 consecutive patients were performed using 80/140 kV and 33 with 100/140 kV. Dual energy CT 128-slices was used, and dual energy post-processing was done using the "head bone removal" tool. The vascular tree was divided into 15 segments, and vessels quality was evaluated in each segment, studying too the capability of bone removal, both in MPR and in MIP images, differentiating cortical and the trabecular bone.
Results. 46 CTA of the supraortic vessels were performed (13 using 80/140 and 33 with 100/140 kV), with no statistically significant differences between both groups in age or sex. Statistically significant differences were present in the evaluation of vessels quality in four segments and in automatic bone removal, being superior in the 100/140 kV group. There were also statistically significant differences in radiation dose, superior in the 100/140 kV group.
Conclusion. Using 100/140 kV kV when performing a CTA of the supraaortic vessels result in statistically significant differences in quality when evaluating some arterial segments compared witn the 80/140 protocol. Significant differences where found too in automatic bone removal, being superior in the 100/140 group in MPR images in cortical bone and in MIP images in cortical and trabecular bone. However, it implies an increase in dose radiation (1.16 mSv with 80/140 kV and 1.59 mSv with 100/140) with statistically significant differences.

C0072

Fungal sinusitis: Apropos of a case and revision of the literature

Antonio Marín Cañete[1], Maria Rosa Cambra Martí[2], Albert Pujol Olmo[2], Nuria Rojo Sanchis[2], Bolivia Yadira Barragán Requena[2], Ana María Sánchez Laforga[2], Rafael Vera Llaó[2]

[1]Hospital Universitari Mutua Terrassa (Barcelona) Spain; [2]Hospital General - Parc Sanitari Sant Joan de Déu (Barcelona) Spain

Introduction/Purpose. We present the case of a male patient aged 78, insulin-dependent diabetic and hypercholesterolaemic, who came to our hospital with a two-month history of right hemicranial headache associated with right III cranial nerve paresis.
Materials and Methods. During the hospital stay we studied our patient with cranial CT, angio-CT and angio-MR. Given the scan results, surgical treatment was planned.
Results. Radiological findings showed occupation of the right portion on the sphenoidal sinus with signs of bone remodelation, specially in the right lateral wall, that contacted with the cavernous sinus and the right internal carotid artery, which was permeable. Right III cranial nerve paresis was attributed to an ischemic event probably secondary to his DM rather than the mucocele diagnosed. Characteristically, in the MR we found a really low-intensity central area of the mucocele. Surgery (sphenoidectomy and endoscopic biopsy of the sphenoid sinus) confirmed the fungal nature of the mucocele (aspergiloma).
Conclusion. Fungal sinusitis is an important clinical entity with several forms of presentation. We must distinguish between the non-invasive and the invasive sinusitis, as the second may simulate aggressive tumoral pathology. The classic presentation as "fungus ball" (mycetoma) is seen in most cases as a chronic sinusopathy of the maxillary sinus.

Knowing the different clinical presentations of fungal sinusitis and its characteristic radiological findings is a must for the radiologist, so the physician can be alerted and a accurate treatment can be given to the patient.

C0073

Cranio-cervical paragangliomas: Diagnostic imaging and percutaneous embolization

Antonio Marín Cañete[1], Cristina Corbella Sala[1], Josep Lluís Dolz Jordi[1], Andrea Elías Mas[1], Nuria Rojo Sanchis[2], Joan Perendreu Sans[3], Jordi Branera Pujol[3]

[1]Hospital Universitari Mutua Terrassa (Barcelona) Spain; [2]Hospital General - Parc Sanitari Sant Joan de Déu (Barcelona) Spain; [3]Corporació Sanitària Parc Taulí (Barcelona) Spain

Introduction/Purpose. We conducted a retrospective study of paragangliomas, especially cranio-cervical, diagnosed in our hospital

during the last 10 years, as well as assessing the effectiveness of preoperative treatment with endovascular embolization.
Materials and Methods. As part of the complex neuroendocrine sympathetic nervous system, the paraganglia plays unique baro/chemoregulatory and homeostasis functions through the secretion of vasoactive hormones. Paraganglia is composed by many organelles, many of them in the adrenal glands and some in extra-adrenal locations, the latter mostly found in 5 characteristic locations: carotid bodies, jugulo-tympanic space, aortic arch (Zuckerkandl body), coccygeal gland (of Luschka) and following the paravertebral sympathetic chains and the vagus nerve. Neoplasms typically known as glomus or chemodectomas, histologically benign and with locally aggressive behavior, arise from either adrenal or extra-adrenal paraganglia.
Results. We retrospectively evaluate a group of ten patients: 4 with a diagnosis of carotid glomus, 3 cases of jugulo-tympanic paraganglioma (one bilateral), one with mediastinal paraganglioma and also 2 patients with multiple paragangliomatosis (The first patient with a sacral body glomus+jugulo-tympanic+carotid (x2) glomus and the second one with an abdominal and also a jugulo-tympanic tumor). CT and MRI were performed in almost all patients; 6 of them subsequently received endovascular embolization prior to surgery. We review the diagnostic imaging (CT, MRI and conventional angiography) and percutaneous preoperative embolization.
Conclusion. Paragangliomas are neoplasms that show specific behaviour in CT, MRI and angiography imaging due to their hypervascularity. Therefore, preoperative endovascular procedures allow fast and effective treatment by embolization (either with coils, polyvinyl alcohol particles, etc.), with few side effects, making a potential surgery safer, faster and with lower complication rates.

C0074

Visual rating system for assessing medial temporal atrophy

Cesar Augusto Acevedo Silva, Silvana Sarria Estrada, Sahyly Siurana Montilva, Raquel Mitjana Penella, Laura Frascheri Verzeli, Cristina Auger Acosta, Alex Rovira Cañellas

Hospital Universitari Vall d'Hebrón (Barcelona) Spain

Introduction/Purpose. Scheltens et al. developed a visual rating system to grade the severity of atrophy in the medial temporal lobe (MTL), which distinguishes Alzheimer disease (AD) and normal elderly control subjects in a clinical setting. The goal of this study was to analyze the concordance of the Scheltens visual score among different radiologist from a single institution; a required step before implementing this scale in the clinical practice.
Materials and Methods. Fifty patients were included in this prospective study; 25 with "probable" AD or mild cognitive impairment (MCI), and 25 patients without cognitive impairment. All subjects underwent a brain MRI on a 1.5 or 3.0T magnets. Scheltens visual rating score (right and left medial temporal lobes) was performed independently by five radiologist, blinded to the clinical status of the patients. This assessment was done by visual analysis of six oblique slices (slice thickness 5 mm) obtained parallel to the brainstem axis using a T1-weighted inversion-recovery sequence. A concordance inter-observer (5 observers) and intra-observer (two observers) analysis was performed with SPSS 17.0 for Windows.
Results. 24 women's and 26 males with an age range of 65 to 88 years old (mean 74.2) were assessed. The degree of inter-observer correlation coefficient (CC) for the right MTL was 0.861 [0.797–0.911] and for the left MTL 0.838 [0.768–0.895]. Intra-observer CC for the right MTL was 0,879 [0,792–0,931] for one radiologist and 0.887 [0.809–0.934] for the other. For the left MTL the degree of intra-observer CC was 0.802 [0.566–0.901] and 0.828 [0.715–0.899] respectively.
Conclusion. Subjective visual assessment seems an easy and quick method for the evaluation of MTL atrophy and may be useful to support a clinical diagnosis of probable Alzheimer's disease. The good agreement rate among different observers and intra-observer supports its use in clinical practice.

C0078

Computer-aided tool for brain metastases detection using a template-matching algorithm

Úrsula Pérez-Ramírez, David Moratal, Estanislao Arana Fernandez de Moya

Center for Biomaterials and Tissue Engineering, Universitat Politècnica de València (Valencia) Spain

Introduction/Purpose. To develop an algorithm that allowed a semiautomatic detection of brain metastases from MR images
Materials and Methods. Magnetic resonance images (MRI) obtained with 1.5T scanner and a standard dose of gadobenate dimeglumine (0.1 mmol/kg body weight) was administered intravenously 10 min before acquisition of contiguous 2.4-mm spoiled gradient-recalled echo (SPGR). Several ellipsoidal tumour appearance templates were created using MATLAB software. For metastases detection, a three-dimensional normalized cross-correlation coefficient was calculated between the brain volume and the templates of varying radii using a fast frequency domain algorithm. A brain segmentation mask and an edge-based method were applied to reduce false positives outside and inside the patient's brain, respectively.
Results. Ten patients database containing a total of 45 brain metastases, showed a sensitivity of 93.33% and a false positive rate of 0.575. For metastases smaller than 10 mm in diameter, it was obtained a sensitivity and a false positive rate per metastases of 90.51% and 0.82, respectively. The rate was the same for the metastases between 10 mm and 20 mm, but the sensitivity decreased to 84.44%. A 53.57% of the metastases greater than 20 mm were detected.
Conclusion. This tool could be helpful for assisting radiologists in a more precise diagnosis of brain metastases

C0081

Spectrum of imaging findings in sinus disease: What can radiologists contribute?

Carlos Serrano Burgos[1], Víctor Pérez Riverola[1], Mario Prenafeta Moreno[1], Antoni Rovira Gols[1], Yolanda Escamilla Carpintero[2], M. Rosa Bella Cueto[1]

[1]UDIAT-CD. Corporació Sanitària Parc Taulí (Barcelona) España; [2]Consorci Sanitari Parc Tauli (Barcelona) España

Introduction/Purpose. Sinus disease is extremely prevalent. Although inflammatory conditions predominate, radiologists need to be familiar with other causes of sinus disease. To this end, this presentation aims to help radiologists recognize different findings so they can ensure the correct diagnostic approach to sinus disease.
Materials and Methods. We reviewed the imaging, histopathologic, and microbiologic findings in cases of sinus disease studied at our centre over a three-year period (2008–2010).
Results. To ensure the correct imaging approach to characterize sinus disease, radiologists must (1) have detailed knowledge about the normal anatomy and variants of the region; (2) systematically analyze

the characteristics of the occupation and/or secretions of the sinuses, as well as the localisation and type of calcifications when present; (3) identify any alterations or abnormalities in the bony structure of the paranasal sinuses; and (4) evaluate the presence of abnormal soft-tissue components within or outside the sinuses.
Conclusion. Although sinus disease is typically inflammatory, radiologists need to be familiar with different imaging findings to ensure the correct diagnosis of other pathological conditions.

C0082

CNS toxicity in children. Review

Angel Sánchez-Montañez García-Carpintero, David Armario Bel, Ignacio Delgado Álvarez, Luis Gros Subias, Miquel Raspall Chaure, Élida Vazquez Méndez

Hospital Vall d'Hebron, Servicio de Radiologia- Unidad RM (Barcelona) Spain

Introduction/Purpose. To review different radiological findings in paediatric CNS due to endogenous, both by excess and by default, and exogenous substances and make a differential diagnosis. To highlight the importance of establishing an early diagnosis of drug-related toxicity to minimise side effects and propose possible alternative treatments.
Materials and Methods. Imaging findings, particularly by MRI, in some cases of paediatric CNS toxicity seen at our centre in recent years are presented in a didactic manner. Endogenous factors that may give rise to a clinical-radiological picture include glucose deficiency, and ammonia, manganese or cooper accumulation. Metabolic diseases are aetiologies to be considered in any differential diagnosis, particularly when clinically suspected. Some cases of carbon monoxide or methanol poisoning are also included. Many pharmacological agents, such methotrexate, vigabatrin, etanercept, tacrolimus, radiation therapy, vincristine, L-asparaginase, cyclosporine, metrodinazole or benzodiazepines are used in oncology, infections, metabolic disorders, granulomatous diseases and epilepsy. We should be able to recognise their possible side effects when children being treated begin to present neurological symptoms.
Results. The most common conditions that have an impact on the CNS in childhood related to the use of different standard therapies in clinical practice, a well as some resulting from the deficiency of a substance are shown.
Conclusion. MRI is a highly useful tool for evaluating neurological manifestations caused by an excess or lack of some toxic substances in children. These entities should be taken into account when assessing a paediatric patient with onset of neurological symptoms in the emergency room department. As they often go underdiagnosed, it is therefore a great challenge for radiologists to know how to recognise them early for then to be treated and future complications prevented.

C0084

Holes in the skull: Computed tomography imaging characterization of lytic bone lesions in the skull - 5 cases and bibliographic review

Joana Barata Tavares[1], Carolina Mendes dos Santos[1], Ana Filipa Geraldo[1], Sofia Reimão[1], Marta Sousa[2], Graça Sá[1], Jorge Campos[1]

[1]Centro Hospitalar Lisboa Norte - Hospital de Santa Maria (Lisboa) Portugal; [2]Hospital do Espirito Santo de Évora (Évora) Portugal

Introduction/Purpose. Computed tomography (CT) scans of the brain are among the most frequently performed neuroradiologic exams, studying several pathologies, including the ones that affect the bone. There are several conditions associated with "holes in the skull", sometimes an incidental finding in an exam performed for a wide number of reasons. The main goal of this work was their identification and characterization.
Materials and Methods. The authors reviewed the CT imaging of bone lesions in five patients with lytic bone lesions in the skull, characterizing their differences and correlating these data with previous published studies namely regarding their possible causes. A review of the main conditions associated with lytic skull lesions, their differential diagnosis and imaging characteristics that help to identify the aetiology was then performed.
Results. Lytic skull lesions can be either solitary or multiple. The most common solitary holes are due to normal anatomic variants, surgical defects, trauma, dermoid or eosinophilic granuloma; however it is important to remember less common causes such as epidermoid, intradiploic meningioma or a leptomeningeal cyst. In the presence of multiple holes in skull the main differential diagnosis (apart anatomic variants and surgical defects) are metastasis, lymphoma and osteoporosis but hyperparathyroidism, multiple myeloma and osteomyelitis should also be included in the differential diagnosis.
Conclusion. CT brain images allow bone lesions identification, namely lytic lesions in the skull. The knowledge of their characteristics is extremely important to neuroradiologists as they often constitute important diagnostic clues in several pathologies.

C0087

Clinic and radiological reactivation of the disease in a patient with multiple sclerosis (MS), after natalizumab withdrawal

Miguel Yus Fuertes, Cristina Valencia Sánchez, Manuela Jorquera Moya, Virginia de las Heras Revilla, Rafael Arroyo González, Natividad Gómez Ruiz

Hospital Clínico San Carlos (Madrid) Spain

Introduction/Purpose. Natalizumab is a monoclonal antibody highly effective as treatment of relapsing MS patients. It's indicated when the first line inmunomodulatory treatment has failed, and in those patients with very agressive disease from the beginning. The most severe complication of the treatment with Natalizumab, is the development of progressive multifocal leukoencephalopathy (PML), associated with the JC virus (JCV). At this moment, the PML risk for each patient, is mainly dependent of the detection of anti-JCV antibodies in blood serum. Those patients with previous inmunosupression, Natalizumab treatment longer than 24 months, and positive anti-JCV antibodies have a PML stimated risk of 7,8/1000 (CI 95% 5,20–11,30). In this subgroup of relative high-risk patients, Natalizumab withdrawal is being considered.
Material and Methods. We present the magnetic resonance imaging (MRI) findings, in a patient with previously stable MS from the radiological and clinical point of view, with rapidly progressive neurological impairment 6 months after the interruption of Natalizumab, based on the inclusion in the high-risk subgroup for PML development.
Results. The MR study shows a large volume of hyperintense white-matter lesions in T2-weighted sequences, supra and infratentorial, of new apparition when compared with previous examinations, and most of them with contrast-enhancement.
Conclusion. Natalizumab withdrawal, because to a relative high-risk subgroup for PML development, can trigger a disease reactivation with severe clinical impairment in previously well controlled MS patients, secondary to the development of multiple new brain lesions, with radiological inflammatory activity evidence.

C0090

A practical approach to the differential diagnosis of lesions of the cerebellopontine angle

Antonio Cano Sánchez, Alejandro Gómez moran Ballesteros, Francisco de Asis Bravo Rodríguez, Leticia Rodriguez Garcia

Hospital Universitario Reina Sofía (Córdoba) Spain

Introduction/Purpose. The cerebellopontine angle is an anatomically complex area that is included in numerous neuroimaging studies and contains a large number of structures that are different in nature. Thus, it is also a place where we can find a wide range of pathologies. Our study's objective is to demonstrate, from a practical perspective, a diagnostic approach through radiological presentation which enables the accurate differentiation among the various lesions found in this space.
Material and Methods. We reviewed all cases that showed lesions of the cerebellopontine angle in our hospital from January 2007 to June 2010. Also, we have defined the radiological findings of the various pathologies through a literature review to determine the main characteristics of each.
Results. Despite the great variety of lesions found in the cerebellopontine angle, a small number of them will constitute 98% of the pathologies in this space, and only one, the acoustic neuroma, accounts for 75% of all cases.
Conclusions. An adequate knowledge of the radiological presentation of the lesions of the cerebellopontine angle, which takes the prevalence of different pathologies into account, is an approach that allows for accurate diagnosis.

C0091

Severe traumatic head injury: Prognostic value of brainstem injuries detected by MRI

Amaya Hilario, Alfonso Lagares, Elena Salvador Alvarez, Marta Cicuendez, Jose María Millán, Ana Ramos

Hospital Doce de Octubre (Madrid) Spain

Introduction/Purpose. Despite advances in radiology and clinical prognostic models, prognostic assessment in head trauma remains unclear. Using conventional MR sequences, detection of associated lesions to diffuse axonal injury has demonstrated of great utility as a prognostic factor. Brainstem injuries have been traditionally associated to worse prognosis. However, some patients with traumatic brainstem lesions have a benign course. The aim of this study is to correlate brainstem injuries detected by conventional MR with final outcome in patients with severe traumatic brain injury (TBI).
Material and Methods. We retrospectively reviewed the data obtained from patients with severe TBI and brainstem lesions admitted to our hospital between 2002 and 2011. MR imaging was obtained in the subacute phase of head injury (during the first 30 days after trauma).The MR imaging protocol included: T2-weighted FSE, FLAIR and gradient-echo T2*-weighted images in the axial plane. Lesion location and characteristics were determined on MR. The relationship between neuroimaging and outcome was estimated at least 6 months after injury using the dichotomized Glasgow Outcome Scale-Extended (GOSE): good outcome and bad outcome.
Results. The study population consisted of fifty-one patients with brainstem lesions after severe TBI. Lesions tend to occur more frequently in the mesencephalon (84%), followed by medulla oblongata (6%), pons (4%) and multiple locations (6%). Most lesions were hemorrhagic (64%) and unilateral (74%). According to final prognosis, sixteen patients with brainstem lesions showed god outcome. Bilateral lesions led to a poor outcome independent of location. Factors associated with worse prognosis were hemorrhage and posterior location in mesencephalic lesions.
Conclusion. Brainstem lesions detected at MR are not invariably associated with a bad outcome. Location, extension and lesion characteristics must be considered in the assessment of final outcome. A worse prognosis is associated with bilateral lesions.

C0093

Deep arteriovenous malformations. The experience at our center

Daniel Campodonico Opazo[1], Antonio López Rueda[1], Luis San Roman Manzanera[1], Juan Macho Fernández[1], Jordi Blasco Andaluz[1], Alejandro Tomasello Wietz[4]

[1]Hospital Clinic i Provincial (Barcelona) Spain; [2]Hospital San Pau (Barcelona) Spain

Introduction. Deep-seated AVMs, are lesions in which the nidus is largely within the ventricule and/or adjacent periventricular area. The most common presentation is intracranial hemorrage or epilepsy. Endovascular embolization is an increasingly common method to treat AVMs. We conducted a retrospective study to evaluate the treatment safety, occlusion rate and the overall neurologic complications
Materials and Methods. 14 patients with features of deep AVMs were treated endovascularly in our department (16% of all AVMs treated from January 2003 to September 2011) They were 11 men (78,5%) and 3 women (21,5%) with a mean age of 34,3 years. 12 of them all presented with intraventricular hemorrage (85,7%). 2 presented with seizures (14,3%). A total of 19 endovascular procedures were performed.
Results. The course of endovascular treatment was complete in all patients. In 5 patients (37,5%) we obtained a complete occlusion with angiographic cure achieved by using embolization as the sole therapeuthic technique. Parcial subtotal embolization rate was obtained in 7 patients (50%) (mean nidus occlusion 90%). Most of them underwent radiosurgical treatment of the residual nidus. In one patient we achieved an uncompleted occlusion (7.14%) (40% nidus reduction) in 4 embolization sessions. He was finally treated by radiosurgery. There were 3 procedure related complications with rupture of a feeder branch. 2 of them (14,2%) were controlled by embolization without clinical repercussion. 1 of them suffer an uncontrolled intraprocedure bleeding (Procedure Mortality 5,2%). We had 1 patient with post procedure bleeding. He was discharge with right leg plejia. (Procedure morbidity 5,2%).
Conclusion. Deep AVMs constitute a therapeutic challenge (deep localization, bleeding risk, size and number of feeders etc). Endovascular treatment alone or combined with either radiotherapy or surgery seems to represent an available and effective strategy for patients with a high rate of technical success and complete occlusion.

C0094

Carotid-cavernous sinus fistula; endovascular approach through the ophtalmic vein

Daniel Campodonico Opazo, Antonio López Rueda, Luis San Roman Manzanera, Juan Macho Fernández, Jordi Blasco Andaluz

Hospital Clinic i Provincial (Barcelona) Spain

Introduction/Purpose. Carotid-Cavernous sinus fistula (CCF) can be treated endovascularly by transvenous and/or transarterial

routes. Alternative vascular approach for embolization is required when is not feasible to reach this abnormal connection by this standard neurointerventional access (transarterial, inferior petrosal sinus).
Materials and Methods. A retrospective study of three patients with indirect CCF treated with transvenous embolization via the SOV was performed. All patients present with orbital and ophthalmic symptoms (Swelling, chemosis, diplopia, proptosis). Transarterial or transvenous approach was unsuccessful. Alternatively, surgical exposure and direct puncture of the Superior Ophtalmic Vein (SOV) was performed. This allow the retrograde micro-catheterization and delivery of platinum coils (in two cases) and Onyx 500 (one patient) to the fistula point
Results. Complete angiographic fistula obliteration and recovery of the clinical symptoms was achieved in all patients without complications.
Conclusion. The transvenous approach via the surgical exposure of a dilated S.O.V. is technically safe and effective and provides a valuable alternative in the treatment of CCF when other routes were unsuccessful.

C0096

Role of juxtacortical lesions in the diagnosis of multiple sclerosis

Albert Pla, Cristina Auger Acosta, Raquel Mitjana Penella, Deborah Pareto, Juan Francisco Corral, Alex Rovira Cañellas

Hospital Universitari Vall d'Hebrón (Barcelona) Spain

Introduction/Purpose. To evaluate the presence and the spatial distribution of cortico-juxtacortical lesions in patients diagnosed of a first clinical isolated syndrome (CIS) by using MRI-based lesion probability maps, and to determine its impact to diagnose lesion dissemination in space (DIS) according to the 2010 Mc Donald Criteria for multiple sclerosis (MS).
Materials and Methods. 49 patients (29 females) aged between 20 and 50 years old (mean 34y) with the diagnose of a first CIS (19 optic neuritis, 14 spinal cord syndromes, 13 brainstem syndromes and 3 cerebral hemispheric syndromes) underwent brain and spinal cord MRI scanning within the first 5 months symptoms onset. Brain MRI was obtained with a 3T magnet using a 32 channels head coil. The following sequences were obtained: 1) Transverse T2-weighted dual-echo fast-acquisition; 2) 2D Transverse T2-fast FLAIR; 3) 3D Sagittal T1 MPRAGE pulse sequence; 4) 3D transverse double inversion-recovery (DIR). All sequences 3 mm slice thickness (except MPRAGE 1 mm slice thickness). Cortico-juxtacortical lesions of each patient, defined as focal T2 hyperintensities within or in contact to the cortical ribbon, were identified, manually outlined and segmented into a binarized CL mask. A cortico-juxtacortical MRI-based lesion probability map was obtained.
Results. Cortico-juxtacortical lesions were identified in 22 patients (44.9%). Frontal lobe was the most affected area with an incidence of 60% of the lesions. Temporal lobe had also a significant incidence (22.4%). Lower incidence was detected on parietal (10%), insular (6%) and occipital lobes (1%). According to the MS 2010 McDonald diagnostic criteria, identification of cortico-juxtacortical lesion contributed to demonstrate lesions disseminated in space (DIS) in 6 of the 22 patients (27%).
Conclusion. Cortico-juxtacortical lesions are a common MRI finding in patients with a CIS, predominantly involving the frontal and temporal lobes. Its demonstration has a high relevance for the diagnosis of dissemination in space according to the MS 2010 McDonald diagnostic criteria.

C0098

Experience of leo stent in the treatment of wide-neck cranial aneurysms. Long term results

José Manuel Pumar Cebreiro, José Antonio Castiñeira Mourenza, Miguel Blanco Ulla, Maria Perez Alarcon, Maria Ageitos, Amadeo Arango, Annelies Coessens

Hospital Clinico Universitario de Santiago de Compostela (a Coruña) Spain

Introduction/Purpose. To evaluate the reliability, efficacy, and safety of the LEO stent, based on our long term experience, with special emphasis on technical problems, and recommendations for good positioning and liberation.
Materials and Methods. 64 patients, all of them diagnosed with wide-neck cranial aneurysms, were selected for stent implantation with or without coiling (42 ruptured aneurysms and 12 previously embolized aneurysms). There were 36 carotid/ophthalmic/cavernous aneurysms, 15 of the posterior communicating artery, 2 of the posterior cerebral artery, 2 of the basilar artery and 4 vertebral artery aneurysms. In general, the LEO stent was liberated and positioned without difficulties. An angiographic follow-up was performed at 6 months in all patients, at 1 year in 56 patients and at 2 years in 44 patients.
Results. In 90% of cases the selective embolization was successful with an excellent clinical follow-up. Coils were liberated without problems through the stent interstices or in parallel, without protrusion of coils becoming evident.

At long term follow-up (2 years) complete occlusion was shown in 90% of cases, the remaining 10% showing stable neck of aneurysm
Conclusion. According to our experience, the LEO stent is a useful and safe method for treating wide-neck aneurysms. Its main advantages are the possibility of repositioning, its easy liberation system and a greater radial force compared to other types of stents,

C0101

Magnetic resonance imaging in ataxia

Jose Mª Ontañon Garces, Iñigo Vicente Olabarria, Ibone Saralegui Prieto, Begoña Fernández Ruanova, Alberto Cabrera Zubizarreta

Osatek (Vizcaya)

Introduction/Purpose. Ataxia is manifested clinically by a wide-based unsteady gait, errors of extremity trajectory, errors in motor sequence or rhythm and/or by dysarthria. Tone is usually decreased and stretch reflexes can be "pendular." Nystagmus, skew deviation, disconjugate saccades, and altered ocular pursuit can be present. Ataxia can arise from disorders that involve cerebellum, spinal cord, brain stem, vestibular nuclei, thalamic nuclei, cerebral white matter, cortex, and peripheral sensory nerves.
Materials and Methods. Retrospectively reviewed the MRI of patients with ataxia performed in five diffetent centers between 1998 and mid 2011. All MRI were performed on a 1 or 1.5 T system (Siemens or Philips). The MRI protocols consisted of a conventional morphological MR study, in selected cases followed by sequences of perfusion and/or spectroscopy. A selection of the most representative cases of pathology responsible for ataxia is shown.
Results. The purpose here is to categorize the disorders that present with ataxia, and to suggest imaging objectives. We include patients with ataxia secondary to vascular lesions localized to the cerebellum, lateral medulla or pons, mesencephalon, red nucleus, thalamic nuclei

and posterior limb of the internal capsule, demyelinating disorders, trauma, mass lesions of the posterior fossa, congenital disorders such as Joubert syndrome, rhombencephalosynapsis, hereditary, idiopathic neurodegenarive disorders such as autosomal dominant spinocerebellar ataxias, or multi system atrophy, ataxia related to peripheral nerve diseases or to toxic exposure.
Conclusion. Disorders causing ataxia are numerous and often uncommon. These entities should be taken into account when studying a patient with ataxia.

C0103

Role of diffusion weighted imaging in head and neck lesions. A review

Iñigo Vicente Olabarria, Ibone Saralegui Prieto, Alberto Cabrera Zubizarreta, Jose Mª Ontañon Garces, Begoña Fernández Ruanova

Osatek (Vizcaya)

Introduction/Purpose. Palpable and non palpable neck lesions are frequently studied at present with CT and conventional MR imaging (using T1-weighted, Inversion recovery, T2-weighted and contrast enhanced images) for both as well as for biologic behavior characterization using imaging criteria, which include necrosis, invasion of adjacent structure, capsular invasion and perineural spread. However, in certain occasions lesions may have indeterminate findings on cross-sectional imaging and other techniques, such as Diffusion-weighted imaging may add further information. DWI with calculation of apparent diffusion coefficient (ADC) values has been investigated in an attempt to distinguish between benign and malignant head and neck lesions.
Materials and Methods. We retrospectively reviewed the studies of patients with head and neck masses which included DWI from 2007 to mid 2011. All scans were performed at high field Siemens or Philips system (1 or 1,5 T). In all the subjects, conventional MR imaging sequences were performed apart from diffusion-weighted sequences with b values of 0, 500, 1000 and / or 3000 sec/mm2
Results. We describe the DWI features of a variety of pathologies including parotid tumors, both benign and malignant, escamous carcinoma, myeloma, cholesteatoma, post surgical changes, hemangioma and other vascular masses, cysts, haematoma, metastatic adenopathy, lymphoma, abscess and other infectious process (dacryoadenitis …), pseudotumors, between others.
Conclusion. The addition of diffusion weighted MR to routine MR neck protocols may increase the accuracy of imaging in distinguishing benign and malignant neck pathologies. This review provides overview of potential applications of diffusion-weighted MRI in head and neck.

C0105

Study of patient resistance to aspirin and clopidogrel and patient response to the adjustment in the clopidogrel dose in severe internal carotid artery atherosclerotic disease treated with angioplasty and stenting: Preliminary results

Alejandro González García[1], Francisco Moniche[2], Aurelio Cayuela[3], Isabel Gutiérrez Jarrín[1], Jose Ramón González Marcos[2], Antonio Mayol Deyá[1]

[1]Neurorradiología Intervencionista. Hospital Virgen del Rocío (Sevilla) Spain; [2]Servicio Neurología. Hospital Virgen del Rocío. (Sevilla) Spain; [3]Hospital Virgen del Rocío. (Sevilla) Spain

Introduction/Purpose. To present the preliminary results of a study to discover the real prevalence of patients who respond or are otherwise resistant to ASA and CPL, and whether the response to the adjustment in the dose of CPL (75 mg/day vs. 150 mg/day) in patients who do not respond to CPL increases the number of responders.
Materials and Methods. Prospective study (2011–2013) with 88 patients (79.5% male, average age: 68 years) 66% of which have symptomatic ICA stenosis. A control group of 22 patients was used; prior to the study these patients were tested for resistance to both ASA and CPL. Patients that did not respond to CPL were randomly placed in Group 1 (75 mg/day) or in Group 2 (150 mg/day). One month after the ASC patients were tested for resistance to both ASA and CPL.
Results. The rate of resistance to ASA and CPL was 10.1 % and 37.1%, respectively. In the control group, prior to the study the rate of resistance to ASA was 31.8% (p=0.007) and to CPL it was 68.2% (p= 0.015). Fifty percent of the patients in Group 1 (14 patients) and 80% of those in Group 2 (15 patients) were classified as responders in the test made after 1 month (p=0.001).
Conclusion. Correct platelet anti-aggregation is necessary to ensure that the resistance rates to ASA and CPL are no higher than normal. The resistance rate to CPL is higher than the resistance rate to ASA. Although half of the patients who did not respond to CPL at the regular dose did convert to responders, the adjustment in the dose significantly increases the rate of responders.
GRANT: PI10/01536 FIS 2010.

C0106

Relapsing adem: 2 cases report in elderly pacients

José Antonio Castiñeira Mourenza, Tania Garcia Sobrino, Maria Gabriela Tirapu De Sagrario, Miguel Blanco Ulla, Fernado Vázquez Herrero, José Manuel Pumar Cebreiro

Hospital Clinico Universitario de Santiago de Compostela (A coruña) España

Introduction/Purpose. Acute disseminated encephalomyelitis (ADEM) is an immune-mediated usually monophasic inflammatory-demyelinating disorder of de CNS that occurs within days to weeks (range 2–30 days) of a minor viral or bacterial infectious illness or a vaccination. This post-infectious CNS disease is considered by far more common in paediatric population and relapses rare.

Relapses can divide into recurrent or multiphasic forms. The purpose of this study is to report clinical and radiologic features and differential diagnosis of this rare condition in elderly patients.
Materials and Methods. Two patients diagnosed with relapsing ADEM were analyzed. Clinical and radiologic features are provided.
Results. Case 1: 69 years old man with antecedent of tetanus vaccination 15 days prior, who presented gait instability and crural monoparesis. The second and third attack occurred 14 and 20 months later with similar clinical picture and fever. Case 2: 60 years old man with antecedent of dental infection who suffered cephalea and confusion. Relapses occurred 4 and 6 months later. Both patients had been diagnosed and treated of prostatic carcinoma. Several diagnoses were considered and ruled out (metastatic disease, tuberculosis, aseptic meningitis, viral encephalitis, piogenic abscess and multiple sclerosis).
Conclusion. Because no biological markers of the disease exist, cerebral MRI is essential to diagnosis, showing multiple synchronic lesions of the cerebral white and gray matter and infratentorial areas with asymmetric distribution. Accurate diagnose of these disorder may have relevant prognostic and treatment implications, distinguishing them from tumoral or infectious lesions, avoiding unnecessary aggressive diagnostic or therapeutic procedures.

C0107

Angioplasty and stenting for total chronic symptomatic atherosclerotic occlusion of the subclavian or innominate arteries

Alejandro González García[1], Isabel Gutiérrez Jarrín[1], Francisco Moniche[3], Jose Ramón González Marcos[2], Antonio Mayol Deyá[1]

[1]Neurorradiología Intervencionista. Hospital Virgen del Rocío (Sevilla) Spain; [3]Servicio Neurología. Hospital Virgen del Rocío. (Sevilla) Spain

Introduction/Purpose. Endovascular treatment of atherosclerotic stenosis of the supraaortic arch is a well-established treatment, but its efficacy in total subclavian or innominate occlusions is so far not well established. Transthoracic or extrathoracic bypass grafting. has been considered the treatment of choice in these cases The aim of this study is to analyze the safety and efficacy of endovascular recanalization of supra-aortic trunks
Materials and Methods. Retrospective study (2001–2011) in 22 patients (16 men, mean age:62 years old) with the diagnosis of symptomatic occlusion of the left subclavian artery (16 cases), innominate artery (5 cases) and 1 right subclavian artery. The clinical presentation was vertebrobasilar TIA or minor stroke in 17 patients and upper limb claudication in 5 patients. The pre and postrecanalization brachiobrachial index was determined. Occlusions were recanalized by retrograde access (brachial or radial). For retrograde recanalization, a 0.035-inch, 260-cm hydrophilic guidewire, either straight or angled (45&deg), and a vertebral catheter (5 French) were used. The occluded segment was carefully traversed until the guide end was seen floating freely in the aorta. An angioplasty plus stenting of the occluded segment were performed
Results. Recanalization was achieved in 20 patients (91%), failing the technique in two patients (1 left subclavian artery and 1 innominate artery). There was no stroke, death or myocardial infarction within 30 days of the procedure. The difference in systolic blood pressure (BP) between the arms decreased to 7±4 mm Hg and the brachiobrachial index increased from 0.55±0.13 to 0.95±0.06. At follow up, 4 patients (20%) had restenosis who were treated with angioplasty.
Conclusion. Recanalization of supraaortic occlusion is a feasible technique with low morbidity and mortality.

C0112

Atypical presentations of papillary thyroid carcinoma

Mario Prenafeta Moreno, Sandra Pérez Aguilera, Antoni Rovira Gols, Antonio Carvajal Díaz, Martin Zauner Jakubik, M. Rosa Bella Cueto

UDIAT-Consorci Sanitari Parc Tauli (Barcelona) España

Introduction/Purpose. To familiarize readers with less common presentations of papillary thyroid carcinoma (PTC), including both intra- and extra-glandular manifestations.
Materials and Methods. We retrospectively analyzed all cases of PTC diagnosed at our institution during a 10-year period (2000–2010). After reviewing the imaging and histopathologic findings, we selected cases with unusual presentation or imaging findings.
Results. PTC is the most common malignant lesion of the thyroid gland, accounting for 75% to 80% of all thyroid cancers. PTC typically grows slowly and has an excellent prognosis. PTC usually presents as a nodular lesion within the gland. Ultrasonography is the imaging test of choice to characterize this intraglandular nodular lesion. Hypoechogenicity and intranodular microcalcifications are the most specific findings for PTC. However, in certain cases, the presentation of PTC differs clearly from the above. The purpose of this presentation is to describe and analyze unusual presentations of PTC, illustrating the imaging and histopathologic findings, with an emphasis on the following three situations: (1) neoplasms originating in anomalies of the thyroglossal duct, (2) the diffuse sclerosing variant of PTC, and (3) distant metastases from PTC.
Conclusions. Although PTC classically presents as a nodular lesion within the thyroid gland, it is essential to be familiar with other, less common presentations to ensure the correct diagnosis.

C0117

Hemicerebellitis: Case report

Christoph José Klein Zampaña[1], Rosario Sarabia Herrero[1], Alejandro Vara Castrodeza[2], María José Garea García Malvar[3], Jaime Samuel Rodríguez Vico[3]

[1]S. Neurocirugía HU Río Hortega (Valladolid) España; [2]S. Radiología HU Río Hortega (Valladolid) España; [3]S. Neurología HU Río Hortega (Valladolid) España

Introduction/Purpose. We report the radiological follow up of a patient affected by a right hemicerebellitis. As far as we know only 17 cases have been reported in the literature. Cerebellitis usually is a pediatric benign disease, needing in some cases neurosurgical intervention
Materials and Methods. We were consulted for a 16 years old patient with headache, nausea, vomiting and diplopia lasting for a few days. In neurological examination she had diplopia to the right, nistagmus, minimal left central facial palsy and severe instability. Blood examination revealed leucocytosis and elevation of acute-phase reactants which normalized progressively with steroids, antiviral and empiric antibiotic therapy. CSF cultures and blood serologic tests were negative except for Cytomegalovirus and Varicella Zoster. After treatment she improved rapidly being asymptomatic after 4 months of follow up.
Results. On the initial CT scan was a hypodensity at the right cerebellar hemisphere which did not enhance, without producing neither mass effect nor hydrocephalus. In evolution MRI the lesion grew producing mass effect on the IV ventricule and secondary hydrocephalus. On T1 weighted images there was only folia enhancement and the spectroscopy ruled malignancies out. The hydrocephalus progressed to resolution with conservative treatment as the mass effect did, ending at folia atrophy, without needing neurosurgical intervention. The differential diagnosis includes Lhermitte-Duclos disease, infiltrative glioma, lymphoma, vasculitis and other inflammatory-infectious diseases.
Conclusion. Cerebellitis can be secondary to infections, having been as well linked to vaccines, but mainly it's idiopathic. Usually it's a benign disease, but it's course can be highly variable, from paucisymptomatic to fatal progression. Neurosurgical treatment is aimed to treat hydrocephalus with external ventricular drainage or performing posterior fossa decompression in selected cases.

C0118

Perfusion MRI changes in radiated whitte matter

Maria Teresa Pujol Farre[1], Izaskun Valduvieco[1], Laura Oleaga Zufiría[1], Eugenia Verger Fransoy[1], Estela Pineda[1], Carles Falcon[2], Joan Berenguer Gonzales[1], Teresa Ribalta Farre[1], Francesc Graus Ribas[1], Luis Caral[1]

[1]Hospital Clínic i Provincial de Barcelona (Barcelona) Spain; [2]IDIBAPS (BARCELONA)

Introduction/Purpose. On follow up MRI studies in patients with glioblastoma (GB) it is difficult to differentiate between treatment side

effects or tumor progression. Radiation induces changes in brain parenchyma that may mimic tumor recurrence or progression, and concomitant treatment with temozolomide due to the radiosensitizer effect can increase those changes. Therefore MR images after treatment are difficult to interpret. We studied radiation-induced changes in white matter to define what changes might be attributable to radiotherapy.

The aim of the study is to evaluate the radiation changes in normal white matter on MR perfusion imaging at different radiation doses in patients with GB.

Materials and Methods. We have analyzed the MR perfusion studies in 6 patients with GB and complete tumor resection. MRI studies were performed on a 3T Unit (Siemens), using the susceptibility perfusion technique. Quantification of rCBV was performed drawing four regions of interest (ROI); in white matter, in the area of maximal, medium and low isodose (90–100%), (50–90%), (30–50%) respectively, ipsilateral to the tumor side and the last ROI in the normal white matter, not receiving radiation, contralateral to the tumor. Quantification was performed on MRI studies performed at the mid, end, and 4 weeks after finishing the treatment.

Results. We found an increase in rCBV with respect to normal white matter, which receives no radiation, in areas of white matter receiving radiation therapy. This increase is greater in areas of maximal radiation in all corresponding follow up studies performed at mid, end and after 4 weeks of treatment.

Conclusion. Radiation therapy can produce changes in normal white matter that result in changes in rCBV. This has to be taken into account when monitoring patients with brain tumors.

C0119

Pediatric brain ischemia

Clara Ruiz Guerrero[1], Jesús Aguilar García[1], Elena Merchante García[1], Alejandro González García[2], Elena Arce Portillo[1]

[1]Hospital Universitario Virgen del Rocío (Sevilla) Spain; [2]Neurorradiología Intervencionista. Hospital Virgen del Rocío (Sevilla)

Introduction/Purpose. Pediatric brain ischemia is a major cause of child morbidity and mortality in which imaging studies constitute a fundamental basis for the diagnosis, given the lack of specificity of clinical findings.

Materials and Methods. A literature review about radiological manifestations of pediatric brain ischemia in different imaging methods (CT, MRI, ultrasound and arteriography) is performed and illustrated with cases occurred in our center. Epidemiologic and clinical references are provided as well.

Results. Ischemic brain injury in children can be classified into diffuse and focal ischemia. The pattern of diffuse ischemia depends basically on the severity of hypotension, brain maduration and the duration of the event. It is caused by a variety of disorders including complications due to prematurity and birth, metabolic diseases and infections.

Focal infarction, arterial or venous, is among the ten leading causes of child mortality despite the preconception that this is an almost exclusive adult age pathology, rare in childhood. As a consequence of the lack of specific studies risk factors, prognosis, study protocol and treatment of these patients are not well known.

Conclusion. In the assessment of ischemic brain injury the radiologist should consider the patient's medical history, time from onset of symptoms, severity of the injury and cerebral myelination as being critical in the evaluation of the images.

C0121

Volumetric analysis of subaracnoid hemorrhage clot: New ways of assessing bleeding severity

Elena Salvador Alvarez, Alfonso Lagares, Amaya Hilario, Luis Jiménez, Jose María Millán, Ana Ramos

Hospital 12 de Octubre (Madrid) Spain

Introduction/Purpose. Subaracnoid hemorrhage (SAH) bleeding is assessed with the help of qualitative scales that show moderate interobserver reliability and moderate relation with vasospasm and outcome. The objective of this study is to assess the reliability of quantitative and qualitative methods for evaluating subarachnoid hemorrhage and to establish their relation with outcome.

Materials and Methods. The CTs of 150 patients suffering spontaneous SAH were reviewed. DICOM images were evaluated using ANALYZE 8.1 software running on a personal computer. SAH bleeding volume was estimated by ROI measurement; and using the Cavalieri principle. All CTs were graded for the different qualitative scales (Fisher, modified Fisher, Claasen) and semiquantitative scale (Hijdra) by two independent observers. The interobserver agreement was determined by means of kappa index for qualitative scales and following the methodology described by Bland and Altman for quantitative measurements, as well as using the intraclass correlation coefficitent. Area under the ROC curve (AUC) was used for comparing the discriminative capacity of the different scales and quantitative methods.

Results. Qualitative scales show only moderate interobserver agreement. Interobserver agrement is higher with quantitative measurements. A total volume of bleeding over 20 cc increases nearly four times the risk of poor outcome after adjusting for confounding factors such as age or WFNS at admission. Quantitative estimation of the bleeding volume has a higher AUC than qualitative scales in predicting outcome.

Conclusion. Volumetric estimation of SAH clot could be helpful in assessing prognosis after SAH and more reliable than classical scales that assess the severity of the bleeding in CT.

C0135

Cerebral ischemia: Potential complication of gas embolism after pulmonar biopsy?

Joana Martins[1], Carlos Casimiro[1], José Tomás[2], Nuno Mendonça[2], Dina Marnoto[1]

[1]Neurorradiologia, Hospitais da Universidade de Coimbra (Coimbra) Portugal; [2]Serviço de Neurologia, Hospitais da Universidade de Coimbra (Coimbra) Portugal

Introduction/Purpose. Vascular air embolism consists of entry of air in arterial or venous structures and it is a known and rare cause of tissue ischemia. Iatrogenic air embolism is an uncommon complication of various invasive procedures, yet with potentially severe or fatal consequences. The vascular infusion of 1 mL of gas has been described as being enough to cause pathologic features.

We describe a clinical case of a patient submitted to transtoracic pulmonary biopsy who presented sudden cortical blindness after the procedure.

Materials and Methods. Male, 64 years-old, submitted to CT-guided transtoracic pulmonary biopsy of left lung inferior lobe mass. Immediatly after the procedure the patient presented sudden bilateral cortical blindness. Control toracic CT showed small gas emboli in the

left heart ventricle and left braquicephalic vein. Immediate cerebral CT revealed presence of air bilaterally on cerebral posterior areas; MR showed thin cortical bilateral parieto-occipital hipersignal, with difusion restriction, traducing acute vascular alterations. Control cerebral CT later on the same day showed atennuation of cortical occipital sulci. The patient was sent to a hyperbaric facility for a few days. Control MR, performed 40 days later, reveals persistent posterior hipersignal with normal difusion, traducing sequelar vascular lesions.
Results. Complete recovery of the visual deficits after hyperbaric treatment; no further clinical features occurred and no other cause for ischemia was found.
Conclusion. Arterial air embolism is a potentially fatal cause of cerebral ischemia, and should be promptly recognized so that therapy may be instituted immediately. Therefore, clinicians must be aware that acute onset of focal neurological signs can suggest this diagnosis. The treatment with hyperbaric oxygen by closing the patient in a hyperbaric facility reduces the air foci and the risk of pathologic consequences.

C0136

Congenital anomalies of cranial midline in pediatric age: Neuroimaging findings with dermatologic correlation

Joana Martins[1], Ignacio Delgado Álvarez[2], Angel Sánchez-Montañez García-Carpintero[3], Helena Hilari[4], Vicens García-Patos[4], Élida Vazquez Méndez[2]

[1]Neurorradiologia, Hospitais da Universidade de Coimbra (Coimbra) Portugal; [2]Hospital Vall d'Hebron (Barcelona) Spain; [3]Hospital Vall d'Hebron, Servicio de Radiologia- Unidad RM (Barcelona) Spain; [4]Servicio de Dermatología, Hospital Universitario Vall d'Hebron (Barcelona) Spain

Introduction/Purpose. Congenital anomalies of cranial midline (CACM) are quite rare clinical conditions - lower frequency than spinal location - and correct management is very important in order to prevent spontaneous and iatrogenic complications.
Materials and Methods. The authors analysed the clinical and radiologic manifestations of most common CACM with onset in childhood, using the data of the last decade in a pediatric neuroradiology unit of a reference tertiary centre. Pathological entities included sincipitial encephalocele and meningocele, atretic or rudimentary cephalocele, haemangioma, nasal glioma, dermoid cyst with and without dermoid sinus, and extradural dermoid sinus. Most patients were initially studied by MR imaging (T1 and T2 sequences). Particularly useful were Fat-suppressed T2, CISS and diffusion imaging. Some patients were also examined by US/CT.
Results. Our study included 15 patients with various types of CACM; most were diagnosed in perinatal period, few at prenatal stage (using US/MR); the others were referred from dermatology department owing to the visualization of dermatologic stigma that required further investigation. Between dermatologic findings we found pilous follicle, tuft of hair, lipoma or vascular macula. With reference to localization of lesions, most cases were in parieto-occipital and fronto-nasal areas. One patient developed infection, and 3 presented other CNS malformations (ectopic neurohypophysis, polymicrogyria and corpus callosum hipoplasia). Most children were asymptomatic at onset; the majority required surgery. Imaging and dermatologic findings were correlated with histopathology.
Conclusion. CACM can be clinically subtle or silent but may carry various kinds of risks. Therefore, it is very important for clinicians to recognize them and, if necessary, to provide additional imaging investigation in order to allow a correct diagnosis. The majority need surgery and, with the recent advances in fetal US and MR imaging, a great amount of cases can be detected at prenatal stage.

C0137

Caracterización de la placa carotídea mediante resonancia magnética. Resultado preliminares

Clara Ruiz Guerrero[1], Pilar Piñero González de la Peña[1], Isabel Gutiérrez Jarrín[2], Francisco Moniche[3], Jose Ramón González Marcos[3], Antonio Mayol Deyá[3], Alejandro González García[2]

[1]H.U. Virgen del Rocío (Sevilla) España; [2]Neurorradiologia Intervencionista: Hospital Virgen del Rocío (Sevilla); [3]Servicio Neurología. Hospital Virgen del Rocío. (Sevilla) España

Introduction/Purpose. To characterize carotid plaque using magnetic resonance imaging (MRI) in patients with severe stenosis of internal carotid artery.
Materials and Methods. Carotid MRI was performed on Philips Intera 1P magnet with bilateral carotid phased-array four-channel coil in 31 patients (71% male, mean age 67±9.7, mean stenosis 89±9%, 64P symptomatic) with severe carotid stenosis treated with angioplasty plus stenting with distal protection filter. The study protocol was based on black blood sequences (T1, PD, T2 and T1 with gadolinium) sychronized with electrocardiogram, TOF or white blood sequence and diffusion study pre and post stenting. The composition of plaque in the carotid artery operated (plaque index) and in the contralateral was analized and classified according to the plaque classification of the American Heart Association adapted for MRI.
Results. Classification of index carotid plaques: fibrous plaque (type VIII), 38p; calcified plaque (type VII), 12•; complicated plaque (type VI), 35P; atheroma (type IV-V), 3 ; non-assessable, 9p. Classification of the contralateral carotid plaques: type VIII, 45 ; type VII, 9.7%; tipoVI, 9.7%; non-assessable, 22′; without carotid plaque, 12•. The presence of calcium was detected in 77% of the index plaques and in the 67p of the contralateral plaques. Intraplaque hemorrhage was identified in ten of the index plaques (32) and in three of the contralateral (9.7%). Six of the eight symptomatic patients (75%) had intraplaque hemorrhage. Three of the index plaques (9.7%) and one of the contralateral (3.2%) showed the presence of core.
Conclusion. MRI can characterize carotid plaque and identify the components that enable it to classify as vulnerable.

C0138

Early postoperative magnetic resonance imaging in glioblastomas

Ana Teresa Vide H. S. Riobom Brochado, Carina Reis, Paulo Linhares, Afonso Rocha, Rui Vaz

Centro Hospitalar São João (Porto) Portugal

Introduction/Purpose. The extension of tumor resection is an important prognosis factor in the survival of patients with glioblastoma, therefore it is essential to perform early post-operativeMR (EPMR) in the first 72 h after surgery. The changes observed are sometimes difficult to interpret, due to the variety of patterns of contrast enhancement. The aim of the study is to establish the relationship between patterns of contrast enhancement on EPMR and the probability of early tumor regrowth.
Materials and Methods. We retrospectively analyzed the EPMR studies of 40 patients with histopathologic diagnosis of glioblastomas who underwent surgery for tumoral resection. In EPMR, three patterns of enhancement were considered: A -linear<3 mm; B linear>3; C-nodular. For identification of tumor regrowth a comparative study between the sequential MRI was performed, for a maximum period of 12 months. 11 patients were excluded, 8 with partial surgical resection and 3 due to multicentric tumors.

Results. Twenty-nine patients were studied, 15 (51,7%) were male, with an average age (DP): 55,7(13,7) years. Concerning the enhanced pattern 6(20,7%) presented A pattern, 6(20,7%) B pattern and 17 (58,6%) C pattern. After 12 months, only 4(13,8%) patients didn't show tumoral regrowth, 3 with A pattern and 1 with B pattern. The average total tumor-free survival time was 4.1(0,6) months. Survival curves showed that despite the majority of patients showed tumor regrowth in any of the groups, the time until regrowth was significantly different between groups (log-rank <0,05), being longer in A pattern [10,0(0,9) months] and shorter in B and C patterns [4,0 (1,6) months and 3,9 (0,6) months, respectively].

Conclusion. The different enhanced patterns in EPMR may become a risk factor marker for early regrowth, with impact in the planning of radiological follow-up and therapeutic approach.