

CLINICAL VIGNETTE

Symptomatic Epidural Hematoma after Spinal Surgery

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Case

A 78-year-old female was hospitalized for worsening bilateral leg pain. Her history includes prior pelvic fracture, bilateral hip replacement, hypertension, hyperlipidemia and recent L3/L4 laminectomy and L4 kyphoplasty for L4 vertebral body fracture. She was discharged home after spinal surgery, but returned to the hospital due to increased pain radiating down her thigh. Neurosurgery felt symptoms were more related to musculoskeletal causes and postoperative muscle spasms and advised pain control and antispasmodics. She was discharged to a skilled nursing facility for rehabilitation, but developed increased back pain. Pain management recommended epidural steroid injection and MRI imaging. MRI showed a large ventral epidural hematoma at the level of L3 vertebra and L3-L4 disc with marked effacement of the thecal sac at this level. She was re-hospitalized and the hematoma was evacuated by neurosurgery with significant improvement of pain.

This is a unique case of spinal epidural hematoma that developed after spinal surgery. Although rare, they can be life threatening if not detected timely. Symptoms usually include increased back pain and radiculopathy. As the hematoma progresses, it can result in cauda equina syndrome, paraplegia or tetraplegia, and requires emergent decompression and evacuation.

Discussion

Epidural hematomas are uncommon with estimated incidence of ~0.1%. Most published cases develop within hours after surgery, but they can rarely develop days to weeks later. Symptoms of epidural hematoma usually starts with pain, but can progress to radiculopathy, paresthesias and neurologic palsy.¹ Symptoms vary depending on location of compression.

Risk factors for postoperative epidural hematoma include multilevel procedures and the presence of preoperative coagulopathy.² Preoperative risk factors include use of non-steroidal anti-inflammatories, age over 60 years, and operative risk factors of multi-level surgery, and anemia from blood loss.²

Cabana et al., reported an average delay of 5.3 hours from the lumbar intervention to onset of hematoma symptoms.³ Delayed symptomatic epidural hematoma was also described by Uribe et al with the incident occurring more than several days postoperatively. The initial symptoms include increased pain, and muscle weakness.⁴ Another report described a longer delayed

postoperative epidural hematoma two weeks after surgery where the only symptom was vesicorectal disturbance.⁵ Delayed postoperative hematoma can present in different ways, one example described a violent twisting movement and another with vesicorectal changes.⁵ Increased physical activity after surgery may trigger epidural bleeding and cause hematoma expansion.⁶

Most surgeons leave drains at the surgical site to prevent hematoma formation, although the effectiveness remains controversial. Some studies report surgical drains did not change the frequency of hematoma development.⁷ Often cases report development of hematomas despite placement of surgical drain, suggesting this may not be sufficient to prevent hematomas. Treatment for symptomatic epidural hematomas generally requires surgical evacuation to prevent potentially significant, life threatening neurologic sequelae.⁸

A large retrospective study by Kao et al examined possible risk factors for postoperative epidural hematomas.⁹ They studied over 15,000 patients who underwent lumbar decompression between 2002 to 2010. Twenty-five patients had epidural hematomas requiring re-operation promptly after initial spinal surgery. Pre-operative risk factors included elevated diastolic blood pressure, intraoperative use of gelfoam for dura coverage and increased drainage output. The overall incidence of postoperative symptomatic epidural hematoma was 0.16%. After the procedure, symptoms included progressive decrease in muscle power, increased pain, and saddle anesthesia. If decreased muscle power or perineal anesthesia did not improve after hematoma evacuation, there was increased likelihood for permanent leg weakness.

Epidural hematoma should be suspected in patients presenting with an unexpected, new postoperative deficit. However, postoperative cord complications may also result from cord injury intraoperatively and improper alignment of the spine. Radiologic confirmation is required for correct diagnosis and treatment. MRI is the modality of choice, having replaced computed tomography or myelography for evaluating symptomatic epidural hematoma and is the diagnostic modality of choice.¹⁰ MRI can be more specific in defining the extent, location and size of epidural hematoma. In the hyperacute stage of the hematoma, contrast-enhanced MR may be helpful. After IV contrast administration, presence of dotted enhancement in

the hematoma suggest extravasation of contrast-enhanced blood.¹⁰

Additional, risk factors for epidural hematoma include multilevel surgical procedures and the presence of known preoperative coagulopathy.¹¹ Larger exposures of the epidural space during surgery may also increase the bleeding risk from the internal vertebral venous plexus leading to expanding hematoma. Spontaneous bleeding has also been reported in patients with coagulopathies and liver disease. Extra precautions to maintain hemostasis are required for multilevel decompressions or if there is known preoperative coagulopathy.¹¹

This case illustrates the rare presentation and complication of epidural hematoma after spinal surgery. Although uncommon, the complications could be severe. Patients warrant close follow-up and postoperative monitoring for new symptoms for weeks or longer. Concerns should prompt urgent evaluation with imaging.

Conclusion

In conclusion, it is critical for timely diagnosis and treatment of epidural hematomas. Success may be related to the timing to decompression and the extent of preoperative neurologic impairments. If not treated promptly, complications can lead to irreversible consequences. Additional studies may improve the understanding of risk factors to improve surgical outcomes and reduce negative neurologic sequelae.

REFERENCES

1. **Scavarda D, Peruzzi P, Bazin A, Scherpereel B, Gomis P, Graftieaux JP, Rousseaux P.** Hématomes extra-duraux rachidiens post-opératoires. Quatorze observations [Postoperative spinal extradural hematomas. 14 cases]. *Neurochirurgie.* 1997;43(4):220-7. French. PMID: 9686224.
2. **Sokolowski MJ, Dolan M, Aminian A, Haak MH, Schafer MF.** Delayed epidural hematoma after spinal surgery: a report of 4 cases. *J Spinal Disord Tech.* 2006 Dec;19(8):603-6. doi: 10.1097/01.bsd.0000211242.44706.62. PMID: 17146305.
3. **Cabana F, Pointillart V, Vital J, Sénégas J.** Hématorrachis ou hématome extradural rachidien (HER) postopératoire compressif. Etude de 15 cas et revue de la littérature [Postoperative compressive spinal epidural hematomas. 15 cases and a review of the literature]. *Rev Chir Orthop Reparatrice Appar Mot.* 2000 Jun;86(4):335-45. French. PMID: 10880933.
4. **Uribe J, Moza K, Jimenez O, Green B, Levi AD.** Delayed postoperative spinal epidural hematomas. *Spine J.* 2003 Mar-Apr;3(2):125-9. doi: 10.1016/s1529-9430(02)00535-1. PMID: 14589226.
5. **Kamoda H, Ishikawa T, Miyagi M, Eguchi Y, Orita S, Suzuki M, Sakuma Y, Oikawa Y, Yamauchi K, Inoue G, Takahashi K, Ohtori S.** Delayed postoperative epidural hematoma presenting only with vesicorectal disturbance. *Case Rep Orthop.* 2013;2013:861961. doi: 10.1155/2013/861961. Epub 2013 Sep 1. PMID: 24073350; PMCID: PMC3773434.
6. **Parthiban CJ, Majeed SA.** Delayed spinal extradural hematoma following thoracic spine surgery and resulting in paraplegia: a case report. *J Med Case Rep.* 2008 May 2;2:141. doi: 10.1186/1752-1947-2-141. PMID: 18454860; PMCID: PMC2391150.
7. **Brown MD, Brookfield KF.** A randomized study of closed wound suction drainage for extensive lumbar spine surgery. *Spine (Phila Pa 1976).* 2004 May 15;29(10):1066-8. doi: 10.1097/00007632-200405150-00003. PMID: 15131430.
8. **Lawton MT, Porter RW, Heiserman JE, Jacobowitz R, Sonntag VK, Dickman CA.** Surgical management of spinal epidural hematoma: relationship between surgical timing and neurological outcome. *J Neurosurg.* 1995 Jul;83(1):1-7. doi: 10.3171/jns.1995.83.1.0001. PMID: 7782824.
9. **Kao FC, Tsai TT, Chen LH, Lai PL, Fu TS, Niu CC, Ho NY, Chen WJ, Chang CJ.** Symptomatic epidural hematoma after lumbar decompression surgery. *Eur Spine J.* 2015 Feb;24(2):348-57. doi: 10.1007/s00586-014-3297-8. Epub 2014 Apr 24. PMID: 24760464.
10. **Fraser S, Roberts L, Murphy E.** Cauda equina syndrome: a literature review of its definition and clinical presentation. *Arch Phys Med Rehabil.* 2009 Nov;90(11):1964-8. doi: 10.1016/j.apmr.2009.03.021. PMID: 19887225.
11. **Awad JN, Kebaish KM, Donigan J, Cohen DB, Kostuik JP.** Analysis of the risk factors for the development of postoperative spinal epidural haematoma. *J Bone Joint Surg Br.* 2005 Sep;87(9):1248-52. doi: 10.1302/0301-620X.87B9.16518. PMID: 16129751.