Unintended durotomy treatment

There is currently no most ideal technique among the available options. The choice of which technique to be applied in each case is dependent on each surgeon's cumulative experience as well as a clear understanding of the contributory underlying factors in each patient, the nature and site of the leak, the available facilities and equipment [1)].

If the opening is recognized at the time of surgery, the primary watertight dural closure (with or without patch graft) should be attempted with nonabsorbable suture if at all possible to prevent pseudomeningocele and/or CSF fistula. A cottonoid placed over the opening prevents aspiration of nerve roots [2)]. Care must be taken to avoid incorporating a nerve root into the closure. Most repairs will be accomplished with no complication or sequelae to the patient. When the opening is in the far (anterior) side of the dura, consideration may be given to intradural repair accessed through a posterior durotomy which is subsequently closed (this may risk additional injury to the nerve roots). Biocompatible fixatives (e.g. fibrin glue [3)]) may be used to supplement primary closure. Primary repair may be impossible in some situations (e.g. when the opening cannot be found or accessed, as is sometimes the case when it occurs on the nerve root sleeve) and alternatives here include placement of a fat or muscle graft over the suspected leak site, use of the patient’s own blood for a “blood patch” (one technique is to have the anesthesiologist draw ≈ 5–10 ml of the patient’s blood from an arm vein, keeping it in the syringe for several minutes until it starts to coagulate, and then to have the anesthesiologist inject the blood onto the dura), use of gelfoam, fibrin glue… Some recommend that the wound not be drained post-op, with a water-tight closure of fascia, fat, and skin to add to the barrier. Others use a subcutaneous drain or epidural catheter. CSF diversionary procedures (e.g. through a drain inserted 1 or more levels away) may also be used. Although bed rest × 4–7 days is often advocated to reduce symptoms and facilitate healing when watertight closure has been achieved, normal post-op mobilization is not associated with a high failure rate (bed rest is recommended if symptoms develop) [4)]. In one report of 8 patients with leaks that appeared post-op, reoperation was avoided when treated by resuturing the skin under local anesthesia, followed by bed rest in slight Trendelenburg position (to reduce pressure on the leakage site), broad spectrum antibiotics and antibiotic ointment over the skin incision, and daily puncture and drainage of the subcutaneous collection [5)].

Various techniques have been described to manage this complication, such as bed rest, repair with dural substitutes, fibrin glue, gelatin sponge, lumbar drain, muscle flap, etc. Through objective evaluation of the evidence and transparency in the process of making recommendations, it is Chinese Association of Orthopaedic Surgeons' goal to develop evidence-based clinical practice guidelines for the treatment of incidental DT and the consequent CSF leak during spine surgery. The current clinical guidelines focus on 9 clinical questions and the strength of recommendations were made based on the quality of the literature. The work group considers that this guideline recommendations aim to assist in delivering optimum, efficacious treatment and functional recovery from this complication [6)].

The dural closure technique after incidental dural tear during lumbar spine surgery does not seem to influence revision surgery rates due to CSF leakage and its complications. Further prospective

randomized studies are needed to confirm these results [7].

A questionnaire was sent to 149 German neurosurgical departments. In the following 4 weeks 109 replies (73.2 %) were received.

Seventy-one neurosurgical departments (65.1 %) treat dural tears by a combination of methods, 28 (25.7 %) with suture alone, 7 (6.4 %) with fibrin-coated fleeces alone, 2 (1.8 %) with muscle patch alone and 1 (0.9 %) with fibrin glue alone. Sixty-six neurosurgical departments (60.5 %) decide on postoperative bed rest depending on the quality of the dural closure. Forty-three (39.5 %) neurosurgical departments do not rely on the quality of the dural closure for their postoperative management. In total, 72.5 % of the neurosurgical departments prescribe bed rest for 1-3 days, 1.8 % for more than 3 days, whereas 25.7 % allow immediate mobilization.

Among German neurosurgeons, no consensus exists concerning the intra- and postoperative management of accidental durotomies in lumbar spine surgery. Despite not being proved to reduce the rate of cerebrospinal fluid fistulas, bed rest is frequently used. As bed rest prolongs the hospital stay with additional costs and has the potential of a higher rate of medical complications, a prospective multicenter trial is warranted [8].

PEG sealant

A retrospective analysis was performed of pediatric neurosurgery patients (0-18 years of age) treated at The Johns Hopkins Hospital from 2003 to 2010. There were 93 spinal surgery patients identified in whom PEG was applied. The incidence of CSF leakage, meningitis, and neurological injury was recorded. There were 54 males and 39 females in this study with an average age of 8.7 years. Of the identified patients, 16.1%, 28%, and 55.9% underwent surgery in the cervical region, thoracic region, and lumbar region, respectively. Results At 90-day follow-up, 5 patients (5.4%) had a CSF leak, 4 patients (4.3%) required a reoperation, and 1 patient (1.1%) had meningitis within this time period. No deaths or associated neurological deficits were observed.

The use of a PEG sealant to augment dural closure in pediatric spine surgery appears to be a safe adjunct to standard dural closure in pediatric spine patients [9].

The application of a fibrin sealant patch alone is an effective strategy for dural repair in revision lumbar microdiscectomy [10].

Bed Rest

see Bed rest for unintended durotomy treatment.

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