Società Italiana di Neurologia
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Società Italiana di Riabilitazione Neurologica

IRCCS FONDAZIONE
"ISTITUTO NEUROLOGICO C. MONDINO"
PAVIA

XI NEUROLOGICAL SCIENCES MEETING

Selva di Val Gardena (BZ), February 10-13, 2003

ABSTRACTS

Edited by
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ADVANCED MR TECHNIQUES IN THE STUDY OF ALZHEIMER'S DISEASE

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The loss of layer III and V large pyramidal neurons, particularly in cortical associated regions, is the pathological substrate of the progressive dementing process in Alzheimer's disease (AD). Consistent with this, MRI studies have shown atrophy of specific brain structures in patients with AD when compared with non-demented elderly controls. More recently, MR-based techniques have been applied to the study of AD patients to achieve accurate *in vivo* estimates of pathological changes related to the disease. MR-based hippocampal volumetry, MR diffusion-weighted imaging (DWI) and MR spectroscopy (1H MRS) identify structural and biochemical alterations in the brains of AD patients. MR-based volumetry has found that the hippocampi of patients with mild cognitive impairment (MCI) and AD are smaller than those of normal elderly. DWI has revealed that the diffusivity of water is higher in the hippocampi of MCI and AD subjects suggesting an expansion of extracellular space due to neuronal loss in these patients. 1H MRS has demonstrated higher myoinositol and lower N-acetyl aspartate (a neuronal marker) in AD patients compared with normal elderly subjects. More recently, functional MR studies have demonstrated a functional signal decrease in the temporal lobe of AD patients. Each of these quantitative MR modalities provides useful information for early diagnosis of AD.

ROLE OF RADIOLOGICAL STUDIES FOR "LOW-BACK PAIN" SYNDROME DIAGNOSIS: X-RAYS, CT, MYELOGRAPHIC AND ANGIOGRAPHIC EXAMINATIONS

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For many years plain films of the vertebral lumbar and sacral axis and myelo-radiculography were considered the gold standard in the diagnosis of vertebral and spinal diseases, so-called "low-back pain". The introduction first of the CT scan and subsequently of MRI led to a drastic reduction in myelographic examinations, which are now performed in very selected cases. MRI is, today, the most important tool for the diagnosis of lumbar spine diseases. Nevertheless *direct X-rays* (DR) on standard and oblique projections still guarantee a complete view of the column and its morphology and show correctly skeletal diseases such as fractures, osteoporosis and spondylitis.

The *CT scan* is considered an important complementary tool to DR and MRI for precise spatial information and for bone, disc and ligament analysis. This technique is particularly useful in the planning of percutaneous biopsies and vertebroplasty.

In selected cases, *myelography* and *CT-myelography* still constitute a useful method for accurate diagnosis of occult spina bifida (sacral cysts), adhesive arachnoiditis, spinal epidural and subdural cysts. In these cases a dynamic evaluation of spinal subarachnoid spaces gives precise information in the pre-surgical planning stage.

Angiography is still important for the diagnosis and treatment of vertebral hemangiomas compressing the spinal cord, vascularized tumours and artero-venous malformations. In these cases it can be considered an important preliminary step to embolization, biopsy and vertebroplasty.

We believe that MRI has not reduced the use of other diagnostic neuroradiological tools, but rather led to different application of them, even in more selected cases. Correct preliminary clinical evaluation should reduce the risk of non-useful examinations and, consequently, inappropriate therapeutic choices such as surgical or percutaneous approaches in the case of self-limiting lesions.

EARLY TREATMENT OF MULTIPLE SCLEROSIS: PROS AND CONS

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The use of disease-modifying therapies (DMTs) in multiple sclerosis (MS) is becoming more and more "aggressive". In fact, the American Academy of Neurology has recently suggested treating from onset clinically isolated syndromes (CISs) at risk for MS. This trend is due to pathological and neuroradiological evidence indicating early axonal damage (possibly irreversible) in MS, strictly related to, and perhaps caused by, inflammation. Therefore, it is felt that anti-inflammatory drugs could also limit degeneration. The significant effect of βIFN-1a on the risk of clinical and neuroradiological worsening has been demonstrated by important clinical trials, such as CHAMPS and ETOMS. On the contrary, there is no evidence that DMTs can affect late clinical progression and brain atrophy. However, if we do decide to treat a CIS very early, we will come up against the risk of treating a potentially benign patient. In order to overcome this problem, prognostic favourable indicators need to be identified. In this respect, research carried out at our MS centre has demonstrated that a probabilistic Bayesian model is better than a classical Cox multiple regression model in detecting several early prognostic factors. In addition, our statistical approach is able to build a risk score at an individual level, useful in the selection of patients.

To conclude, in general terms, several items of evidence support the early use of DMTs. However, DMTs do not seem to have a strong progression-preventing effect, and thus there is a need to search for additional neurotrophic and protective factors. The decision to treat a single patient should be supported by prognostic models, able to analyse contemporaneously a large number of dynamic clinical, neuroradiological, immunological and genetic variables, accelerating the identification of those patients who are at highest risk of an unfavourable evolution.

LUMBAR DISK DEGENERATIVE DISEASES: PREDICTIVE VALUE OF MRI

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Spontaneous involution of lumbar disk herniation in patients treated with conservative therapy is reported in up to 70% of cases. The aim of our study was to identify and evaluate, by means of contrast enhanced MRI, possible predictive signs of natural involution of disk herniation. We enrolled 64 patients, affected by 72 lumbar disk herniations. MRI examinations were performed on a 1.5 T magnet, using SE T1w sequences on sagittal and axial planes, before and after contrast-medium *i.v.* administration, and FSE T2w on the same planes. The following parameters were considered: age, sex, level and size of disk herniation, its relationship to the spinal canal, clinical onset interval, type of disk herniation, herniated material signal intensity on T2w sequences and its pattern of contrast enhancement. All the patients, conservatively treated, underwent clinical and MRI follow up after 6 months: disk herniation size and contrast-enhancement variations were evaluated. At the 6-month MRI follow up, a spontaneous regression of disk herniation was, on average, observed in 34.72% of cases. Among these, free fragments regressed in 100% of cases, extruded disk with high signal intensity on T2w sequences in 85.18%, extruded disks with peripheral contrast-enhancement in 83% of cases. Rest in bed for at least 15 days proved to be a significant factor for a favorable evolution of acute disk herniation. Disk herniation evolution did not show any relationship with its location, size and level. Our study demonstrates that MRI of disk pathology not only has considerable diagnostic value, but also yields information helping to predict evolution.

MRI EVALUATION IN MULTIPLE SCLEROSIS

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Multiple sclerosis (MS) is one of the most frequent causes of disability in young adults. From a neuropathological point of view, it is characterized by areas of demyelinization widely disseminated in the central nervous system (CNS), while its main clinical feature is the spatial and temporal distribution of focal neurological signs. The above described physiopathology explains the typical clinical remitting-relapsing course on which clinical diagnosis of MS is based. However, since the disease shows a quite variable clinical course, and the physiopathology of the CNS lesions is completely non-specific (perivascular inflammatory reaction), clinical signs alone do not usually allow definite diagnosis, which instead demands objective demonstration of spatial and temporal dissemination of demyelinating areas. Magnetic resonance imaging (MRI) constitutes the best diagnostic technique both for detecting the presence of white matter lesions, and for checking new localizations in relapsing patients. This brief pathological review suggests that diagnosing MS requires both clinical and instrumental findings, as first proposed by Poser in 1983, using diagnostic criteria that are still employed at the present time. The mentioned criteria include both clinical signs and laboratory (CSF examination) and instrumental (MRI, EVP) data, and suggest 4 possible diagnostic groups. However, despite their high sensitivity (almost 95%), MRI findings do not show adequate specificity, as many different pathological conditions can lead to focal white matter alterations (e.g., vascular pathologies, traumas, infections). Aware of this limitation, many authors began working to identify more specific MR findings. Thus, in 1993, Fazekas et al. proposed new diagnostic criteria based on the review of MRI examinations of 1,528 patients affected by white matter lesions characterized by high signal intensity both on T2 and DP sequences. The main outcome of this work was an increase in MRI specificity (96%) in differentiating "MS" from "non-MS" patients when dimensions, location, number and distribution of lesions are taken into account. To be more precise, these authors recommend the presence of at least 3 lesions bigger than 5mm, at least one with infratentorial location, and the involvement of the periventricular areas. Subsequent studies concerned the capacity of MRI to predict evolution towards certain MS, also considering the usefulness of intravenous injection of contrast media in differentiating acute from chronic lesions. The diagnostic criteria required are at least one enhancing lesion, at least one juxta-cortical lesion, at least one lesion with infratentorial location and at least 3 periventricular lesions. This intense research activity led to the latest revision of diagnostic criteria for MS proposed, in 2001, by the International Panel for MS Diagnosis. The commission delineates the new diagnostic guidelines whose main advantage is the simplification of clinical trials allowing diagnosis not only of patients showing the characteristic remitting-relapsing course, but also of atypical "mono-symptomatic" and "chronic" patients. The new criteria give the following diagnostic outcomes: MS, probable MS (for patients at some risk for MS, but whose evaluation is doubtful) and non-MS. MRI continues to be the diagnostic method of choice, also for checking treatment efficacy.

PERCUTANEOUS TECHNIQUES FOR TREATING DISC DISEASE

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The percutaneous approach to disc diseases was proposed many years ago and several different techniques have been applied. Some are more "surgical", like the Caspar technique based on the insertion of thick tubes, even bila-

terally, to allow mechanical rupture and removal of nucleus fragments. Other methods may be considered more "mildly-invasive" and "radiological", such as chemonucleolysis with chymopapain or mechanical fragmentation by means of thin probes and suction of nuclear fragments, such as the Onik procedures. More recently, technological advances have led to the use of an oxygen-ozone mixture to obtain chemical lysis of the nucleus or mechanical fragmentation with thinner probes. The different uses of these modalities are based on the percutaneous approach to the disc and the basic diagnostic information supplied by discography. In fact, discography underlies all of these techniques given the need to check the exact position of the needle and the exact size and position of the herniated nucleus: percutaneous techniques are effective when the herniated part is connected with the centre of the nucleus which is the sole possible percutaneous target. The percutaneous techniques have no possibility of reaching the herniated part, their effect is on the nucleus and will be effective on the herniations if there is a continuity which will "transfer" the therapeutic effects to the herniated fragment.

Papain and Onik were widely used about ten years ago, results were satisfactory in selected cases, but several problems arose. In fact, papain (chymodiactin) obtained FDA authorisation in 1982, but never received EU approval, which is a major drawback in Europe, especially nowadays with the increasingly high risk of litigation in the event of failure or complication. In our experience, the Onik procedure is indicated for small herniations, and the ratio between cost-invasiveness and pathology definitely favours a more conservative approach or a less invasive procedure.

Intradiscal ozone therapy is successful in a slightly lower percentage of patients than those treated by chemonucleolysis, but it is well tolerated even in elderly patients. The burning sensation experienced on paraspinal and periradicular injection of the ozone is temporary. The slight reduction in the percentage of positive results compared with chemonucleolysis becomes negligible in the context of a wider cost-benefit assessment.

The percutaneous approach allows the treatment of disc herniation with a satisfactory level of good results, average 70%, in selected cases, with small or medium size herniations with continuity between the central nucleus and the herniated fragment.

PHYSIOPATHOLOGY AND REHABILITATION OF BACK PAIN

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Back pain (BP) is one of the most frequent conditions encountered in clinical practice. It is the leading cause of worker's compensation in the USA and Canada. Sixty to 90% of the adult population are at risk of developing BP at some point in their lifetime. BP has a significant social and economic impact, causing impairment of functional abilities and occupational activities. The aetiology of BP is multi-factorial. Various individual and occupational risk factors for BP have been identified. Different structures may be involved in the genesis of BP, and four different types of BP have been described, i.e.: local, referred, radicular, and that arising from secondary muscular spasm. Unfortunately, the correlation between clinical symptoms and instrumental findings is low. Thus, expensive neuroradiological and neurographic examinations may be avoided through consultation of a physician skilled in BP and a neurologist. The goals of BP therapy are to relieve pain, reduce muscle spasm, improve range of motion and strength, and correct postural failure, in order to improve the patient's functional status. Different practitioners are involved in the treatment of BP (physicians, chiropractors, physical therapists, massage therapists, kinesiologists and rehabilitation technicians). Despite the number of rehabilitation and physical therapy interventions commonly used in the management of BP, to date there are no statistical data on which treatment is most suitable in each specific condition.

REHABILITATION PLANNING IN PATIENTS WITH MUTIPLE SCLEROSIS

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Rehabilitation of subjects suffering from multiple sclerosis (MS) is influenced both by the progression of the disability and by interactions between functional impairments.

Few investigations to date have addressed the factors predictive of rehabilitation efficacy; furthermore, the advantages derived from a restorative approach have still to be defined in terms of activities of daily living improvement, rather than subjective feeling of well-being.

Three clinical domains may separately influence rehabilitation outcome: a) the stage of disease progression and the severity of disability at the start of treatment; b) the recovery potential of the different functional domains affected by MS; c) the features of the rehabilitation network, including availability of social services and clinical pathways for MS patients.

Consideration should thus be given to the following prognosis-influencing factors:

a) MRI detection of neuronal degeneration before planning motor treatment

b) Assessment of cognitive performances prior to selecting a learning-based approach

c) The availability of continuum of care pathways before attempting to minimise the disease impact on patient's participation in daily life.

Although many conditions may influence the effectiveness of rehabilitation, individual factors, mainly in the cognitive and psychic domains, are considered the strongest predictors of outcome after rehabilitation.

LEFT HEMIPARESIS WITH SUBACUTE ONSET IN "RELAPSING UVEITIS" DUE TO OCULAR LYMPHOMA

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Clinical case: a 37-year-old housewife was submitted to clinical observation in October 1995 because of dysesthesias of the left hemiface, which after a week spread to the left hand. She had had visual disturbances since 1989 and been hospitalized since 1991 following a loss of visus. The patient was diagnosed with uveitis and undertook cortisonic therapy. She had a glycemia of 168 mg/dl with a mild hyperproteinorachia (56 mg/dl). Cerebral CT showed small multiple hypodense areas of the hemispheres, both in the white and gray matter. Cerebral MRI revealed multiple areas with altered signal in the right thalamus, in the basal nuclei and in the white matter of the semioval centres, and another small area showing similar findings in the left part of the pons. The patient responded to a cortisonic treatment, which was reduced after one month, when a small area of altered signal in right thalamus was also no longer evident on MRI. After two months, the woman was seen by an ophthalmologist for a left hypaesthetic hemisyndrome. The ophthalmologist found a "partially occlusive retinal vasculitis" and, hypothesizing Behçet's disease, put the patient on cyclosporine 300 mg/day. The patient became progressively worse, until the appearance of a left ataxic paresis with pyramidal signs. An MRI in the fourth month showed the reappearance of the right thalamic lesion, displaying a ring enhancement. Only when a clear left hemiplegia appeared was a biopsy performed in a neurosurgical setting. The result was large B-cell lymphoma. The patient began chemotherapy with methrotrexate and also endorachis and radiotherapy. Seven years later, the patient is still alive, but she is tetraplegic and brain damaged following the onset, three years after the treatment, of leucoencephalopathy.

INTERACTION BETWEEN APOE GENOTYPE AND VASCULAR RISK FACTORS IN ALZHEIMER'S DISEASE

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A range of epidemiological, clinical and instrumental evidence suggests that vascular disorders contribute to the development of sporadic Alzheimer's disease (AD). As a matter of fact, most known risk factors for AD have a vascular substrate, but whether cerebral hypoperfusion is a cause or a consequence of the degenerative process remains unclear.

The aim of this study was to analyse the interaction between ApoE genotype and vascular risk factors, in order to assess the possible involvement of the latter in the genetic predisposition to AD.

Patients included were diagnosed as probable AD according to NINCDS-ADRDA criteria and had a MMSE <24. We analysed a total of 54 patients, 24 (44.4%) carrying the E4 allele (E4+). Demographic features known to affect vascular pathology were similar in both groups, apart from gender, thus separately analysed. The E4+ group showed a significant female prevalence and earlier age at onset of dementia. Among all the analysed risk factors we found a significant association between E4 and hypercholesterolemia in males only ($p=0.001$). On the contrary, the presence of the E3 allele was found to be significantly associated with hypertension in males ($p=0.039$) and with carotid atherosclerosis in both sexes. A sum score of vascular risk factors resulted significantly higher in E4- males ($p=0.001$).

Our data highlight that although serum cholesterol levels are significantly higher in male carriers of E4, the other analysed vascular risk factors were not significantly associated with the E4 allele. On the contrary, at least for males, the contribution of vascular pathology seems to be greater than that of the genetic component in the development of AD.

THE HETEROGENEITY OF MULTIPLE SCLEROSIS

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Multiple sclerosis (MS) is a commonly occurring neurological disease in young adults and the prototype autoimmune inflammatory disorder of the central nervous system (CNS). While MS was, for over a century, considered a demyelinating disease, over the last ten years, it has become progressively clear that demyelination is only a part of MS pathology. Indeed, MS is characterized morphologically by various degrees of inflammation, demyelination, reactive gliosis and axonal damage. Unconventional magnetic resonance imaging (MRI) methodologies as well as immunopathological studies have disclosed that axonal damage and neuronal loss occur very early in the inflammatory lesions, and constitute the major morphological substrate of permanent clinical disability. Four pathological patterns of inflammation/tissue damage have been described on the basis of the immunological network involved, the extension of gliosis and the type of demyelination observed in the plaques. From the immunological point of view, while in the past MS was considered a CD4+ Th1 lymphocyte-mediated disorder, recent studies have indicated a possible role for other immune cells, such as CD8+ T cells and B lymphocytes. Indeed, CD8+ cytotoxic T cells and reactive macrophages/microglia have been demonstrated to correlate with the extent of axonal damage in the

early phase of MS, and the presence of B cells with deposition of immunoglobulins and complement factors is the main histological feature of the type II pathological pattern. Moreover, brain lesions from patients with the primary progressive clinical form of the disease are characterized by primary oligodendrocyte degeneration, possibly expressing a genuine metabolic disturbance of oligodendrocytes that renders these cells particularly vulnerable to immune-mediated toxicity. Therefore, MS appears to be quite a heterogeneous disease not only from the clinical, but also from the immunological and pathological points of view.

NEUROIMAGING IN DEMENTIA: MORPHOLOGIC STUDIES

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Neuroimaging studies support the diagnosis of dementia in appropriate clinical settings. Besides allowing the identification of potentially treatable causes of dementia certain entities present specific imaging features, useful in their classification.

Alzheimer's disease (AD). Neuroimaging shows cerebral atrophy, more severe in the gray matter of the hippocampus, uncus, and entorhinal cortex. Measurement of the interuncal distance and of the temporal horn and volumetric methods have been suggested to discriminate early AD from control subjects.

Pick's disease. Neuroimaging shows dramatic focal atrophy and mild hyperintense signal on long TR/long TE sequences affecting the frontal and/or temporal lobes ("knife blade atrophy").

Multi-infarct dementia (MID). MR shows extensive periventricular and subcortical hyperintense lesions on T2-weighted images, cortical infarcts, and basal ganglia lacunar infarcts.

Two other forms of MID are "état lacunaire", due to occlusion of penetrating arteries, and subcortical arteriosclerotic encephalopathy (SAE) or Binswanger's disease, characterized by demyelination and frank infarctions of the white matter and basal ganglionic lacunar infarcts, sparing the subcortical arcuate fibers and the cortex.

Normal pressure hydrocephalus (NPH). Imaging studies show ventricular enlargement and transependymal cerebrospinal fluid resorption with effacement of convexity cortical sulci. MR flow-studies may show increased cerebrospinal fluid flow void. In the event of doubts, positive isotope cisternography classically would show no passage of the radiopharmaceutical isotope over the convexity.

Creutzfeldt-Jacob disease. MR studies show a rapidly progressive atrophy. T2-hyperintense areas involving basal ganglia and cerebral cortex may be associated.

NEURORADIOLOGICAL ASPECTS IN CONGENITAL ADRENAL HYPERPLASIA

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Congenital adrenal hyperplasia (CAH) is an inherited recessive disorder of adrenal steroidogenesis, caused by 21β-hydroxylase deficiency (21OHD), in 95% of CAH cases due to deletion or point-mutation in the cytochrome P450c21 gene, located within the HLA complex locus on 6p21.3. The adrenal enzyme deficiencies cause underproduction of cortisol and, in turn, hypersecretion of ACTH, overproduction both of progesterone and androgens, responsible for early virilization in both sexes, and underproduction of aldosterone, with hyponatremia.

Previous evidence suggested possible central nervous system (CNS) involvement.

We have studied 22 CAH patients, in order to assess the possible occurrence of neurological and brain MR abnormalities.

In a 22-year-old female patient with a salt wasting form of 21OHD, definite multiple sclerosis according to McDonald was diagnosed. In all the other patients clinical history was negative for neurological symptoms, and no significant neurological signs were detected. Conversely, brain MRI was abnormal in 17 cases (74%): 7 patients had focal areas of abnormal signal in the white matter, 8 had diffuse T2-hyperintensity of the white matter, 13 had brain atrophy, 8 had caudal cerebellar tonsillar ectopia.

Our findings indicate that involvement of the CNS is very frequent in CAH. Genetic and neuroradiological clues suggest that CAH and focal lesions of myelin could share common determinants, which allows us to speculate that their co-occurrence could be non random.

CLINICAL RADIOLOGICAL CORRELATIONS IN SEVERE HEAD INJURY PATIENTS

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In our experience, severe head injury associated with a completely negative or non-correlated CT scan and with unconsciousness is an increasingly frequent finding. We performed conventional MR during the clinical acute phase (1-5 days after trauma), experiencing some technical problems with patient transportation and monitoring during examinations.

We found diffuse axonal injury (DAI) in all these patients and a direct relationship with Glasgow Coma Scale

severity. The lesions were located in the brain stem and corpus callosum and we considered this finding to be a factor indicating a worse prognosis. We are currently looking for correlations between these findings and neurophysiological examinations, such as evoked potentials and EEG. In our view, diffusion-weighted MR imaging will, in the future, become more sensitive and also able to detect small DAI lesions not recognizable on conventional MR. Furthermore, MR tractography will enable us to identify the precise locations of DAI along the most important neurological pathways.

SEVERE HEAD INJURY INTENSIVE CARE

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In severe head injury (Glasgow Coma Scale<9), isolated or associated with extracerebral lesions, we can identify two types of damage: primary and secondary.

Primary damage: a) expansive lesions that may be treated with surgery; b) diffuse axonal injury.

Secondary damage: physiological response of the organism in which neuronal damage occurs as a result of impairment of oxygen transport to the brain and/or cerebral perfusion.

Treatment of secondary damage must begin in the first aid stage and must be continued without interruption until admission to the intensive care unit.

In the intensive care unit, the patient undergoes monitoring of: haemodynamic and respiratory parameters, intracranial pressure, cerebral perfusion pressure, jugular venous O_2 saturation (which gives a constant picture as regards oxygen availability and consumption), and regional tissue variations of: oxygen, carbon dioxide, pH, and temperature. These findings are obtained using Clark electrodes in ischaemic penumbra zones. The patient also undergoes EEG and somatosensory evoked potential monitoring, both serial and continuous, and transcranial Doppler for early detection of regional modifications of arterial flow.

These tools, applied in accordance with international guidelines, make it easier to treat, in aggressive way, the intracranial pressure that frequently complicates the course of severe head injury.

INJURIES TO THE NERVOUS SYSTEM AND SPINE IN SNOWBOARDING AND DOWNHILL SKIING

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Snowboarding is a relatively new winter sport which has undergone a dramatic increase in popularity, especially among young people. Reflecting this public enthusiasm, official snowboarding games were held during the Winter Olympic Games in 1998 in Nagano, Japan. However, this rapid growth in popularity has been accompanied by increasing reports of snowboarding-related injuries. Snowboarding injuries display particular features in comparison with those sustained during downhill skiing; for example, snowboarding accidents result in more fractures, especially of the upper limbs, fewer knee injuries, and more severe injuries caused by impact rather than by torsion.

As regards *head injuries*, falls are the most frequent causes of such injuries in skiing, while collisions are associated with the most severe injuries; jumping is the most frequent cause of injury in snowboarders, thus, occipital region lesions predominate in snowboarders. The relative incidence of head injuries is higher in snowboarding and means that in some countries – Japan, for example – where this sport is very popular, the absolute incidence of head injuries is also higher. Head injuries are more severe in snowboarding as reflected in the greater number both of fractures and intracranial haematomas requiring surgery.

Spinal injuries are more frequent in snowboarding than in skiing: jumping is the most frequent cause of injury; simple falls, on the other hand, are at the leading cause of spinal injuries in skiing. There are no significant differences regarding various types of lesion: transverse process fractures are, however, a lesion unique to snowboarding. The incidence of neurological deficits, in a few series, seems be to higher for skiing than for snowboarding.

In conclusion, improvements to ski boots and bindings have resulted in a decrease in injuries to the lower limbs, whereas the frequency of upper body injuries has remained unchanged or increased due to the faster possible speeds; the spread and effective use of dedicated helmets will – hopefully – significantly reduce the incidence of traumatic lesions, especially of the most severe injuries.

GORHAM'S DISEASE STARTING WITH LOW BACK PAIN: CASE REPORT

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Gorham's disease is an extremely rare bone disorder of which fewer than 200 cases have been reported in the medical literature. The disease is characterized by bone loss (osteolysis) often associated with swelling and abnormal blood vessel growth (angiomatous proliferation). Bone loss can occur in just one bone and spread to soft tissue and adjacent bone.

Synonyms of Gorham's disease are: disappearing bone disease, essential osteolysis, Gorham's syndrome, Gorham-Stout syndrome, idiopathic massive osteolysis, massive osteolysis, progressive massive osteolysis, Morbus Gorham-Stout, and vanishing bone disease.

Laboratory investigations reveal only a slight increase of alkaline phosphatase.

The disease, which shows no sex prevalence, may start at any age, but most often has onset between 8 and 40 years.

It has two known symptoms: i) abrupt onset with pain and swelling, and ii) muscle atrophy and functional impairment, which can induce pathological fractures.

Radiographically, the onset of the disease is characterised by the presence of intramedullary or subcortical osteolysis focus like osteoporosis in blotches, while the advanced stage is characterised by bone atrophy ranging from fragmentation and fractures to vanishing bone.

According to TC Shives et al. (1993), "Radiographically, disappearing bone disease appears capable of originating either in soft tissue or in bone, or simultaneously in both".

In August 1991, a 20-year-old woman reported lower left limb pain on standing; X-ray investigation in December 1991 revealed osteolysis affecting a portion of the sacrum, coccyx, a portion adjacent to left pelvis and L5; a scan confirmed the presence of osteolysis, while bone scintigraphy failed to show definite malignant abnormalities. There was no progression of this patient's condition until May 1995.

In 1995 she suffered a spontaneous fracture, which was followed over subsequent months by rapid disappearance of the sacrum and left ilium and migration of the spine in the left hemipelvis causing mild mechanical symptoms. The patient lost 5 cm in height since 1991.

Histological test showed blood vessel growth mixed together with fibrous blood vessel tissue.

When the diagnosis was specified in April 1996 she had 4.200 rads to her pelvis and lumbar spine and FKT treatment in the context of a progressive programme of dynamic lumbar/cervical stabilization.

Examined in 2003 she showed no progression of her disease. Neurologically she is grossly intact.

EFFICACY OF AZATHIOPRINE IN R-R MS: MRI EVALUTATION OF BRAIN LESIONS

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Azathioprine is a well-tolerated cytostatic drug used in patients with relapsing-remitting multiple sclerosis. We performed a one-year study in which we sought, also through monthly MR investigations, to monitor patients' improvements. Six months of therapy were alternated with 6 months without therapy in 14 patients. The dose administered was 3 mg/kg/day. MR was performed with and without gadolinium injection. The evaluation parameters were: total number and volume of Gd+ lesions; number of new Gd+ lesions; modifications of lesion load; neurological evaluation and changes in lymphocyte number. We found a reduction in the total number of lesions, a reduction of enhanced lesions and a significantly reduced lesion load, particularly on SE T2 and FLAIR images. In each patient, statistical analysis, clinical evaluation, EDSS and laboratory data, were performed. No adverse reactions were recorded and no patient was excluded from the study.