Unintended durotomy

Unintentional opening of the dura during spinal surgery has an incidence of 0.3–13% (risk increases to ≈ 18% in redo operations) [1].

Terminology: The terms “unintended durotomy,” “incidental durotomy,” or even just “dural opening,” have been recommended in preference to “dural tear” which may imply carelessness.

Cerebrospinal fluid fistula is a common complication of surgery involving the lumbar spine.

Cerebrospinal fluid fistula can be troublesome, leading to pseudomeningocele, cutaneous cerebrospinal fluid fistula, and meningitis. Revision surgery is unavoidable in some cases.

Etiology

Potential causes are many, and include: [2]

unanticipated anatomic variations, adhesion of the dura to removed bone, slippage of an instrument, an obscured fold of dura caught in a rongeur or curette, thinning of the dura in cases of longstanding stenosis, and the possibility of a delayed CSF leak caused by perforation of the dura when it expands onto a surgically created spicule of bone [3]. The risk may be increased with anterior decompression for OPLL, with revision surgery, and with the use of high-speed drills [4].

Risk factors

523 patients who underwent lumbar and thoracolumbar spine surgery, were compared in whom a dural tear occurred with data from patients who did not experience durotomy. The data included basic demographic information, intraoperative data, and clinical information from a medical record review.

131 patients underwent discectomy and 392 patients underwent laminectomy. Among the 131 patients who underwent discectomy 6 patients had a dural tear. Among the 392 patients who underwent laminectomy 49 patients had dural tear. Patients with incidental durotomy were older (mean 65 ± 13 vs 60 ± 14 years of age; $p = 0.044$, t-test), and had longer surgery (146 ± 59 vs 110 ± 54 minutes; $p = 0.025$, t-test), compared with the patients without dural tear. The incidence of dural tear was more common in patients with a history of previous spine surgery ($p < 0.001$).

In patients who underwent lumbar and thoracolumbar spine surgery for degenerative problems, previous surgery and older age were found to be predisposing factors for dural tear [5].

Open Versus Tubular Revision Microdiscectomy

The incidence of durotomy and postoperative CSF fistula in lumbar revision microdiscectomy does not significantly differ between minimal access and standard open procedures.

Prevention

Usage of a polyethylene glycol (PEG) sealant in combination with standard closure techniques has been shown to be effective in preventing Cerebrospinal fluid fistulas in animal models and adult patients, but the results of its use have not been reported in the pediatric population.

Results of a study indicated no benefit of prolonged flat bed rest (BR), after an adequately repaired incidental durotomy in lumbar spine surgery [6].

Treatment

Unintended durotomy treatment.

Outcome

It can lead to significant patient morbidity and mortality, including meningitis and even death.

The impact of durotomy on long-term outcomes remains a matter of debate. In the Spine Patient Outcomes Research Trial (SPORT), during first-time lumbar laminectomy for lumbar spinal stenosis did not impact long-term outcomes in affected patients [7].

Case series

Unintended durotomy case series.

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