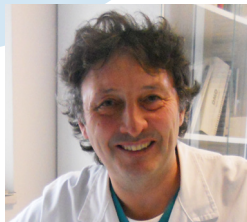


# Clinical Sheet

## DURAL PLASTIC SURGERY WITH EQUINE PERICARDIUM MEMBRANE

Surgical removal of a meningioma of the right parietal convexity and dural reconstruction with Heart pericardium membrane.



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Cerebral meningioma is a tumor originating from the meninges, the membranes enveloping the central nervous system. It is a mainly benign tumor and represents the most common among primary intracranial neoplasms, approximately 13-26% of the total. The incidence of the neoplasm is greater in old age and in women, in whom it occurs with a 2:1 ratio compared to men.<sup>1</sup>

The treatment of choice is surgery. The aim of the procedure is complete resection of the tumor mass and of the dura mater portion from which it originates. In most cases, dural plastic surgery is indicated by means of an appropriate substitute in order to restore its integrity and continuity.

<sup>1</sup> Marosi, C. et al. Meningioma. *Crit. Rev. Oncol. Hematol.* 67, 153–171 (2008)

## Materials

The dural plastic surgery was performed using the Heart pericardium membrane (HRT-42DM, Bioteck, Italy).

The membrane is produced from equine pericardium by a patented enzymatic process (Zymo-Teck) which preserves its collagen content in native structure as well as its three-dimensional texture.

This gives it high mechanical resistance which

makes it suitable for sutures and impermeable to cerebrospinal fluid, ensuring dural reconstruction is "watertight".

The membrane is resorbable and available in various sizes and shapes, also suited to covering wide defects.

The equine origin and exclusive manufacturing process make it safe with regards to the risk of transmitting encephalopathies and possible release of chemical residues in the graft site.



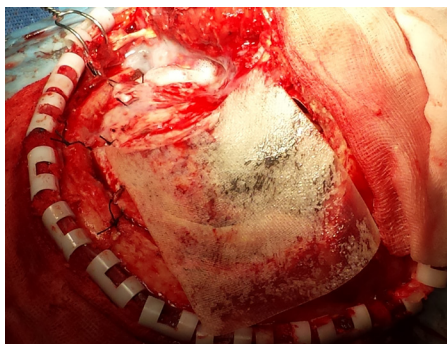
**Fig. 1** – Preoperative magnetic resonance in axial section that shows the presence of the expansive lesion in the right parietal convexity.



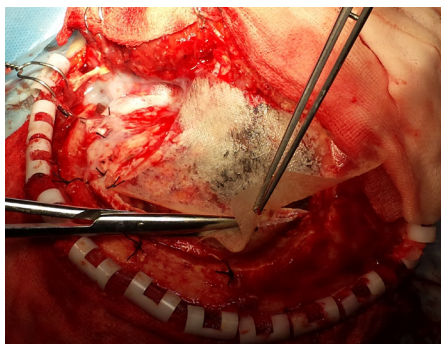
**Fig. 2** – Preoperative magnetic resonance in coronal section. Notice the compression of the cerebral tissue adjacent to the tumor lesion.



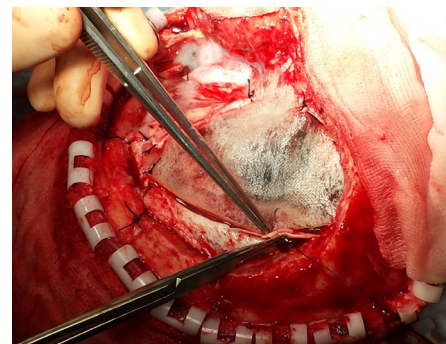
**Fig. 3** – The Heart membrane prior to hydration and molding. It is available in surgical package and beta-ray sterilized in order to preserve its biological and mechanical features.



**Fig. 4** – Positioning the pericardium membrane on the dural defect area.



**Fig. 5** – After fixing it at one end, the membrane is cut out to remove the excess portion and adapt it to the shape of the defect.



**Fig. 6** – Suture with 3/0 silk single stitches.

# DURAL PLASTIC SURGERY WITH EQUINE PERICARDIUM MEMBRANE

Surgical removal of a meningioma of the right parietal convexity and dural reconstruction with Heart pericardium membrane.

## Results

The case regards a patient hospitalized after a partial seizure episode.

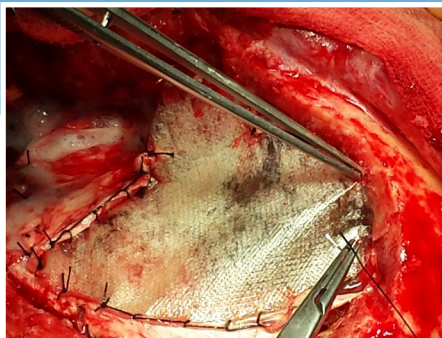
Neurological examination found a deficit of the left hand's fine movements. Magnetic resonance imaging highlighted the presence of an expansive right parietal extracerebral lesion. Surgery for right parietal craniotomy and excision of the tumor was planned.

The patient was placed supine on the operating table, his head turned to the left and set in the Mayfield head holder. A horseshoe-shaped right parietal skin incision was carried out followed by parietal craniotomy. This was followed by incision of the dura mater and dural suspension on the edge of the craniotomy. Lesion debulking was performed by means of ultrasonic aspiration. After identifying the correct cleavage plane between

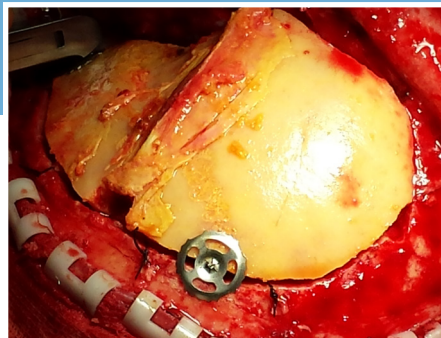
meningioma and brain tissue, tumor and adhesions resection was performed.

Upon completing hemostasis, dural plastic surgery was performed with a Heart pericardium patch. After hydrating in saline, the membrane was cut, adapted to the defect profile and sutured to the patient's dura mater. After re-positioning the bone flap with neurosurgical clips, the surface planes were fixated with drainage.

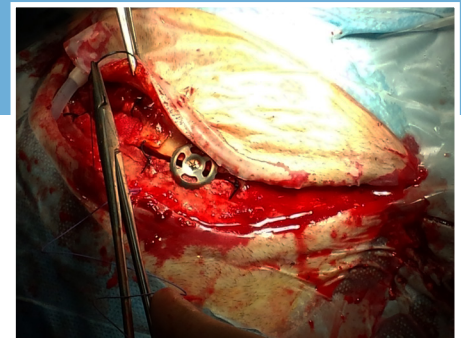
Postoperative MRI showed successful removal of the entire neoplastic formation and the absence of complications. Clinical and radiological follow-up after one year confirmed the good clinical outcome of the procedure and the excellent bio-compatibility of the grafted dural substitute. The surgical images provide an example of membrane use and do not refer to the specific case in question.



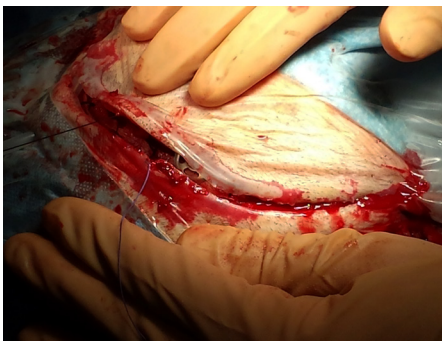
**Fig. 7** – Completion of "watertight" dural closure.



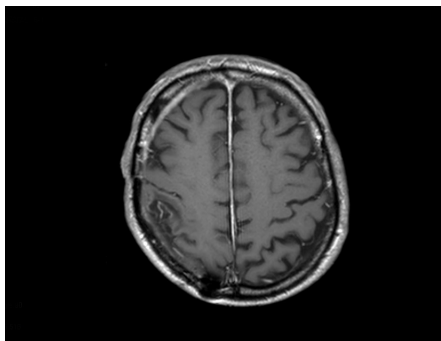
**Fig. 8** – Replacement of the bone flap and clamping with fixation devices (Craniofix, Aesculap AG, Tuttlingen, Germany).



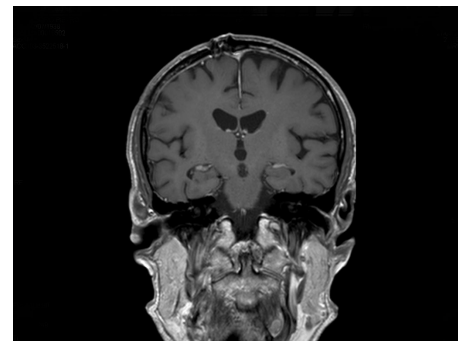
**Fig. 9** – Subcutaneous fixation with drainage.



**Fig. 10** – Suture of superficial planes.



**Fig. 11** – Magnetic resonance imaging in axial section 13 months after surgery. The absence of delayed onset complications is confirmed (edema, foreign body reactions, dural fistulas)



**Fig. 12** – Magnetic resonance imaging in coronal section 13 months after surgery.