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Primary intradural mesenchymal chondrosarcoma of the spinal canal: a case report and literature review

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Mesenchymal chondrosarcomas are rare tumors of the bone and soft tissues. Extraskeletal tumors located in the spinal canal are very rare, and those located intradurally, have been described incidentally. The diagnosis of this tumor can create difficulties, because it is neoplasm with polyphenotypic differentiation and features that overlap those of other small cell malignances of bone and soft tissue. We report on a case of a 22-year-old woman with a primary intradural mesenchymal chondrosarcoma arisen from the arachnoidea at the T12-L1 level without dural attachment. At 13 years of follow-up, there have been three local recurrences in years 4, 6 and 10.6 after initial resection respectively. During the initial surgery procedure a mass was found intradurally with attachment to arachnoidea with normal dura mater. Tumor was resected totally via osteoplastic laminotomy T12-L1 with subsequent reconstruction of spinal canal roof. Microscopic examinations and immunohistochemical studies revealed mesenchymal chondrosarcoma at initial resection and at local recurrences. The tumor was composed of small, round or spindled cells, and scanty stroma with small hyaline cartilage islands. The mitotic index was low. Immunohistochemically expression of CD99, S100, NSE and desmin focally was found. Cytokeratins, myogenin, HMB45 and EMA were negative. Pathological picture of the neoplastic tissue was similar in the consecutive relapses. The patient received radiotherapy after the first resection, and chemotherapy after the first recurrence. All recurrences were treated surgically via osteoplastic re-laminotomies. Despite the four surgical resections of the spinal tumors, 19 months after the last surgery, neurological condition of the patient is still relatively good. Described protracted clinical course of disease is quite typical, making long-term follow up obligatory in mesenchymal chondrosarcoma cases.

Role of skin-muscle biopsy in diagnostics of cerebral small vessel diseases

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Cerebral small vessel diseases (CSVD) consist a relatively new group of neurological disorders. Regardless of their significant clinical heterogeneity, CSVD commonly manifest as recurrent ischemic strokes, progressing dementia and migraine. These symptoms usually appear in patients below 45 y.o. without typical risk factors for vascular diseases. In neuroimages, diffused or disseminated changes in the cerebral white matter are characteristic. In spite of the name, majority of CSVD are generalized angiopathies with clinical predominance of neurologic symptoms. Therefore skin-muscle biopsy can be helpful in their diagnostics. Skin-muscle biopsy has been popularized with an increased interest of clinicians and scientists in CADASIL (Cerebral Autosomal-Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy), the best known and common cerebral microangiopathy. Its introduction into routine diagnostics of patients suspected for CADASIL has led to discovery of several new vascular disorders such as PADMAL, COL4A1, HERNS, CRV or HVR, and spectrum of the cerebral microangiopathies still broadens out. Histopathological, immunohistochemical and ultrastructural assessment of the biopsy material unable diagnosis of CSVD *in vivo* – in some cases even nosologic diagnosis. Currently, skin-muscle biopsy and genetic tests constitute "gold standard" procedure in diagnostics of cerebral small vessel diseases.

Effectiveness and safety of stereotactic biopsy of the brain lesions

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Background: Obtaining tissue material from changes in the CNS allows them appropriate treatment. Objective: The purpose of this study was to evaluate effectiveness and safety of stereotactic biopsy of the brain tumors based on a large number of cases.

Methods: From October 1996 to September 2015 authors performed over than 2300 stereotactic biopsies of brain lesions. In each case the biopsy was performed under local anaesthesia, in a semi-sitting position, supported by MRI/CT fusion, using stereotactic system and software provided by Brainlab AG and Inomed.

Results: During the performed biopsies the following tumors were diagnosed: low-grade astrocytoma, anaplastic astrocytoma, lymphoma, glioblastoma multiforme, metastases, non-tumors lesion. Complications occurred in less than 1.5% of cases.

Conclusions: Stereotactic biopsy is a hardly invasive and effective method of tissue sampling from the brain tumors. It is a safe and reliable method, carrying low risk of complications.

Biopsy of paediatric brain tumours – usefulness and limitation

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Brain tumours are the second malignancy of childhood in order of frequency. Correct and precise pathologic classification is the most important prognostic indicator. Major differences in therapy result from different pathological diagnoses for tumours of similar location, identical clinical presentation, and the same radiological features.

The most common techniques for biopsy of paediatric brain tumours include stereotactic biopsy, neuroendoscopic biopsy and open biopsy.

The biopsy is very useful in the management of pineal region tumours. In these cases, the tissue taken via neurendoscopic biopsy allows for precise diagnosis of germinoma and pineoblastoma. However, the diagnosis of mixed germ cell tumours in material obtained by neuroendoscopic biopsy is difficult because of their heterogenic histopathologic pattern.

Diffuse intrinsic brain stem gliomas are the most common brain stem tumours in children. The differential diagnosis of lesions in brain stem include low-grade astrocytomas, gangliogliomas, as well as non-glial tumours, such as ependymoma and primitive neuroectodermal tumours, or even nonneplastic lesions such as inflammation. The majority of these tumours are benign and amenable to surgical resection. The biopsy is the only way to diagnose tumours in this location.

The biopsy is limited in diagnosis of desmoplastic infantile astrocytomas (DIAs) and desmoplastic infantile gangliogliomas (DIGs). The presence of primitive small-cell components within these tumours may be missdiagnosed as a high grade gliomas or PNET.

Conclusions: biopsy of paediatric brain tumours is useful diagnostic method for germinoma, pineoblastoma, brain stem tumours, and optic gliomas. In cases of DIA/DIG and mixed germ cell tumours the biopsy tissue material has a limited diagnostic value because of heterogenic histopathological patters of these tumours.

GLUT-1 and GLUT-3 in glioblastoma

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Altered metabolism in malignant tumors in hypoxic conditions, and especially the process of glycolysis, are the result of dysregulation of various metabolic pathways, including AKT/mTOR, Ras/MAPK and SHH pathway. One of observed phenomena is changed expression of glucose transporters GLUT. The aim of the study was to analyze the expression of Glut1 and Glut3 in glioblastoma. The study was conducted on 52 archival cases of glioblastoma. Representative sections from tumors were selected and microarrays were manually prepared from the paraffin-embedded tissue. Immunohistochemical staining for GLUT-1 and GLUT-3 was performed, and was microscopically evaluated qualitatively and semi-quantitatively. The semi-quantitative method was based on the percentage of cells with membranous immunopositivity and staining intensity. The scale used was SIS (staining intensity score), wherein the % of stained cells were assigned to the corresponding range of values (0, 1-33%, 34-66%, 67-100%), giving number of points (resp. 0 to 3). Staining intensity was defined as: 0-none, 1-low, 2-medium, 3-strong. Both values were multiplied and the number of possible points ranged from 0 to 9. The qualitative method analyzed the distribution of staining in tumor tissue based on microscopic image assessed under small and/or medium zoom. Tumors with intense membranous reaction located around necrosis and/or vascular thrombosis awarded 3 points. Points collected in both methods were summed, and

tumors that with <6 points were classified as low-GLUT, while those with a score ≥6 as a high-GLUT. It was revealed that tumors with high expression of GLUT-1 (high-GLUT-1) accounted for 76% of the cases, wherein the reaction with strong intensity and the location in perinecrotic areas and/or around thrombotic blood vessels affected 68% of gliomas. Tumors with high expression of GLUT-3 (high-GLUT-3) represented 71% of cases, and 53% had a distinct perinecrotic distribution. 27% of gliomas showed intense GLUT-3 membrane staining in areas with intense glomerular vascular proliferation. Furthermore, it was observed that in 19% of cases, relating glioblastoma with a significant proliferation of microvessels, MVP showed strong expression of GLUT3. The results revealed a frequent expression of GLUT in tumor cells of glioblastoma, indicating the dependence of expression of transporter Glut-1 and Glut-3 from an oxygen content in the tumor tissue and the potential association with angiogenesis.

Brain tissue in the gynecological biopsy material

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We present two very rare situations when the nervous tissue of brain type was diagnosed in a gynecological biopsy material. The first case was an intrauterine 1,5 cm mass in a 22-years old woman with a history of uncomplicated delivery 13 months earlier and recent vaginal bleeding. The polyp was excised and histologically disclosed dense astroglial tissue with thick wall blood vessels, covered with a layer of a normotypic proliferative endometrium. Immunohistochemistry revealed GFAP, GLI1 and S100 expression, while SMA, desmin, CD10, CK AE1/3, CK, synaptophysin and CD34 negativity. The final diagnosis was glial endometrial polyp (focal gliomatosis). The second case concerns a 16-years-old girl with an abdominal discomfort due to a big ovarian tumor with dissemination within the peritoneal cavity, suspected of ovarian cancer. Macroscopically the tumor was multicystic, and histologically presented as mature teratoma. The samples taken from the peritoneal implants were made of mature neuro-glial tissue (GFAP+, NFP+, Synaptophysin +, GLI1+), covered by reactive mesothelium. The endometrial glial polyp can be explained as embryonal/fetal neural tissue graft or metaplasia/transformation of the pluripotent Mullerian tissue within the endometrium. The second case examplifies peritoneal gliomatosis originating from ruptured/ disseminated most probably initially immature ovarian teratoma.

Comparison of the effectiveness of stereotactic biopsy and open biopsy in the neurooncologic diagnosis

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Brain biopsy is an invasive procedure of obtaining material for histopathological examination, threatened by the risk of complications, especially intracranial bleeding and infection. Stereotactic biopsy is particularly useful in the case of inoperable tumors, since obtaining histopathologic diagnosis, allows the implementation of radio- or chemotherapy. Initially, in our clinic, a biopsy of the brain using stereotactic frame was performed. Since 2008, this procedure is assisted by a neuronavigation system "Brainlab".

The aim of the study was to compare the effectiveness of stereotactic biopsy and open biopsy in the neuro-oncologic diagnosis.

In 10 years (2005-2015) at our center 276 biopsies were performed (160 stereotactic and 116 open biopsy) in cases of 123 female and 153 male patients. Histopathological diagnoses were divided into following categories: 1) full diagnosis, 2) partial diagnosis and 3) lack of diagnosis (non-diagnostic material). The t-Student test was performed for testing significance of difference of two mean values. Significance of the relationships and differences in distribution was investigated using the Chi-square test. The significance level was set at $p = 0.05$.

The female patients ranged in age from 14 to 80 years (Mean = 56.3, SD = 15.13), and male patients aged 17 to 83 years old (Mean = 52.3, SD = 15.55). The difference in age between female and male patients was 3.8 years and was statistically significant ($p = 0.045$). Stereotactic biopsy in 97 (60.6%) cases, allowed for a full diagnosis, in 30 (18.8%) cases allowed for a partial diagnosis, and in 33 (20.6%) cases the material was non-diagnostic. In contrast, open biopsy in 71 (61.2%) cases allowed for full diagnosis, in 9 (7.8%) cases allowed partial diagnosis and in 36 (31.0%)

the material was non-diagnostic. The differences in these proportions were statistically significant ($p = 0.013$).

On the basis of presented analysis, a full histopathological diagnosis is possible as often in the case of stereotactic biopsy (60.6%) as in the case of open biopsy (61.2%). However, the partial diagnosis in the case of stereotactic biopsy is possible more than twice as frequently (18.8%) than in the case of open biopsy (7.8%). In contrast, in case of stereotactic biopsy a non-diagnostic material appears much less common (20.6%) than in the case of open biopsy (31.0%). The results confirm the higher diagnostic efficacy of stereotactic biopsy.

CADASIL-syndrome: difficulty in the ultrastructural diagnosis

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Introduction: Skin and skeletal muscle biopsies are routinely processed in the diagnosis of CADASIL syndrome using electron microscopy (EM). EM examination shows deposits of granular osmiophilic material (GOM) in small vessels, specific and pathognomonic features of CADASIL. We report the case of an 84-year-old male patient afflicted by CADASIL. He showed minimal symptoms of the disease diagnosed on the basis of genetic and ultrastructural examinations.

Material and methods: Biopsy samples were fixed in 2.5% glutaraldehyde and post-fixed in 2% osmium tetroxide and routinely processed to Spurr resin. Ultrathin sections were contrasted with uranyl acetate and lead citrate, and examined with a transmission microscope Opton DPS 109.

Results: On ultrastructural examination of muscle and skin vessels, typical vascular pathologies, such as destruction and loss of pericytes and vascular smooth muscle cells (VSMCs) as well as thickening of the membrane basement were revealed. In abnormal capillary vessel walls no GOM deposits were found, while single arterioles in GOM deposits were identifiable. The deposits were located typically in indentations of VSMCs or in close vicinity to VSMC and they showed various structures of which only some resembled the structure characteristic of GOM.

Conclusions: Our experience, as well as that of other authors indicate that effective EM detection of GOM depends not only on the ability of EM operator and examination of an adequate number of small blood vessels but also on the patient's age. It should be emphasized that in our study case a successful EM examination required much time due to the fact that the patient's family history and positive result of genetic-testing only prompted us to search for GOM deposits.

Diagnostic yield and accuracy in frame-based stereotactic needle biopsy without intraoperative neuropathological verification

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Background and aim: Stereotactic biopsy is an established method of the diagnosis of brain tumors. Recently, with the advance in neuroimaging, use of intraoperative histological verification has been questioned. The aim of the study is to assess diagnostic yield and accuracy of stereotactic needle biopsy without intraoperative neuropathological examination, as verified with histological study after tumor resection.

Material and methods: We prospectively collected patients who underwent frame-based stereotactic biopsy between 2013 and 2015. Of 93 biopsied patients, 22, who later underwent open tumor resection, and in whom final histological diagnosis was obtained, were included in the study. Biopsies were performed under local anesthesia, using Inomed ZD system and PraezisPlus planning software. Multiple biopsy samples were taken from 2-4 sites within the tumor with side-cutting biopsy cannula. Tissue was inspected macroscopically by the surgeon and no neuropathological assessment was done intraoperatively.

Results: A positive diagnosis was established in 20 cases (90.9%). One biopsy revealed no neoplastic but necrotic tissue related to the central tumor necrosis on MRI, and another one revealed gliosis. There were no hemorrhagic or infective complications and none of the studied patients developed new neurological deficits after the operation. Histological diagnosis showed GBM in 6 cases, grade III glioma in 3, grade II in 10, DNET in 1, necrosis in 1, and gliosis in 1. Final histological diagnoses in these patients, based on openly resected tumor tissue, confirmed GBM diagnosis in all 6 cases, grade III glioma

in 2 of 3, grade II in 4 of 9, and DNET in 1 case. GBM was diagnosed in 1 case, previously assessed as grade III, grade III in 3 cases, previously diagnosed as grade II and GBM in 3 cases diagnosed as grade II. In 2 patients with necrosis/gliosis, final diagnosis was GBM. Majority of patients were discharged on the first postoperative day.

Conclusions: The described biopsy technique proved to have high diagnostic yield with excellent safety profile. Lack of intraoperative neuropathological examination did not negatively influence diagnostic accuracy of stereotactic biopsy.

Histopathological diagnosis of brain biopsy specimens – the risk of diagnostic pitfall

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The stereotactic biopsy of intracranial lesions is considered as a method with high diagnostic validity. Nevertheless, the histopathological diagnosis of brain tumours based on small tissue samples is associated with the risk of incorrect assessment of pathological changes. We would like to present the histopathological dilemmas associated with surgical stereotactic biopsy specimens.

The material from stereotactic biopsies obtained for the pathologic studies does not always allow for proper interpretation of morphological changes. In some cases, the biopsy specimen appears to be not representative for the whole tumour or contains only the margins of neoplastic infiltration with unspecific glial or mesodermal reaction. Moreover, the patient's follow-up is not always compatible with the defined grade of tumour malignancy. This especially refers to the tumours of astroglial origin, mainly glioblastomas, which exhibit significant histologic heterogeneity and variable degrees of differentiation in subsequent sections. It is possible to determine varying histological grades of malignancy in certain areas of the same tumour. Moreover, the identical cellular components and similar histopathologic patterns are common for tumours of different origin. The low grade astrocytomas, especially pilocytic astrocytomas with oligo-like component, might be upgraded but more often malignant gliomas are underestimated. Focal necrosis or accompanying glial reactive tissue may lead to a false diagnosis. Nonspecific reactive changes may occur in both non-neoplastic as well as neoplastic lesions. Serious diagnostic error may occur in patients with postradiation necrosis. The identification of the nature of brain lesions is typically confirmed by immunohistochemical studies but the expression of tumour markers are not always conclusive.

Conclusions: Our experience in surgical pathology indicates that histopathological diagnosis of stereotactic biopsies does not always allow to established the correct diagnosis. There is need to correlate the clinical data with findings obtained at biopsy material. It could be postulated that in the cases when the presumptive diagnosis of brain lesion is not conclusive, the clinical and neuroimaging findings should be the basis for appropriate therapeutic treatment.

Brain biopsy in the diagnosis of non cancerous lesions – cerebral amyloid angiopathy

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General clinical indications, contraindications and diagnostic approach to brain biopsy in non cancerous lesions are presented. A detailed description of cerebral amyloid angiopathy (CAA) cases diagnosed by biopsy are analyzed. CAA is a progressive degenerative disease characterised by the deposition of β-amyloid aggregates in the wall of the brain vessels. Of all brain stereotaxic and open neurosurgical biopsy performed in the years 2011–2015, 5 biopsies confirmed CAA. The study group consisted of 5 patients (3 women and 2 men), aged between 67 and 78 years, mean 74.4 ± 4.83. Neuroimaging done before brain biopsy suggests cerebral tumor in one case and in 4 cases intracerebral hemorrhage was suspected. Amyloid lesions were mostly found in cerebral vessels in moderate to severe grades of CAA according to Vonsattel's scale under an optical microscope. Older age of patients and characteristic MRI findings with T2* weighted gradient echo and SWI (susceptibility weighted imaging) can help to establish the correct clinical diagnosis of CAA.

Conclusions: 1. Brain biopsy is frequently a very useful tool to establish the final diagnosis. 2. Brain biopsy done to diagnose CAA is contraindicated. 3. Due to the risk during and after brain biopsy this procedure should be indicated after very careful analysis and multidisciplinary team consultation.

Comparison between Laitinen System and Vario-guide Brain-Lab System in obtaining diagnostic brain tumor tissue

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Introduction: Contemporary neurosurgery has benefited greatly from introduction of CT and MRI – compatible image-based stereotactic instrumentations. In image-based stereotaxy mechanical device is attached rigidly to the patients head and MRI or CT scan is obtained. The computer in the scanner determinates the three-dimensional coordinates of any point inside the brain in relation to the stereotactic space of the frame. Therefore tissue can be obtained safely from the deep structures of the brain with low mortality and morbidity rate.

Aim: Evaluation of Laitinen and Vario-guide Brain-Lab Systems in brain tumor biopsies.

Material and methods: Patients treated in the Neurosurgical Departament of University Hospital of Lublin from 2000 to 2008 underwent stereotactic biopsy using Laitinen Stereotactic System on the basis of CT scans under local anaesthesia. From 2008 biopsies are performed on the basis of MRI-scans for neuronavigation examination (thickness of slices – 1 mm) under general anaesthesia using Vario-guide Brain-Lab Stereotactic System. Data obtained from 30 patients who underwent biopsy using Laitinen System were compared with data collected form 30 patients who underwent biopsy using Brain-Lab System. Efficacy in obtaining a representative sample of tumor tissue, duration of the surgery, hospitalization time, complications rate and procedure costs were evaluated.

Results: Efficacy in obtaining a representative sample of tumor tissue is higher in the group operated using Brain-Lab System. Hospitalization time of these patients was also shorter. Hospitalization costs differed between the two groups while the number of complications in both groups was comparable.

Conclusions: Stereotactic biopsy is a safe procedure, effective in the diagnosis of intracranial neoplasmatic pathologies.

Biopsy diagnosis of neuromuscular diseases in children

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Skeletal muscle biopsy is a well recognized method in diagnosis of neuromuscular disorders, being in practical use for over 100 years. Tissue sampling include open surgical biopsy and needle biopsy, both having their followers and opponents. Muscle most often biopsied is quadriceps femoris due to its relatively large mass and accessibility. It is mandatory to process muscle sample to frozen sections with snap-freezing technique, and perform a panel of histochemical/immunohistochemical reactions concordant with the clinical suspicion. Most often performed panel includes: hematoxylin and eosin, modified Gomori trichrome stain, oil red O, succinate dehydrogenase (SDH), NADH dehydrogenase (NADH-D), cytochrome c oxidase (COX), acid phosphatase, myosin ATP-ase at pH 4.3; 4.6; and 9.4, periodic acid Shiff (PAS), picrosirius, etc. Immunohistochemical assessment in children usually include dystrophin and merosin among other selected antibodies. It is to be empasized that fixation in formalin and paraffin embedding is definitely improper processing in muscle biopsy material for histopathological assessment. Tissue blocks should be also submitted for transmission electron microscopy, at least to the stage of semi-thin epon section for initial assessment. Lesions that may be observed in skeletal muscle biopsy are traditionally divided into myopathic and neurogenic. Several disorders display the diagnostic or nearly diagnostic pattern. Approximately 30-50% of biopsies demonstrate non-specific lesions, or even no detectable pathology at all. In such cases further diagnostic approach should include multidisciplinary workout employing clinicians, biochemists, and molecular geneticists.

Biopsy-based assessment of mitochondrial ultrastuctural changes in patients with suspected mitochondrial disease

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Mitochondria are the powerhouses of cells. They generate chemical energy in ATP. They are also involved in the apoptosis signaling pathway. Mitochondrial disease represents a group of metabolic disorders commonly defined by a lack of or decrease in cellular energy due to oxidative phosphorylation (OXPHOS) defects. Mitochondrial disorders are a genetically heterogeneous group of different diseases caused by mutations in mitochondrial and/or nuclear DNA. These mutations may affect different ultrastructural changes of the mitochondria. We report on two patients with suspected mitochondrial disease. The clinical symptoms of the first patient (23-year-old woman) included myoclonic epilepsy, a mild form of the Fahr disease, bilateral sensorineural hearing loss and kidney stones. The patient was provided with cochlear implant HiRes 90K to the right ear. The diagnostic tests demonstrated elevated levels of lactate and creatine kinase (CK). Magnetic resonance imaging (MRI) scan of the brain showed focal changes in the basal ganglia. The other patient (38-year-old man) was admitted to the hospital with cognitive changes, extrapyramida-cerebellar syndrome, impaired hearing both sides and binocular cataracts. Magnetic resonance imaging scan T2 of the brain showed diffuse white matter changes and atrophy of cerebellum. Laboratory tests showed the increased levels of long-chain fatty acids and lactic acidosis. Ultrastructural studies were carried out by performing the biopsy of the biceps muscle derived from two patients with suspected mitochondrial disease. Tissue samples were fixed in 2.5% glutaraldehyde, post-fixed in 2% osmium tetroxide, and embedded in epoxy resin after dehydration. Ultrathin sections were counterstained with uranyl acetate and lead citrate and examined with a transmission electron microscope Opton DPS 109. On the biopsy examination proliferation and ultrastructural changes in the mitochondria in skeletal muscle fibres impaired were found in both patients. We also observed mitochondria showing altered shape, swelling, particularly in giant mitochondria, loss and/or altered configurations of cristea (concentric or irregular cristae), paracrystalic inclusions, vacuoles and lipid droplets. The presented ultrastructural changes in mitochondria are characteristic of a large group of mitochondrial diseases. The diagnosis of mitochondrial specific disease requires a complex synthesis of clinical, morphological, biochemical and genetic investigations.

Granular cell astrocytoma with features of high-grade glioma (WHO G IV). Case report

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Granular cell astrocytoma (GCA) is an uncommon brain tumor composed of granule cells of astrocytic lineage. GCA distinguishes from the others, usually benign granular cell tumors, seen elsewhere in the body, by its highly aggressive biological behavior. We report on the case of GCA in a 74-year man, with radiological and histological features corresponding to WHO G IV glioma (according to proposed grading system for GCAs by Brat *et al*. 2002). Radiologically, the right parietal tumor was contrast-enhancing and partially cystic, with prominent perifocal edema. Surgical subtotal resection of the tumor was performed. Histological examination of the surgical biopsy showed granular cell astrocytoma with malignant features. This tumor was composed of cells, filled with PAS-positive granules and immunoreactive for GFAP and CD-68. Furthermore, it demonstrated cellular pleomorphism, frequent mitoses and pseudopalisading necroses. Tumor cells expressed strong reactivity for EGFR and focal nuclear expression of p53. Proliferative MIB-1 labeling index was about 20%.

The presented case illustrates the potential malignancy of GCA showing some morphological and cytogenetic features of glioblastoma in primary tumor. In literature, GCA with transformation to glioblastoma were mainly observed in cases with progression and recurrence of the tumor.

The role of the biopsy in the diagnosis of vascular malformation of the central nervous system – clinical, radiological and neuropathological features

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The diagnosis of vascular malformation of the central nervous system (CNS) is usually based on characteristic radiological features. Biopsy is performed only in a few cases of vascular malformation with nonspecific clinical symptoms and nondiagnostic radiological images. In this study seven cases of vascular malformation of the brain and frontal squama with neuroimaging findings representative of vascular malformations, were verified histologically. Radical surgical removal was performed in all of lesions. Biopsy was performed in only one case: a 46-year-old women who suffered from low back pain with lesion in spinal canal described in magnetic resonance imaging (MRI) as probable benign extradural tumor at the L1-L2 level, compressing dural sac and spinal cord (imaging study suggested meningioma or neurofibroma). Surgical specimen and biopsy material were embedded in paraffin, then histological and immunohistochemical methods assays were performed. In all lesions removed from the brain and frontal squama the neuropathological study confirmed radiological diagnosis. All cases exhibited microscopic findings characteristic of vascular malformations: collections on nonneoplasmic blood vessels, abnormal in the structure or the number, composed of normal and malformed arteries, veins or their mixture. Neuropathological examination of biopsy specimen revealed lesions consisting of numerous pathological blood vessels, mostly thin-walled with one layer of endothelium. Among them a few vessels with thicken wall and amorphous eosinophilic material in the lumen of vessels were seen. Vascular malformation of different structure was recognized. Neurosurgeons face much difficulty in evaluating patients for biopsy. In patients with progressive symptomatic lesions with diagnostically inconclusive laboratory and imaging studies biopsy is sometimes necessary. It is important that the neuropathological diagnosis of biopsy specimen give an opportunity to provide the specific and lesion-directed treatment.

Cerebral toxoplasmosis mimicking a brain tumour

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In HIV-infected patients toxoplasmosis is a frequent cause of mass lesions in the central nervous system (CNS). We analysed two HIV positive cases of cerebral toxoplasmosis, diagnosed as a result of neurosurgical intervention and neuropathological examination. The clinical symptoms of the first patient (a 40-year-old man) were manifested by cognitive changes with disorders of consciousness, leukopenia and oral candidiasis. Magnetic resonance imaging (MRI) scan of the brain showed a compact-cystic lesion with surrounding edema in the left cerebral peduncle and temporal lobe. The other patient (a 58-year-old man) was brought to the Department of Neurology because of seizure, head trauma and left hemiparesis. A cranial MRI revealed homogeneously enhancing lesion located at the parietal lobe with surrounding edema. Based on the MRI findings, possible primary brain tumours were diagnosed in these two cases. Neuropathological examination of biopsy specimens showed areas of necrosis walled by a broad band of macrophages, occlusive hypertrophic vessels and perivascular micronodules composed of histiocytic/lymphocytic and microglial cells. Microglial nodules were also frequently seen, while astroglial reaction was relatively rare. Single toxoplasmic cysts and trophozoides positive for anti-*Toxoplasma gondii* (clone TP3) antibody spread freely in the brain specimens. In the first patient serological tests confirmed the sero-positive reaction for IgG antibody responses to *Toxoplasma gondii*. The non-invasive diagnosis of cerebral toxoplasmosis is very important. Serologic assays and imaging can be used to diagnose toxoplasmosis. Unfortunately, up to 20% patients with CNS toxoplasmosis are sero-negative for *Toxoplasma gondii*. On neuroimaging examination a specific T2W/ Flair "concentric target" sign (concentrically hypo- and hyperintense zones) are not always visible. Therefore, the distinction between cerebral toxoplasmosis and CNS lymphoma and tuberculosis is a challenging task. In our opinion the brain biopsy proves to be an important diagnostic method, since the identification of toxoplasmic cysts and trophozoides (tachyzoides) provides a reliable diagnosis of cerebral toxoplasmosis.