Cerebrospinal Fluid Seepage through Polyglactin 910 Dura Substitute Manifested as Spinal Extradural Collection of Fluid

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Following excision of pilocytic astrocytoma, a 12-year-old girl underwent posterior cranial fossa synthetic duraplasty with polyglactin 910 mesh. On the 8th postoperative day, unusual extradural collection was diagnosed by spinal magnetic resonance imaging. On the 14th postoperative day, cerebrospinal fluid leakage in the upper part of the postoperative wound was noticed. Unusual extradural collection detected by spinal magnetic resonance imaging was assumed to be the consequence of cerebrospinal fluid seepage and a warning sign of cerebrospinal fluid leakage following synthetic posterior fossa duraplasty. This case shows that polyglactin 910 mesh may be ineffective when used for posterior cranial fossa duraplasty in children, although it is considered as valuable as autologous tissue.

Key words: cerebrospinal fluid; cranial fossa, posterior; dura mater; magnetic resonance imaging; spinal fluid pressure

Discussion

Polyglactin 910 dura graft is a watertight film of bovine collagen covering both sides of a Vicryl mesh: it is easy to use, supports ingrowth of
fibroblasts and production of a new collagen layer resembling the original host dura (2,3). However, it seems that it may be ineffective in some patients. Resorption of such substitutes within two weeks after surgery was reported (4), which is in line with our observation. Pare and Batzdorf (5) described 2 cases of pseudomeningocele due to perforations in the pseudodura following posterior fossa polyglactin 910 duraplasty. Our case also suggests that the absorption of Vicryl collagen may be too rapid for posterior fossa duraplasty and may not allow the formation of pseudomembranes in a structurally competent manner. Cerebrospinal fluid finding of 120 cells per mL, predominantly reactive lymphocytes, could be a sign of an immunological reaction to a foreign peptide.

The present case is interesting because of the unusual intraspinal collection seen on spine magnetic resonance imaging scans on the 8th postoperative day, 6 days prior to cerebrospinal fluid leakage through the upper part of the postoperative wound. Shaw et al (6) presented 10 children who underwent staging spinal magnetic resonance imaging 6 to 12 days after resection of a posterior fossa tumor. All 10 patients in the series developed postoperative pseudomeningocele over the craniectomy site, but without subsequent cerebrospinal fluid leakage. In 4 out of 10 patients, subdural enhancement was visible on spinal magnetic resonance scans, but there was no hyperintensity on noncontrast images. Rabin et al (7) published a report on 3 patients with spontaneous intracranial hypotension and spinal magnetic resonance imaging finding of ventral extradural fluid collection at the site of cerebrospinal fluid leakage. These collections were hyperintense relative to the intensity of cerebrospinal fluid on proton density weighted images and isointense on T1- and T2-weighted sequences. The collections did not enhance in the presence of intravenous contrast material. They concluded that these spinal fluid collections were most probably caused by extradural cerebrospinal fluid leakage and its accumulation. We suspect that the collection of fluid in our case was located extradurally, because of its biconvex shape and asymmetrical posterior location. This is supported by the finding of hyperintense quality of the collection on T1- and T2-weighted images due to both the decrease of cerebrospinal fluid pulsation within the extradural collection and cell and protein content of the fluid. The enhancement with contrast material was probably caused by venous engorgement, which followed impaired venous drainage due to the compression by the collected fluid.

In summary, extradural hyperintense spinal collection that enhances with contrast can be a warning sign of cerebrospinal fluid leakage following synthetic posterior fossa duraplasty. Moreover, synthetic dura patch cannot be recommended for posterior fossa duraplasty in general and especially in children.

References

Figure 1. Spine magnetic resonance imaging 8 days after surgical resection of a posterior cranial fossa tumor and polyglactin 910 duraplasty in a 12-year-old girl. Left: sagital T1 weighted magnetic resonance imaging of the spine revealed hyperintense extradural collection that enhanced with a contrast. Right: axial magnetic resonance imaging scan at T5 level revealed an extradural biconvex collection.


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