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10-year Follow-up of Watertight Dural Patch Repair for an Iatrogenic Dural Defect during Spinal intradural Arachnoid Cyst Excision

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Background & Purpose

Back ground

- Spinal arachnoid cysts (SACs) are rare intradural CSF lesions; symptomatic cases require surgical decompression and cyst excision.
- Microscopic excision can be complicated by iatrogenic dural tears (incidental durotomy), which occur in 1-17% of spinal surgeries.
- Inadequate repair can lead to CSF leakage, intracranial hypotension, pseudomeningocele, and notably, a significantly increased risk of postoperative infection.
- Effective, watertight closure is critical to prevent CSF leakage, infection, and recurrence.

Purpose

- Long-term data exceeding 5 years on artificial dural patch repairs is scarce.
- To report a 10-year follow-up demonstrating durable, watertight dural patch repair (nylon sutures) after an iatrogenic dural defect during L2–3 intradural arachnoid cyst excision.

Key imaging

Figure 1. Preoperative MRI (sagittal T2) showing intradural cystic lesion at L2–3.

Case presentation

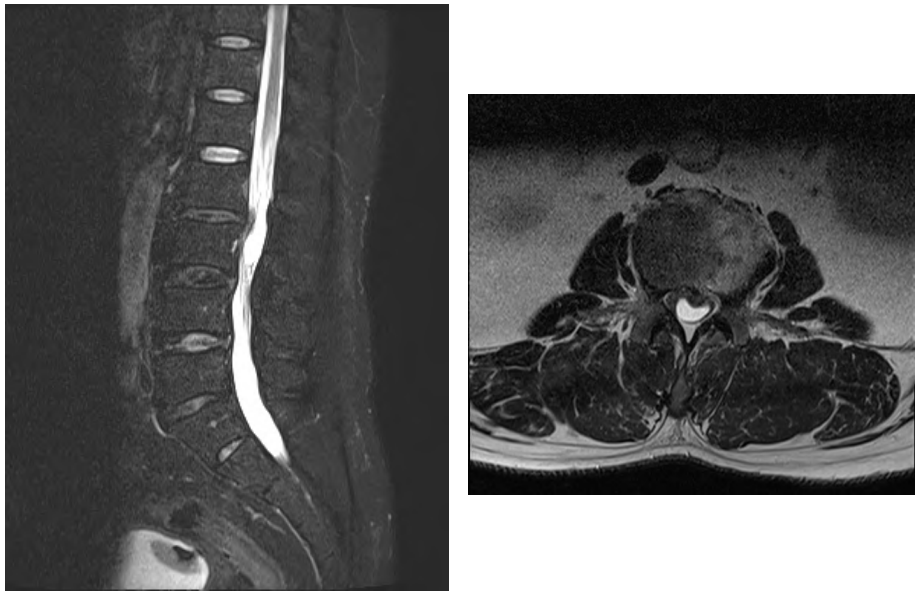
Patient & Exam

- 58-year-old male with severe low back pain and left leg radiating pain with neurogenic claudication.
- Straight leg raise: Right 70° / Left 30° (positive).
- Motor weakness: Left extensor hallucis longus (MRC Grade 4).
- Sensory: Left L3 dermatome mild hypoesthesia.
- Deep tendon reflex : Symmetric

Preoperative MRI summary

- Intradural cystic lesion from the L2–3 disc level to the L3 inferior endplate (1.4 × 1.1 × 2.4 cm).
- The lesion showed CSF-equivalent signal intensity without contrast enhancement, compressing the cauda equina and displacing the L3 nerve root laterally.
- Concomitant degenerative changes included lumbar spondylosis and multi-level disc herniations.

Imaging



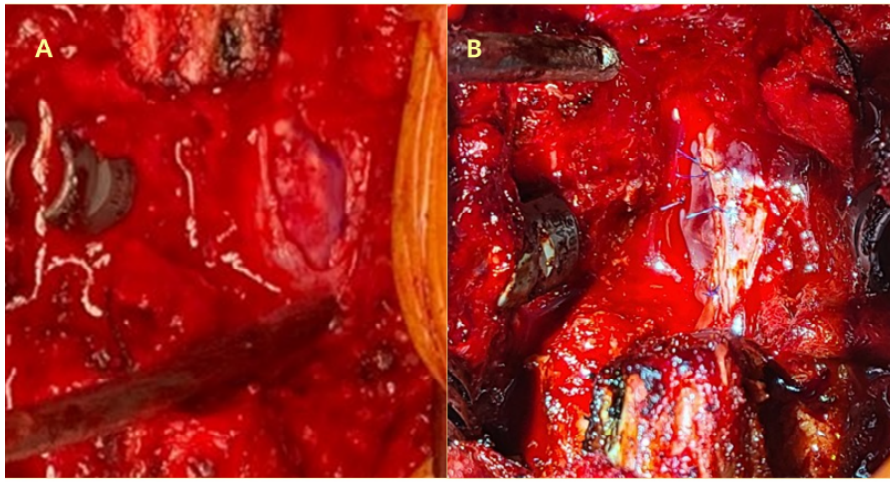
T2 FS sagittal (left) and T2 axial (right) views at L2–3.

Surgical Procedure

Index operation

- L2–3 posterior decompression with posterolateral fusion.
- Microscopic intradural arachnoid cyst excision.
- During meticulous adhesiolysis to separate the cyst wall from the nerve roots, an irregular dural tear occurred due to dense arachnoid adhesions.
- Primary suture alone was deemed insufficient to ensure a watertight seal without compromising the neural elements.
- The defect was repaired using a suturable artificial dural patch reinforced with 6-0 nylon sutures.
- A watertight seal was confirmed by an intraoperative Valsalva maneuver up to 40 mmHg.
- The spine was stabilized with pedicle screws and autologous bone graft.

Intraoperative photos



Incidental dural tear (A) & repair using a suturable artificial dural patch with 6-0 nylon sutures (B).

Watertight Dural Patch Repair

Technical pearls

- Use a suturable dural substitute sized to overlap the defect margins.
- Circumferential interrupted nylon sutures to secure patch to native dura.
- Keep patch flat and tension-free to minimize puckering and leak points.
- Perform Valsalva test; reinforce any suspicious suture lines.
- Layered closure + CSF-leak precautions postoperatively.

Close-up view

Goal: Watertight seal

- Patch overlaps defect
- 6-0 Nylon sutures
- Valsalva negative

Representative intraoperative view of dural defect and patch repair.

Result

Follow-up & Clinical outcome

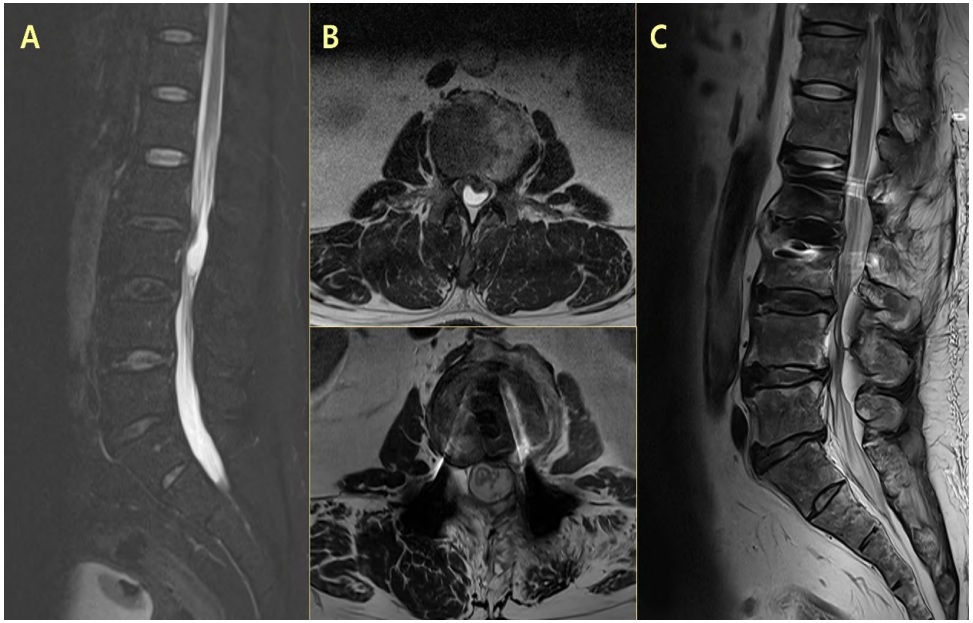
- Subfascial drains were removed on POD 5.
- The patient was mobilized early without symptoms of CSF leakage (e.g., postural headache).
- Discharged on POD 14. At 6 weeks and 6 months, radicular pain had resolved, and motor function normalized.
- Lost to follow-up until 10 years after surgery.
- At 10 years: asymptomatic; returned to normal daily activities.

MRI at 10 years

- Follow-up MRI confirmed complete resolution of the cyst, a stable fusion, and an intact dural repair with no signs of pseudomeningocele, recurrence, or foreign body reaction.

Timeline & imaging

Index surgery — 10-year MRI



Pre-op | 10-year f/u

Representative MRI demonstrating stable repair without CSF-related complications.

Discussion

Key points

The challenge of incidental durotomy

• Incidental durotomy (ID) increases the risk of postoperative infection by nearly four-fold.

• The paradigm of ID management from merely preventing headaches to deep surgical site infections.

• Prompt and thorough repair is essential.

Efficacy of artificial dural patches

• A systematic review demonstrated that the combination of primary closure with a patch or graft resulted in the lowest CSF leakage rate (5.5%), significantly superior to sutures alone (17.6%) or sealants alone (22.1%).

• Synthetic patches offer consistent strength and availability.

• Our case utilizes a suturable artificial patch, which provides mechanical stability that non-suturable only patches or sealants may lack in large defects.

Long-term implications

• Most studies offer limited follow-up (1-2 years), leaving questions about the long-term biocompatibility of synthetic dural substitutes.

• The absence of late complications in our patient suggests that modern artificial patches are safe and durable for long-term spinal implantation.

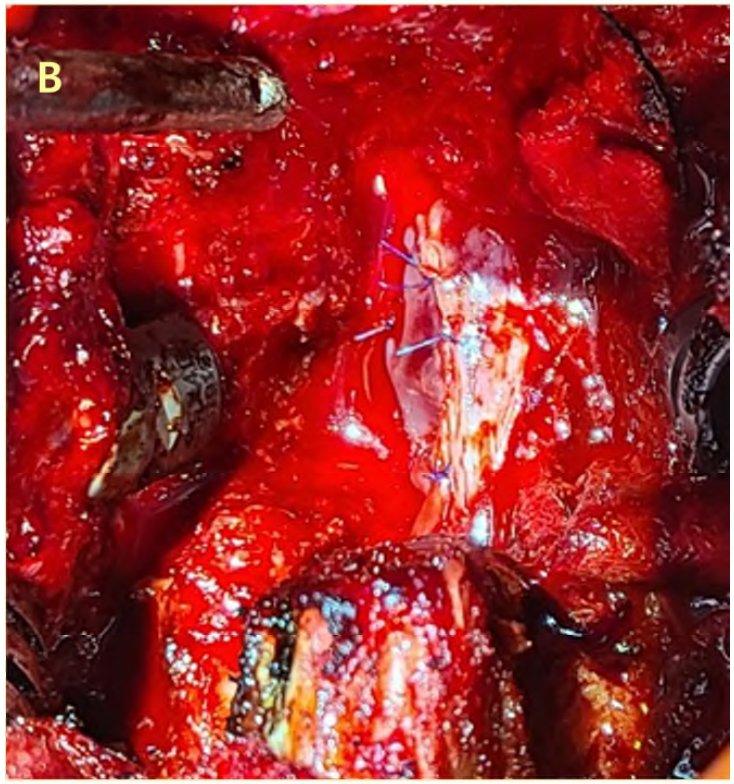
• Aggressive management of dural defects with patch reinforcement to ensure definitive closure.

Conclusion & Take-home Message

Conclusion & Take-home message

- Watertight dural patch suturing during intradural arachnoid cyst excision is a safe and effective technique that yields excellent long-term outcomes.
- This 10-year follow-up confirms the durability of artificial patches in preventing CSF leakage and recurrence without adverse long-term sequelae.
- Surgeons should prioritize reinforced repair techniques for complex dural defects to minimize postoperative morbidity.

Image highlight



Watertight patch repair (representative view).