Spinal subdural hematoma as a complication of spinal surgery: can it happen without dural tear?

Harinder Gakhar · Rajendranath Bommireddy ·
Zdenek Klezl · Denis Calthorpe

Received: 12 March 2012 / Revised: 17 June 2012 / Accepted: 30 June 2012 / Published online: 19 July 2012
© Springer-Verlag 2012

Abstract Post spinal surgery subdural hematoma is a rare entity. This is a report of a case of acute post-operative spinal subdural hematoma, without any dural injury. The case was managed expectantly and went on to complete resolution of the hematoma and full clinical recovery.

Keywords Spondylolisthesis · Spinal subdural hematoma

Introduction

Spinal subdural hematomas are rare. Prompt recognition is vital, as they can cause cord or cauda equina compression leading to permanent deficits. Common causes are vascular malformations, neoplasms, trauma, coagulation abnormalities, arachnoiditis and even spontaneous hemorrhage [1–3]. Spinal surgery is not a common cause for spinal subdural hematoma. There are only very few reports in published literature about post-operative spinal subdural hematoma [6–8]. We would like to highlight a case of acute post-operative spinal subdural hematoma without any dural tears, discussing the aspects around diagnosis and treatment in similar situations.

Case report

A 76-year-old man presented to our department with back pain and right leg L5 distribution radiculopathy. He had Meyerding grade I spondylolisthesis L5/S1, and compression of his exiting L5 nerve root on the left side at the foraminal level. He was worked up as routine and was not on any anticoagulants. His pre-operative bloods revealed normal platelet count, APTT and PT. He had left sided L5 hemilaminectomy and left L5/S1 facetectomy to decompress the L5 nerve root. He also had L5/S1 pedicle screw stabilization and posterolateral fusion using locally harvested bone and Vitoss^R (bovine bone graft substitute). The procedure was done using a microscope and the whole procedure was uneventful. There were no visible dural leaks intra-operatively. Total blood loss during surgery was 250 ml.

Post-operatively there was good relief of radiculopathy. Drain was removed after 24 h. Total drain output was 20 ml. On day 2 the patient developed new onset weakness of the hip flexors and knee extensors bilaterally right worse than left. There were no bladder or bowel problems. He underwent an MRI scan, which showed a significant subdural hematoma extending all the way up to L1 (Figs. 1, 2). The scan also showed a small epidural hematoma at the surgical site not causing any significant compression. Within 12 h of the presentation of symptoms the patient reported improvement of power in his left hip flexors and knee extensors. He was managed conservatively. He was closely monitored for any worsening neurologic status. He showed progressive neurologic improvement and started to walk after 1 week of symptoms. He underwent a follow-up MRI scan after 1 week that showed complete resolution of the subdural hematoma (Figs. 3, 4). He finally made complete clinical recovery with no residual neurologic deficits.

H. Gakhar (✉) · R. Bommireddy · Z. Klezl · D. Calthorpe
Royal Derby Hospital, Derby, UK
e-mail: gul34@yahoo.com

Z. Klezl
3rd Medical School, Charles University, Prague, Czech Republic

Fig. 1 Sagittal MRI scan showing hyperdense subdural collection posterior to the cauda equina pushing it anteriorly

Discussion

Spinal subdural hematoma is a known clinical entity, albeit rare. There are several reports of spinal subdural hematomas in literature, but to the best of our knowledge only three reports of post-spinal surgery subdural hematomas were seen [6–8].

Usual causes of spinal subdural hematomas are vascular malformations, coagulation abnormalities, neoplasms, trauma, and anesthetic complications following spinal or epidural punctures. Injury to the bridging blood vessels between dura mater and arachnoid mater would be the most plausible explanation for subdural hematoma without any dural injury. Rarely, bridging vessels between two layers of dura mater may be the source of the bleed [4]. In this case, there was no obvious dural injury; therefore we suspect that dural manipulation during the facetectomy may be causative to the hematoma formation.

MRI scan is usually the mode of investigating any post-operative spinal complication. The appearance of blood on MRI scans is a matter of controversy. It is known to

Fig. 2 Axial MRI T2 W section showing a biconvex posterior collection hyperdense to the cauda. Also note the reversal of the normal orientation of the cauda equina

Fig. 3 Sagittal T2 W MRI scan at 10-day post-operative stage showing complete resolution of the subdural collection

Fig. 4 Axial T2 W section showing complete resolution of the hematoma. Also note the orientation of the cauda equina that is like normal

breakdown into its respective constituents, changing the radiologic appearance [5]. In our case the MRI revealed a collection in the subdural space extending from the sacrum to L1, which was isointense to the spinal cord on T1W and hyper-intense to the spinal cord on T2W images. The features of this were consistent with a hematoma in the subdural location. Characteristically, the location of the hematoma was posterior to the cauda equina, which was pushed anteriorly. On axial sections the cauda equina, which is normally aligned in a “U” with apex posterior was inverted, as a result of the hematoma in the posterior location in the dural sac.

Sakai et al. [6] in their recent report have discussed about post-spinal surgery subdural changes, which were thought to be subdural hematomas. Gehri et al. described a case of subacute spinal subdural hematoma that developed following a dural tear. In this case the patient had bladder symptoms and was treated by decompressive surgery. The patient had almost full recovery [7]. Another case of post-spinal surgery subdural hematoma has been attributed to traumatic pre-operative myelography [8].

Khalatbari et al. [9] have discussed about intracranial hemorrhage, as a complication of spinal surgery and also their causation. Wang et al. [10] have discussed a case of cervical epidural hematoma during pregnancy. Little et al. [11] suggest that in cases of subdural hematoma that spans over multiple levels, recombinant tissue Plasminogen

Activator helps to reduce the surgical exposure and hence reduce the rate of complications. Mascarenhas [12] has highlighted the difficulties in diagnosing spinal subdural hematoma in an elderly hypocoagulated patient.

Spinal subdural hematoma is not a common complication of spinal surgery. Prompt diagnosis followed by either surgical evacuation or a conservative approach can lead to potentially full clinical recovery. As in our case that showed some neurologic recovery, or as in the cases reported by Sakai et al. which had only mild symptoms, conservative approach may be the best. Whereas, in the case reported by Gehri et al. the patient had bladder dysfunction, surgical evacuation is probably better than wait and watch, to prevent any permanent bladder problems.

Conclusion

Spinal subdural hematoma is a rare complication of spinal surgery. Awareness of this condition can lead to a prompt diagnosis and help prevent any permanent neurologic sequelae.

Conflict of interest We declare that there is no conflict of interest in the work leading to our study.

References

1. Domenicucci M, Ramieri A, Ciappetta P, Delfini R (1999) Nontraumatic acute spinal subdural hematoma: report of five cases and review of the literature. *J Neurosurg* 91(1 Suppl):65–73
2. Hausmann Kirsch E, Radü E, Mindermann TH, Gratzl O (2001) Coagulopathy induced spinal intradural extramedullary hematoma: report of three cases and review of the literature. *Acta Neurochir (Wien)* 143:135–140
3. Lee JI, Hong SC, Shin HJ, Eoh W, Byun HS, Kim JH (1996) Traumatic spinal subdural hematoma: rapid resolution after repeated lumbar spinal puncture and drainage. *J Trauma* 40:654–655
4. Loughenbury P, Wadhvani S, Soames R (2010) Double spinal dural sheath: a cadaveric case report. *Int J Anat Var* 3:41–43
5. Cohen MD, McGuire W, Cory DA, Smith JA (1986) MR appearance of blood and blood products: an in vitro study. *Am J Roentgenol* 146:1293–1297
6. Sakai T, Sairyo K, Bhatia NN, Miyagi R, Tamura T, Katoh S, Yasui N (2011) MRI changes of the spinal subdural space after lumbar spine surgeries: report of two cases. *Asian Spine Journal* 5(4):262–266
7. Gehri R, Zanetti M, Boos N (2000) Subacute subdural hematoma complicating lumbar microdiscectomy. *J Bone Joint Surg [Br]* 82-B:1042–1045
8. Reinsel TE, Goldberg E, Granato DB, Wilkinson S, Penn R (1993) Spinal subdural hematoma: a rare cause of recurrent postoperative radiculopathy. *J Spinal Disord* 6:62–67
9. Khalatbari MR, Khalatbari I, Moharamzad Y: Intracranial hemorrhage following lumbar spine surgery. *Eur Spine J*, Feb 16 2012 [epub ahead of print]

10. Wang P, Xin XT, Lan H et al (2011) Spontaneous cervical epidural hematoma during pregnancy: case report and literature review. *Eur Spine J* 20(Suppl.2):176–179
11. Little CP, Patel N, Nagaria J, Kumar R, Nanra J, Bolger CM (2004) Use of topically applied rt-PA in the evacuation of extensive acute spinal subdural hematoma. *Eur Spine J* 13(4):380–383
12. Mascarenhas L (2009) Difficulties diagnosing spinal subdural hemorrhage in a hypo-coagulated patient due to simultaneous symptomatic subdural cranial hemorrhage. *Eur Spine J* 18(Suppl 2):217–219