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CLINICAL CASE OF REMOVING SUPRACEREBELLAR TUMOR OF POSTERIOR CRANIAL FOSSA.

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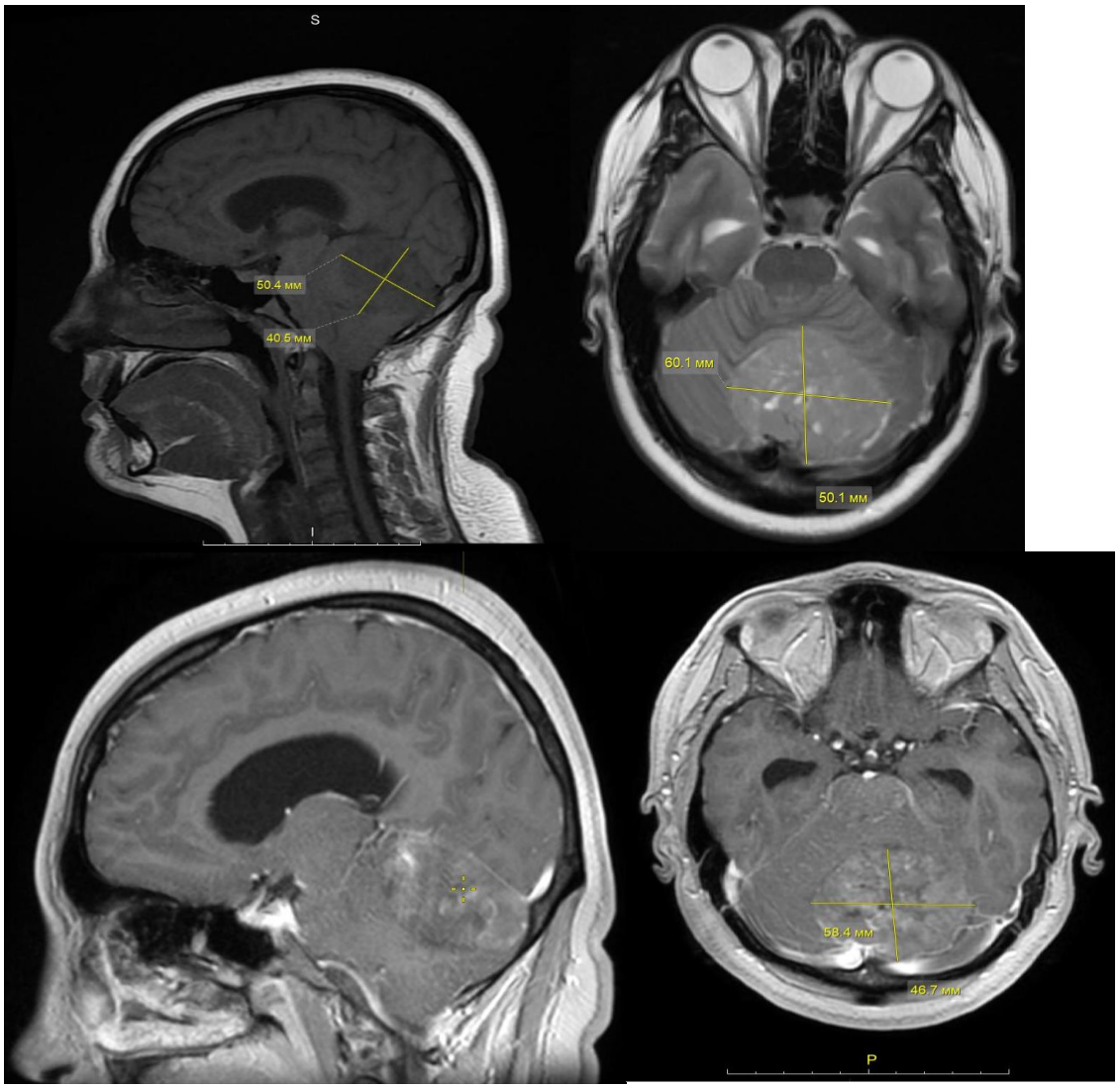
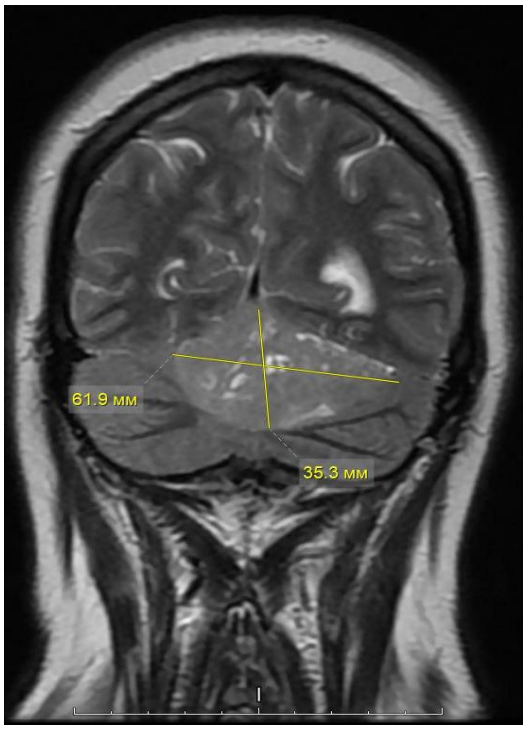
Abstract: Medulloblastoma (MB) is an embryonal tumor originating from the midline cerebellum with the potential for leptomeningeal spread [1]. MBs account for 61.9% of all posterior fossa embryonal tumors and account for 14.3% of childhood mortality [2–5]. Early diagnosis of MB is difficult due to the initial nonspecific clinical symptoms, especially in very young children. The most common signs of posterior fossa space-occupying lesions are symptoms of intracranial hypertension, visual and cerebellar disturbances, as well as seizures, behavioral changes, and cranial nerve deficits [6–9].

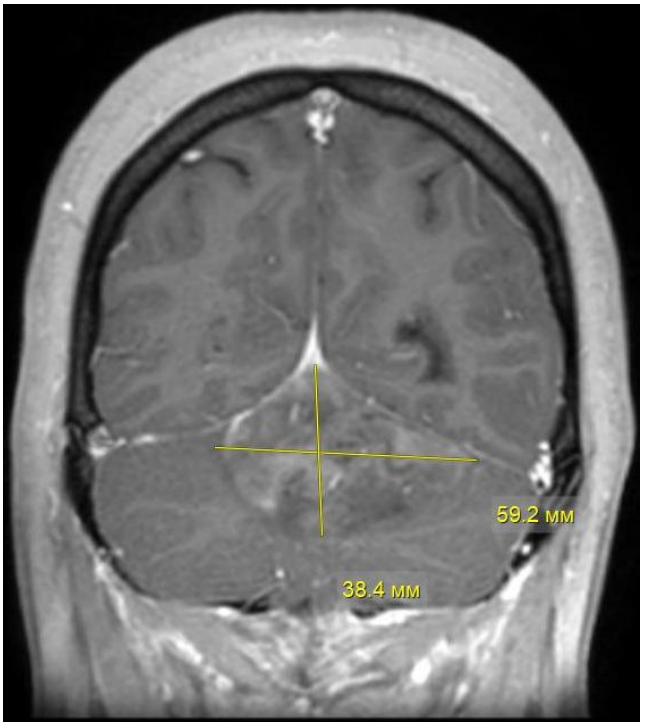
Keywords: medulloblastomas; power Doppler; grayscale; radiographic progression.

Neuroimaging data are critical for the comprehensive evaluation of posterior fossa tumors [10]. Computed tomography (CT) is the first radiographic study to document the presence of hydrocephalus and detect a space-occupying lesion in the posterior fossa. Further differentiation of the mass lesion requires contrast-enhanced magnetic resonance imaging (MRI) with multiple sequences [11]. Conventional MRI without contrast provides limited information on the extent and type of the tumor [3]. Surgery to achieve maximal total resection continues to play a crucial role in the treatment of medulloblastomas [12]. The goal of surgical treatment of MB is maximal safe resection to slow down progression and improve survival, relieve symptoms and provide adequate tissue for histological examination. The prognosis of the disease mainly depends on the totality of resection [8]. Patients older than 3 years are stratified depending on the volume of postoperative residual tumor and the presence or absence of metastases into the categories of “standard risk” and “high risk” with long-term survival rates of approximately 85% and 70%, respectively [13, 14].

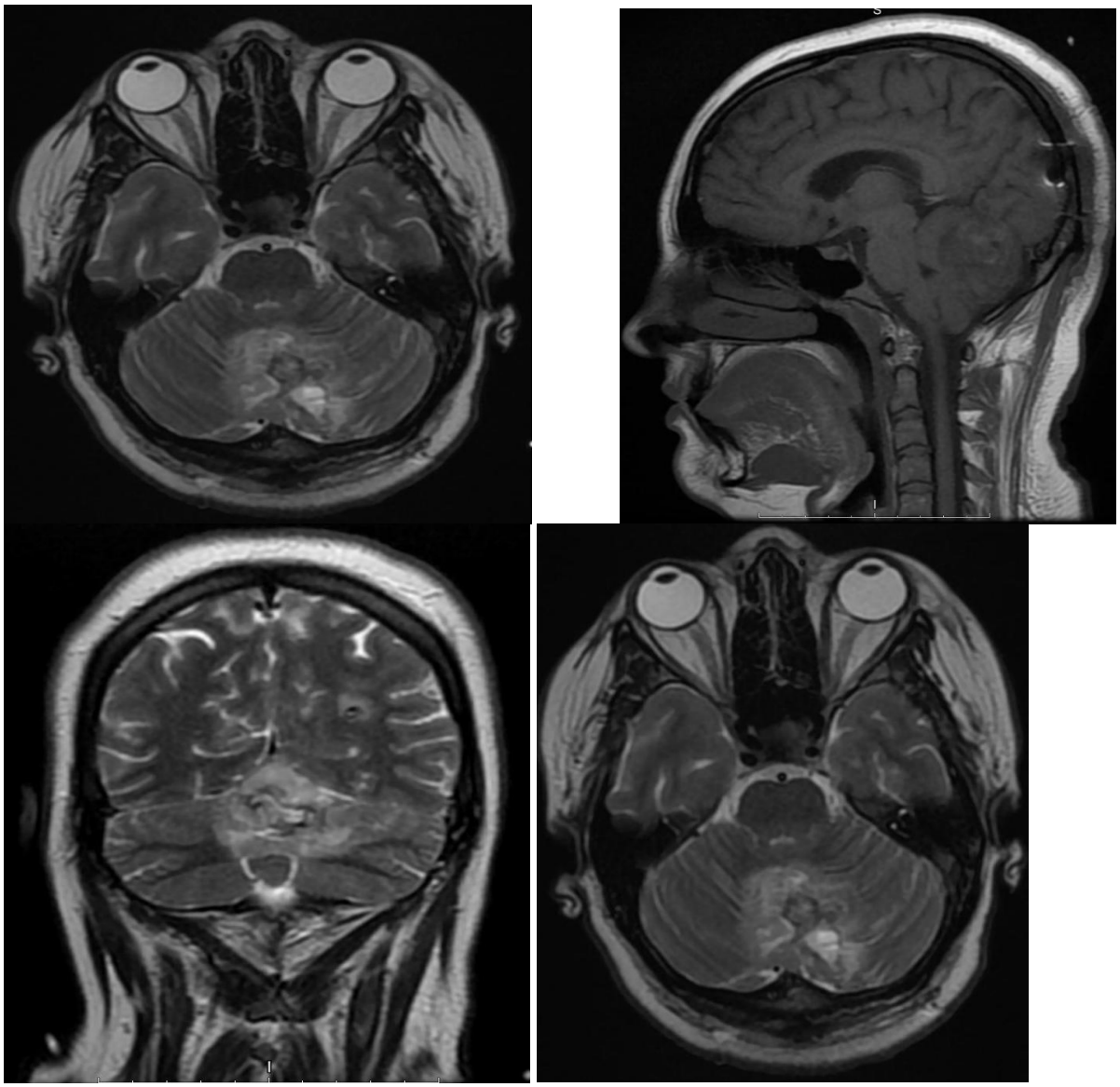
A craniotomy was performed in the nape of the skull and microsurgical removal of a supracerebellar tumor in the area of the cerebellar hemispheres through the suboccipital transtentorial approach.







Post operation



Suboccipital paramedian approach The paramedian approach was used to approach tumors of the meningiomas of the free edge of the tentorium cerebelli, lateral and posterior surfaces of the cerebellar hemisphere, posterior facet of the pyramid of the temporal bone, lateral parts of the foramen magnum, and intracerebral tumors of the cerebellar hemisphere. When planning the paramedian approach, the same bone landmarks were used as when planning the median approach. In addition to the projection lines "E", "D", "C" and the Frankfurt horizontal, line 5 (base of the mammillary process) was used, limiting the base of the posterior cranial fossa. In addition to the craniometric parameters described above, the conditions for performing paramedian suboccipital craniotomy were influenced by the length of the chord of the occipital arch - the distance from the internal occipital eminence to the base of the pyramid. With the value of this parameter of 75 mm or more, along with a favorable combination of the values of the parameters described above, conditions are created for choosing the optimal location and size of the trepanation window in accordance with the access parameters. With a chord length of the occipital arch of less than 75 mm, to ensure the optimal angle of surgical action, we planned to expand the trepanation window closer to the midline. A wide posterior cranial fossa (chord length of the occipital arch of more than 75 mm) differed from other forms by a massive base, greater expression of the mammillary process and thickness of the occipital bone. When planning an approach to the free edge of the tentorium cerebelli, its configuration was assessed by a combination of the angle between the axis of the straight sinus with the Frankfurt horizontal and the width of the posterior cranial fossa. In a wide, shallow form of the posterior cranial fossa, the combination of these parameters is most favorable from a surgical standpoint; the cerebellar tentorium had a flat shape. Suboccipital retrosigmoid approach Retrosigmoid approach was used to remove acoustic neuromas, meningiomas of the

posterior edge of the petrous temporal bone and tentorium cerebelli. The following bone landmarks were used when planning the retrosigmoid approach: external occipital eminence "INION" (i), posterior edge of the foramen magnum "OPISTION" (o), junction of the parietal, temporal and occipital bones "ASTERION" (As), posterior base of the mastoid process (oCO) (Fig. 6). When modeling the retrosigmoid approach to the internal auditory canal zone to perform the required range of manipulations, we were guided by the average access parameters: angle of surgical action - 18-20 °, depth of access - 45-55 mm, angle of surgical permissibility no more than 10-15 ° from the access axis [3]. The conditions for observing these parameters were determined by the length of the temporal bone pyramid being less than 70 mm, the angle of convergence of the pyramidal axes being less than 105°, and the pyramidal-occipital angle being more than 75°.The maximum possible parameters of the retrosigmoid approach were achieved when removing meningiomas of the posterior edge of the temporal bone pyramid with a posterior cranial fossa width of less than 117 mm and a depth of more than 33 mm, while there was no need to expose the edge of the sigmoid sinus. In a long, wide posterior cranial fossa, in order to avoid significant traction of the cerebellar hemisphere, it is advisable to immediately plan resection of its lateral sections or perform resection of the mastoid process and part of the pyramid to expose the dura mater in front of the sigmoid sinus (in the discussed form of the fossa up to 15 mm with displacement of the sigmoid sinus). This allows reducing the depth of access by an average of 20 mm while maintaining the optimal angle of surgical action. The most favorable conditions for manipulations in the area of the internal auditory canal were created in a narrow, short posterior cranial fossa. Favorable conditions for access to petroclival meningiomas were observed when the matrix was located predominantly subtentorially, the pyramid length was less than 66 mm, the angle of convergence of the pyramid axes was up to 100º, and the angle of inclination of the clivus from the plane of the foramen magnum was less than 118º. Similar conditions were observed in the short, wide form of the posterior cranial fossa, where the angle of convergence of the pyramid axes was optimal, the pyramid was displaced posteriorly, the apex was inward, and the upper edge of the pyramid was lowered. In the long, wide, deep posterior cranial fossa, the combination of craniometric parameters made it impossible to use the retrosigmoid approach to approach the petroclival region. In these cases, it is necessary to consider the use of a combined transtentorial approach. Conclusions 1. Generalized analysis of longitudinal-latitudinal parameters of the bone-shell framework of the posterior cranial fossa, projection analysis data of computer and magnetic resonance tomograms using the visualization mode of vessels and sinuses of the dura mater allows us to identify individual features of craniocerebral topography depending on the tumor localization and use them when choosing and planning surgical access. 2. Planning surgical access using an individual anatomical model of the posterior cranial fossa is an effective tool for optimizing parameters, increasing accuracy and reducing trauma of surgical approaches in surgery for tumors of the posterior cranial fossa.The most favorable conditions for manipulations in the area of the internal auditory canal were created in a narrow short posterior cranial fossa. Favorable conditions for access to petroclival meningiomas were formed when the matrix was located predominantly subtentorially, the pyramid length was less than 66 mm, the angle of convergence of the pyramid axes was up to 100º, and the angle of inclination of the slope from the plane of the foramen magnum was less than 118º. Similar conditions were noted in a short wide form of the posterior cranial fossa, where the angle of convergence of the pyramid axes was optimal, the pyramid was shifted posteriorly, the apex was inward, and the upper edge of the pyramid was lowered. 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Literature review

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