DURAL CLOSURE BIOMATERIALS

Clinical Series

Mr Marcel Ivanov, MD, PhD, MSc, FRCS
Consultant Neurosurgeon and
Spine Surgeon,
Sheffield Teaching Hospitals, UK

Use of Lyomesh™ augmented with TissuePatchDural™ for repair of dural defect in spinal cord herniation.

Pre-operative status

A 36 year old lady with a background of NF1 underwent surgery for excision of C1 intradural extramedullary dumbbell tumour (Fig 1.a) which was located anterolaterally to the spinal cord. The dura was closed in a standard fashion using 5.0 non-resorbable stitch and a patch of "artificial dura" from another provider. The patient had complete resolution of her symptoms postoperatatively. Postoperative MRI at 8 weeks confirmed adequate tumour excision and decompression of the spinal cord (Fig 1.b).
At 12 months postoperatively she presented with new deterioration of her myelopathy, burning dysesthesia in her upper limbs. The follow up MRI scan confirmed that there was no evidence of tumour recurrence, however there was posterior herniation of the spinal cord through the previously repaired dural defect (Fig 1.c).

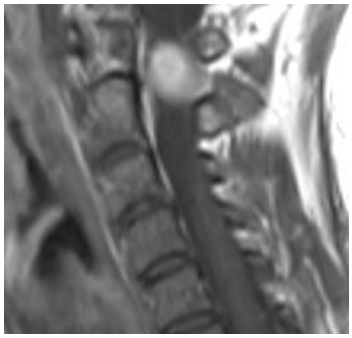

Figure 1a. Pre-operative MRI - Intradural extramedullary tumour.

Figure 1b. Post-operative MRI - Tumour excision.

Figure 1c. Pre-operative MRI - Posterior herniation of spinal cord.

Figure 1d. Post-operative MRI - restoration of the normal anatomy.

Surgical procedure

The patient underwent revisional surgery. She was placed prone with the head fixed using a Mayfield clamp. Microscopic dissection of the soft tissue surrounding the spinal cord herniation was facilitated by the presence of small fluid collection from the pseudomeningocelle (Fig 2.a).

Under high magnification and intraoperative neurophysiological monitoring guidance the herniated and "strangulated" part of the spinal cord was sharply dissected from the surrounding dura, avoiding manipulation of the neural tissue with enlargement of the dural defect. Once released, the herniated part of the spinal cord was reintroduced to the spinal canal (Fig 2.b).

The remaining dural defect was repaired using Lyomesh™ dural substitute, which was trimmed to size and sutured to the normal dura circumferentially with separated stitches. With the purpose of achieving a supplementary watertight barrier, TissuePatchDural™ dural sealant film was placed extending several millimetres laterally and cranio-caudally over the repaired dura (Fig 2.c).

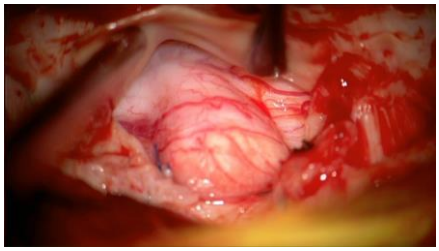

Figure 2a. Spinal cord herniation.

Figure 2b. Dural defect with Lyomesh™ in place prior to suturing.

Figure 2c. Dural defect after repair with Lyomesh™ and TissuePatchDural™.

The Valsalva manoeuvre confirmed watertight closure of the dura. The rest of the wound was closed in layers and the patient was discharged home 72 hours post-surgery.

The MRI of the cervical spine at 6 months postoperatively confirmed complete repair of the spinal cord herniation and restoration of the normal anatomy (Fig 1.d).

Summary and Surgeon's opinion

The use of Lyomesh™ facilitated a safe repair of the dural defect avoiding inadvertent damage to the herniated spinal cord situated immediately underneath. The fact that it was transparent was very helpful in order to perform a controlled suture with the tip of the needle being clearly visible under the patch of Lyomesh™.

Postoperatively the patient recovered well with no CSF leak.