

**Postoperative Symptomatic Anterior Spinal Epidural Hematoma. Complete Drainage
Using Corpectomy and a Bladder Catheter**

Rafael Gonzalez-Diaz, MD-PhD, Department of Orthopedic Surgery and Traumatology, Spine Unit, Hospital Universitario Fundación Alcorcón, Alcorcón, Spain.

Ismael Auñon-Martin, MD, Department of Orthopedic Surgery and Traumatology, Hospital Universitario 12 de Octubre, Madrid, Spain.

Francisco Javier Ortega-Garcia, MD, Department of Orthopedic Surgery and Traumatology, Hospital Universitario 12 de Octubre, Madrid, Spain.

Rui Miguel Reis da Rocha, MD, Department of Orthopaedic Surgery, Centro Hospitalar de Vila Nova de Gaia/Espinho, Portugal.

Corresponding Author:

Rafael González-Díaz,
Department of Orthopedic Surgery and Traumatology,
Spine Unit, Hospital Universitario Fundación Alcorcón,
c/ Budapest 1, 28922, Alcorcón, Madrid, Spain

Telephone number: (0034) 916219517

Fax: (0034) 91 621 99 01

Email: rgonzalez@fhalcorcon.es

Acknowledgement: October 14, 2015

1st Revise: December 17, 2015

2nd Revise: February 9, 2016

Accept: March 16, 2016

The manuscript submitted does not contain information about medical device(s)/drug(s).

No funds were received in support of this work.

Relevant financial activities outside the submitted work: board membership, consultancy, expert testimony, payment for lectures, payment for development of educational presentations.

Study Design: Case report

Objective: We describe a technique to drain a thoracic and cervical postoperative epidural hematoma causing paraplegia after anterior cervical discectomy and fusion.

Summary of Background Data: Postoperative compressive spinal epidural hematoma (SEH) is a devastating complication and early diagnosis and treatment is essential. The most commonly accepted treatment is decompression and drainage of hematoma.

Methods: A 65-year-old male with a degenerative disc disease located at C4-C5, C5-C6 and C6-C7 levels with disc herniation underwent a standard anterior cervical decompression and fusion at C4-C5-C6-C7. Three hours after the procedure, the patient started complaining of progressive paraplegia and affection of upper extremity. A magnetic resonance imaging (MRI) revealed a postoperative spinal epidural hematoma extending from C3 to T6, causing compression.

To resolve this unusual complication, a new surgery was performed. An anterior approach through the previous one was performed, and a C6 corpectomy was done. The anterior epidural hematoma was drained with an elastic urinary catheter. At the end of the surgery a tricortical iliac crest autograft was placed between C5-C7 and the plate was placed as previously.

Results: The patient recovered tactile and vibratory senses, as well as motor function in both hands twelve hours after the second procedure. The complete drainage of the hematoma was MRI-verified the first postoperative day.

The patient was discharged from the hospital presenting a complete sensitive recovery and a 3/5 of muscle recovery. At one year, the patient made a full recovery and was able to walk unassisted.

Conclusions: The treatment of choice in SEH is the early decompression as complete as possible, usually with the same approach or at the level of major compression. In rare cases like this, we recommend the use of an elastic catheter to complete hematoma drainage, distant from the surgical wound.

Key words: Drainage technique, paraplegia, postoperative complication, spinal epidural hematoma, spine surgery, surgical decompression, surgical technique.

Level of Evidence: N/A

ACCEPTED

Introduction

The overall incidence of postoperative compressive spinal epidural hematoma (SEH) associated with anterior cervical surgeries ranges from 0.05% to 3% ¹⁻⁴. Most of these cases are described in the epidural space posterior to the spinal cord after a posterior procedure, and usually, a posterior approach is recommended for the evacuation of the hematoma^{3,5,6}. The reported cases of SEH after anterior cervical surgery are rare and the most frequent location of the hematoma is ventral, using an anterior approach for hematoma evacuation^{3,4,7,8}.

Methods

A 65-year old man with a medical history of well controlled hypertension reported a history of continuous neck and arm pain, progressive weakness around the shoulder and advanced to the left arm. Neurological examination showed a decrease in pain sensation over C6 and C7 left dermatomes, and the left triceps reflex was unobtainable. The patient was not medicated with antithrombotic or anticoagulant agents.

Magnetic Resonance imaging (MRI) showed a degenerative disc disease and disc herniation with foraminal stenosis at C4-C5, C5-C6 and C6-C7 levels.

The patient underwent anterior cervical discectomy and fusion at C4-C5-C6-C7 levels. Reconstruction was performed with cages filled with autologous bone graft and an anterior locking plate, (*Vectra/Cervios. DePuy-Synthes. Warsaw. Indiana. USA*). Care was taken to obtain absolute haemostasis and no incidences were reported.

In the recovery room the patient moved both legs and arms and pain was successfully controlled. Three hours after procedure the patient reported progressive weakness in upper extremities, followed by weakness in both legs, becoming paraplegic soon after. At this moment he presented a motor level at C8 with an intrinsic muscles paralysis of both hands and a sensitive level at T5. He had no respiratory compromise.

An emergent MRI was performed, which revealed a postoperative SEH extending from C3 to T6 with spinal cord compression. Mannitol and prednisolone⁹ were administered, and two hours after the onset of symptoms the patient was operated again (Figures 1 and 2).

An anterior approach through the previous one was performed. The anterior plate was removed and a C6 corpectomy was done. Using this window, the anterior epidural hematoma located at this level was drained. To drain the hematoma located distally a thin elastic urinary catheter was used. The device was connected to a syringe and gently introduced distally in the anterior epidural space, until any resistance was noted. Manual aspiration manoeuvres were performed with the syringe, as well as irrigation with saline. The procedure was repeated several times until any soft clot was obtained (Figures 3 and 4). Reconstruction procedure was made with tricortical iliac crest graft at the site of corpectomy, and the plate was placed as previously. Aspiration drainage was placed as in the previous surgery.

Results

At wake up the neurological examination continued unchanged. Twelve hours after the surgery the patient recovered tactile and vibratory sensation, as well as motor function at the intrinsic muscles of both hands. A new MRI was performed the first postoperative day, and a complete drainage of the hematoma, as well as the presence of cord oedema were verified (Figure 5). The patient was discharged from the hospital to a rehabilitation centre five days after surgery, presenting a complete sensitive recovery at all levels, and a muscular recovery of 3/5 at all levels. One year after the procedure the patient made a full recovery and walks normally.

Discussion

Early surgical decompression is the gold-standard treatment of SEH. Decompressive laminectomy is the most used technique in all segments of the spine¹⁰, but in the context of postsurgical SEH the use of the primary surgical approach is recommended^{3,4,7,8,11-14}.

The factors determining neurological outcomes after SEH are localization of the hematoma, preoperative neurological status, interval from symptom onset to surgery, and duration of maximum deficit¹⁵.

Variables that were not associated with prognosis or postoperative results included age, sex, position of the hematoma in the canal, and size of the hematoma¹⁵.

Our patient had a large ventral hematoma extending from C3 to T6. Lawton described 30 patients with a hematoma average length of 4.5 levels¹⁴.

Direct approach at the level of major compression is the treatment of choice, but in this case the procedure involved both, anterior cervical and posterior thoracic approaches.

This is the first case in the literature that describes a novel technique, utilizing a thin elastic urinary catheter, to resolve this complication.

In the case described the surgery was performed within 3 hours of the on-setting of the symptoms. However, the pre-surgical status with a complete paraplegia is a non-modifiable factor for poor clinical prognosis¹⁵.

REFERENCES

1. Cabana F, Pointillart V, Vital J, Senegas J. Postoperative compressive spinal epidural hematomas. 15 cases and a review of the literature. *Rev Chir Orthop Reparatice Appar Mot* 2000;86(4):335-45.
2. Scavarda D, Perruzzi P, Bazin A, Scherpereel B, Gomis P, Graftieaux JP, Rousseaux P. Postoperative spinal extradural hematomas. 14 cases. *Neurochirurgie* 1997;43(4):220-7.
3. Sang H, Wilson CB. Postoperative epidural hematoma as a complication of anterior cervical discectomy. *J Neurosurg* 1978;49:288-291.
4. Hans P, Delleuze PP, Born JD, Bonhomme V. Epidural hematoma after cervical spine surgery. *J Neurosurg Anesthesiol* 2003;15:282-285.
5. Uribe J, Moza K, Jimenez O, Green B, Levi A. Delayed postoperative spinal epidural hematomas. *The Spine Journal* 2003;3:125-129.
6. Neo M, Sakamoto T, Fujiayashi S, Nakamura T. Delayed postoperative spinal epidural hematoma causing tetraplegia. *J Neurosurg Spine* 2006;5:251-253.
7. Yi S, Yoon DH, Kim KN, Kim SH, Shin HC. Postoperative spinal epidural hematoma: risk factor and clinical outcome. *Yonsei Medical Journal* 2006;47:326-332.
8. Lee JY, Schwartz DM, Anderson G, Hilibrand AS. Epidural hematoma causing dense paralysis after anterior cervical corpectomy. *J Bone Joint Surg Am* 2006;88:198-201.
9. Bracken MB, Shepard MJ, Holford TR, et al. Administration of methylprednisolone for 24 or 48 hours or tirilazad mesylate for 48 hours in the treatment of acute spinal cord injury: Results of the Third National Acute Spinal Cord Injury Randomized Controlled Trial. National Acute Spinal Cord Injury Study. *JAMA* 1997;277:1597-1604.
10. Al-Mutair A, Bednar DA. Spinal epidural hematoma. *J Am Acad Orthop* 2010;18:494-502.
11. Lee DY, Lee SH. Cervicothoracic spinal epidural hematoma after anterior cervical spinal surgery. *J Korean Neurosurg Soc* 2010;48:541-543.

12. Ahn SS, Song YJ. Clinical experience and management of cervico-thoracic epidural hematoma. *J Korean Neurosurg Soc* 2010;47:381-384.
13. Jankowski R, Zukiel R, Nowak S. Acute cervical epidural hematoma as a complication of anterior cervical C5-C6 discectomy. A case report. *Neurol Neurochir Pol* 2003;37:955-62.
14. 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;83(1):1-7.
15. Groen RJ, Van Alphen HA. Operative treatment of spontaneous spinal epidural hematomas: A study of the factors determining postoperative outcome. *Neurosurgery* 1996;39:494-509.

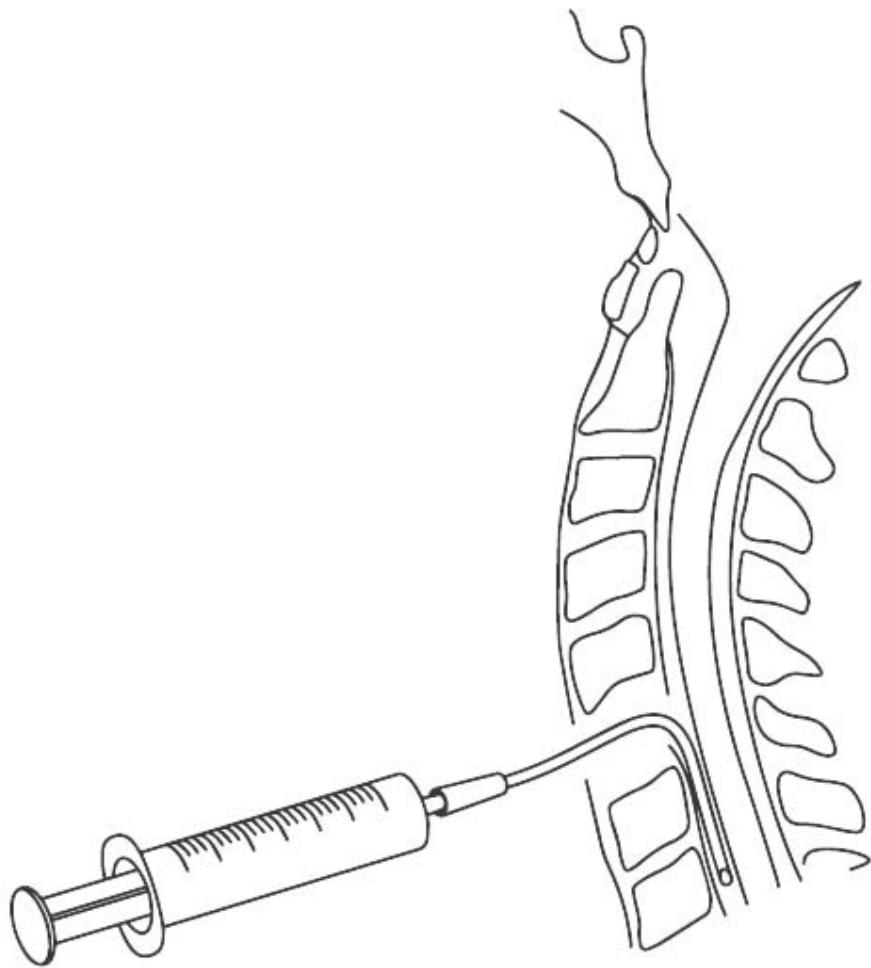
Figure 1. Postoperative Magnetic Resonance: Compressive epidural hematoma (C3-T3).



Figure 2. Postoperative Magnetic Resonance: Compressive epidural hematoma (T3-T7).

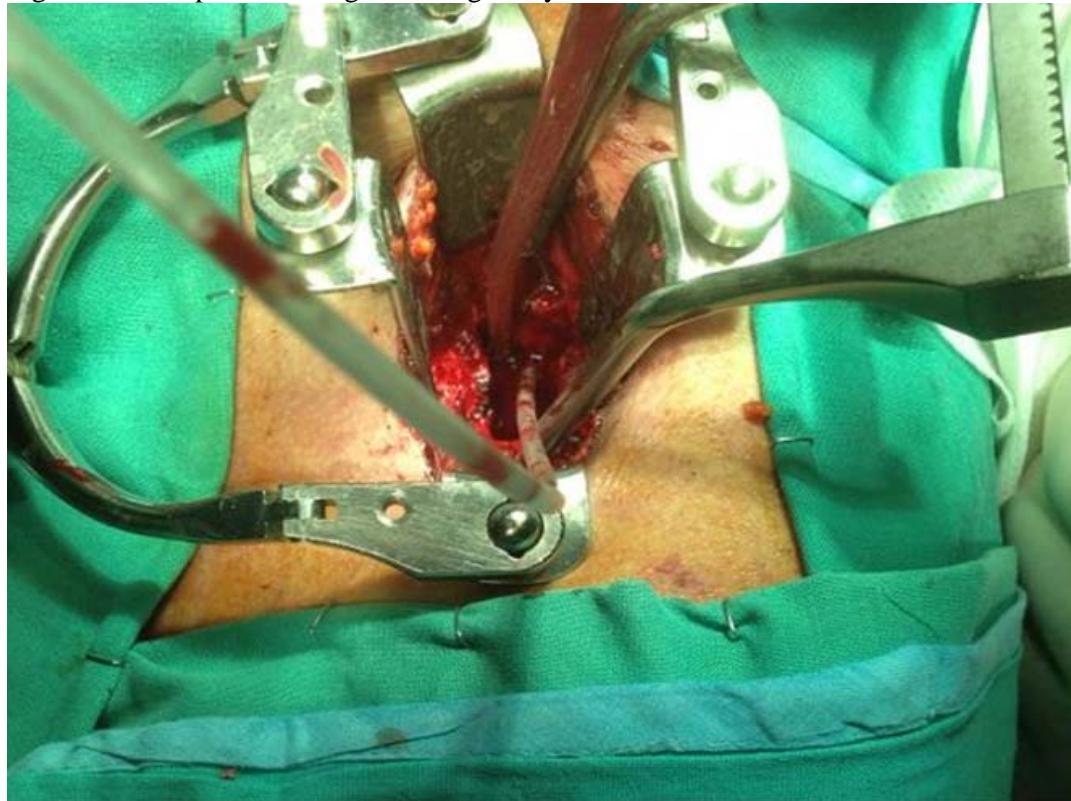


Figure 3. Corpectomy and catheter in place.



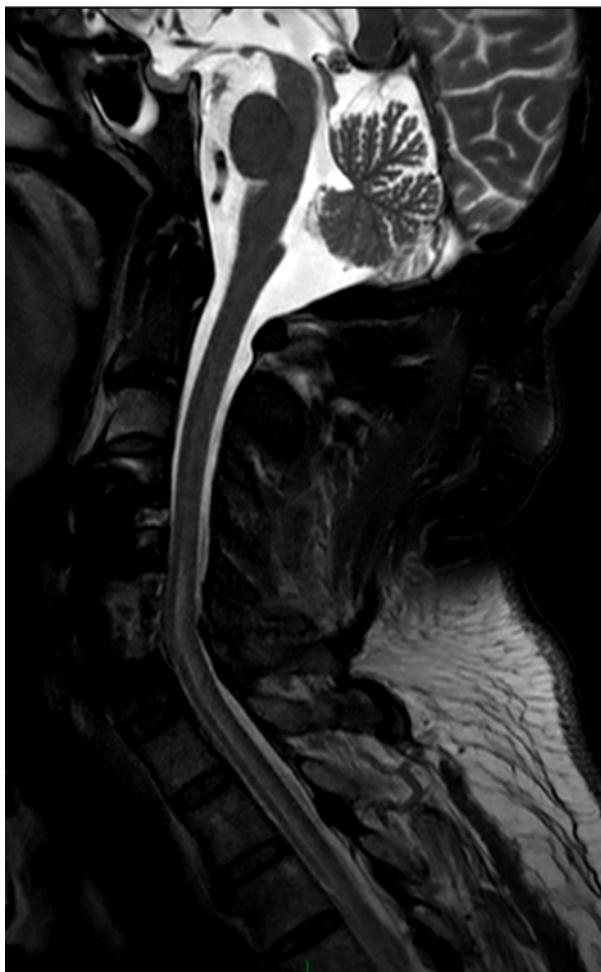
AC

Figure 4. Intraoperative image showing Foley catheter.



ACCES

Figure 5. Postoperative Magnetic Resonance: Complete drainage of the hematoma, anterior plate and cortical strut graft.



ACG