

Introduction

- Spinal surgery poses a risk of injury to the dura which can lead to a cerebrospinal fluid (CSF) leak. An occult dural tear may occur whereby the tear and leak are initially undetected.
- Patients with a CSF leak can experience signs of meningeal irritation such as neck stiffness, nausea, neurological deficits, and sometimes a subcutaneous fluid collection known as a pseudomeningocele.
- Patients can also experience a postural headache which improves with lying down and worsens when sitting up, known as a post-dural puncture headache (PDPH). Most PDPH will self-resolve in 7-10 days with conservative treatment including hydration, caffeine, and bedrest.
- For a non-resolving PDPH, surgery may be required to repair the dural tear. Alternatively, an epidural blood patch (EBP) can be considered as a lower risk intervention for symptom control while the dural tear heals.
- An EBP is performed by injecting autologous blood into a patient's epidural space. The blood in this space is hypothesized to allow the CSF pressure to normalize and symptoms to dissipate.
- Performing an EBP can be a helpful procedure to avoid possible complications related to a continued CSF leak such as chronic headache, cranial subdural hematoma, chronic back pain, cerebral venous thrombosis, cranial nerve palsy, and seizures.



Figure 1



Figure 2

Case report

- 34-year-old male underwent a L4-L5 hemilaminotomy, foraminotomy, and microdiscectomy for a L4-L5 paracentral extruded disc that was compressing the descending left L5 nerve root. The surgery was completed without complications and the patient was discharged home the same day of surgery.
- On postoperative day one the patient experienced an improvement in his presurgical radicular pain in his left leg.
- Two weeks after surgery, the patient noticed drainage coming from his surgical incision. Two weeks later the patient then noted increased pain and swelling under his incision (Fig. 1), severe headache, blurred vision, and lightheadedness.
- A repeat MRI was performed showing a new fluid collection within the subcutaneous fat of the lower back at the surgical level, concerning for a pseudomeningocele (Fig. 2).
- The patient was referred for an EBP for symptom management and to avoid the need for further surgery.
- A caudal approach to the EBP was selected to avoid traversing the fluid collection present in the lumbar region. The patient's headache completely resolved after placement of the caudal EBP and the subcutaneous fluid collection under the surgical incision resorbed over the following three weeks.

Discussion

- Traditionally an EBP is targeted at the level of prior dural puncture. Without an identified leakage site, the lumbar level is often the point of entry.
- With this patient the decision was made to assume a caudal approach for the EBP to completely avoid the surgical site of L4-L5 and surrounding sterile fluid collection. A literature review was performed, and several case reports were identified to support this approach.
- The caudal EBP was successful with clinical resolution of the subcutaneous fluid collection and headache complaint.
- Since the 1970's, EBP with autologous blood have been an effective method of treating PDPH. Multiple studies have shown the efficacy rates ranging from 70-90%. There are two proposed theories of how the autologous blood achieves the resolution of PDPH.
 - The first is that the blood provides a mechanical seal that prevents further leakage of CSF.
 - The second hypothesis is that the blood creates a mass effect in the epidural space which translates to pressure on the thecal sac and therefore increased CSF pressure.
- Studies have shown the average spread of 15 mL of blood to be six spinal segments cephalad and three spinal segments caudad. In patients where there are contraindications or technical challenges to performing a traditional lumbar epidural blood patch, a caudal hiatus approach may be an alternative.
- This less common approach allowed for a more individualized method of therapeutic intervention to treat a PDPH with a decreased infection risk, and in the case of our patient, resolution of a pseudomeningocele in the lumbar region.

References

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