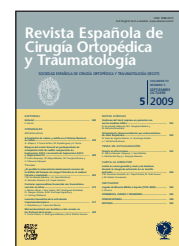


Revista Española de Cirugía Ortopédica y Traumatología

www.elsevier.es/rot



LETTERS TO THE EDITOR

Injury to the gonadal, renal and duodenal veins during pedicle screw extraction surgery

J.M. Femenias Rosselló, G.J. Ripoll Estela, M. Rubí Jaume and M. Lladrés Comamala

Department of Orthopedic and Trauma Surgery, Son Dureta Hospital, Palma de Mallorca, Spain

Received September 13, 2008; accepted January 14, 2009

Available on the internet from May 6, 2009

KEYWORDS

Spine;
Pedicle screw;
Extraction;
Complication

Abstract

Introduction: Complications during pedicle screw extraction are rare.

Clinical case: We present a case of a vascular and duodenal injury arising from a complication that occurred during a pedicle screw extraction procedure. The pedicle screw had to be removed because it was causing irritative nervous symptoms to a patient that had undergone surgery for degenerative lumbar scoliosis.

Conclusion: The severity of the complication made it necessary to perform median laparotomy during the same surgical procedure to resolve the bleeding and withdraw the screw.

© 2008 SECOT. Published by Elsevier España, S.L. All rights reserved.

PALABRAS CLAVE

Columna;
Tornillo pedicular;
Extracción;
Complicación

Lesión de venas gonadal y renal y de duodeno durante la cirugía de extracción de un tornillo pedicular

Resumen

Introducción: Las complicaciones durante la retirada de tornillos pediculares son poco frecuentes.

Caso clínico: A continuación se presenta un caso de lesión vascular y duodenal como resultado de una complicación ocurrida durante una cirugía de extracción de tornillo pedicular que causaba sintomatología nerviosa irritativa en una paciente intervenida de una escoliosis lumbar degenerativa.

Conclusión: La gravedad de la complicación obligó a realizar una laparotomía media en el mismo acto quirúrgico para solventar la hemorragia y poder retirar el tornillo.

© 2008 SECOT. Publicado por Elsevier España, S.L. Todos los derechos reservados.

* Corresponding author.

E-mail: juanm.femenias@ssib.es (J.M. Femenias Rosselló).

Introduction

Complications in spine surgery are apt to be severe because of the great significance of the surrounding anatomical structures. The literature contains reports on neurologic, vascular and visceral complications provoked during the approach or in the course of the procedure, which often result in legal claims¹. In the case herein, the complication arose during extraction of a pedicular screw, which abruptly migrated toward the retroperitoneal space causing direct trauma to the duodenum and the renal and gonadal veins. Complications related to the removal of a pedicular screw are rare and include the unfeasibility to remove the distal part of a broken screw and nerve root and dura mater lesions². No reports have been found of vascular or visceral lesions induced by migration of the screw at the time of attempted screw extraction.

Clinical case

We present the case of a 67-year-old female who developed symptoms of acute lumbar pain with episodes of neurogenic claudication as a result of degenerative lumbar scoliosis with areas of severe medullary stenosis (fig. 1A). A decision was made to perform decompressive surgery from the second to the fifth lumbar vertebrae accompanied by a bilateral arthroectomy to flexibilize the curve and permit an instrumented posterolateral arthrodesis; no intraoperative incidents occurred. Postoperatively, the patient developed pain and paresthesias in the right thigh, which were interpreted as symptoms of nerve root irritation. Postoperative x-rays showed that the left-sided screw in L2 had an external extrapedicular course (fig. 1B); this finding was confirmed with a computerized tomography scan (fig. 2A-C). The patient was reoperated in order to revise the pedicular screw. The rod was removed from

the left side but when attempting to withdraw the L2 screw, since there were difficulties to adapt the screwdriver in the L2 screw bed an inappropriate pressure was exerted. For that reason, there was an abrupt migration of the screw toward the anterior region of the vertebral body; the former disappeared from the field of vision and a profuse hemorrhage was immediately observed flowing toward the posterior part, which made it necessary to tamponade the bleeding. An endoscopic exam was performed, which showed the screw in the abdominal cavity. For this reason, and given the fact that when the tamponade was removed the patient was still bleeding, it was decided to perform a temporary closure of the wound, turn the patient and carry out a central laparotomy. The screw, which was found at the root of the mesentery in the area of the Treitz angle, was extracted. A bleeding gonadal vein lesion was observed at its point of entry into the left renal vein as well as 2 point-shaped lesions in the left renal vein; the former was ligated and the latter were sutured. Exploration also revealed a 1 cm lesion in the fourth portion of duodenum, which was also sutured. Once control of hemorrhage was achieved, the laparotomy was closed and the patient was turned once again in order to place the rod on the left side and perform the final closure of the posterior approach (fig. 3). The patient had an uneventful postoperative evolution and was discharged on a soft diet; she was able to ambulate with no complications with a corset. In a follow-up visit at 6 months post-op the patient reported significant improvement of her symptoms and claudication and had not suffered any complication as a result of duodenal repair.

Discussion

Vascular, urethral and visceral lesions have been profusely described in spine procedures performed through an

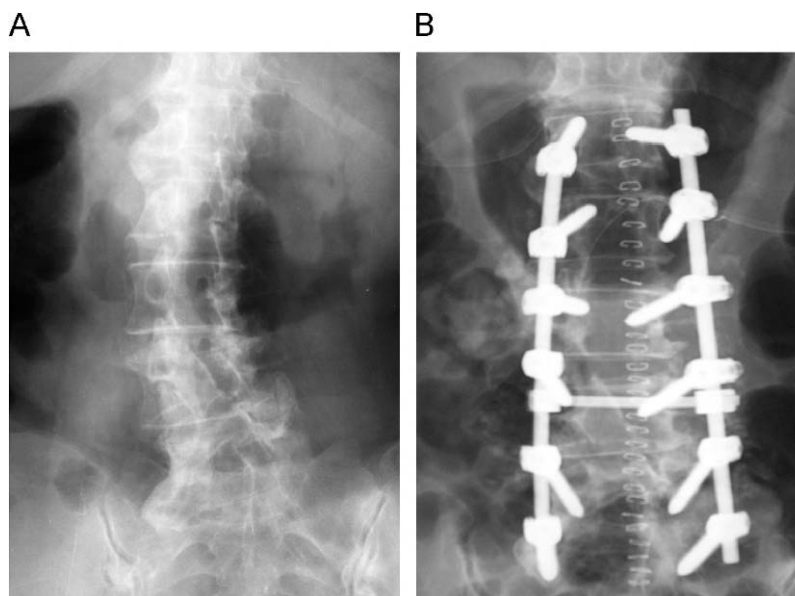


Figure 1 A) Post-operative anteroposterior x-ray. B) Post-op x-ray showing an external extrapedicular course of the screw at the second left lumbar vertebra.

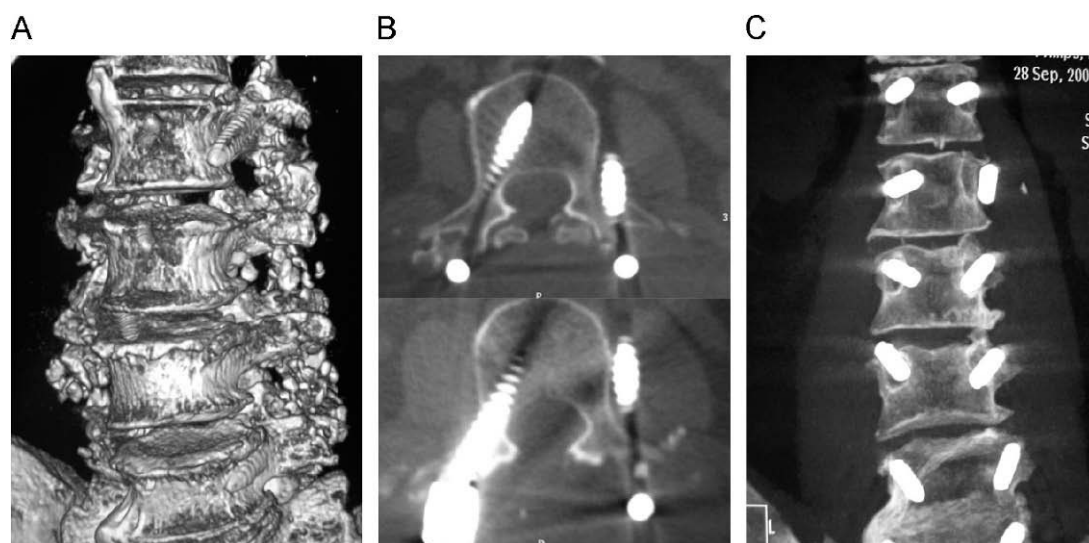


Figure 2 A) Anterior view of a 3D CT-reconstruction showing the extrapedicular course of the screw at the second left lumbar vertebra. B) Axial slices. C) Coronal slice.

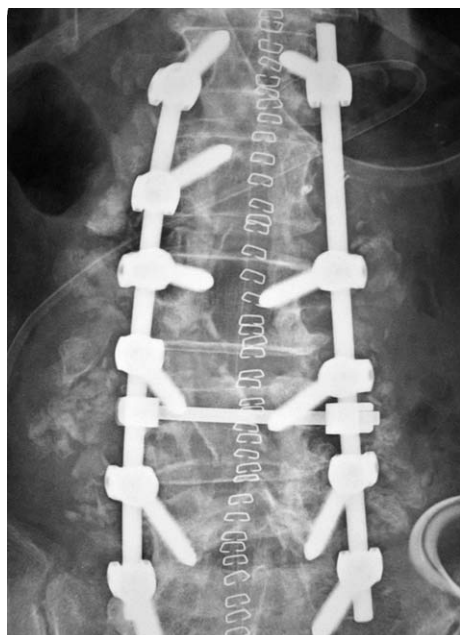


Figure 3 Anteroposterior x-ray following withdrawal of the left screw of the second lumbar vertebra.

anterior approach³. Surgeries performed through a posterior approach such as conventional disectomies^{4,5} and pedicular screw fixation⁶, have also resulted in large vessel or urethral lesions. These lesions occur as a result of an inadvertent invasion of the retroperitoneal space, which results in hemodynamic destabilization of the patient, which is not usually associated with surgical hemorrhage caused by the retroperitoneal hematoma that develops. In these cases, the lesion is detected because the screw disappears and the hole it leaves behind makes it possible to identify the hemorrhage.

Placement of pedicular screws is not exempt from complications, the most frequent of which being dural lesions, transient nerve root palsy, nerve root pain, pedicle fracture and screw loosening⁷.

Although neurological complications are the most usual, with rates ranking between 1 and 6%, vascular and visceral lesions can also be caused by pedicular screws given the close relationship existing between the spine and the aorta and the other major retroperitoneal structures⁸. Vascular lesions can occur during pedicular screw insertion^{6,9} or at a later stage in the form of a pseudoaneurysm¹⁰. These lesions normally occur as a result of an anterior and particularly a lateral invasion of the pedicle cortex.

Pedicular screw removal surgery can also lead to complications including nerve lesions, dural tears or the impossibility to withdraw the distal part of a broken screw². Vascular or visceral lesions are exceptional in this type of surgery. Only Vanichkachorn et al have published a paper that dwells on the potential risk of injuring large vessels in the attempt to extract a broken pedicular screw as a result of the displacement of the broken distal part of the screw, which ends up in an area immediately adjacent to the thoracic aorta². In the case herein there is not only a fully-fledged vascular lesion resulting from injury to the gonadal and renal veins, but there is also a visceral lesion caused by trauma to the duodenum during the migration of the pedicular screw until it gets to the root of the mesentery.

To conclude, it can be said that the case presented herein is exceptional. To date, there were no reports in the literature of vascular or visceral complications in pedicle screw extraction surgery, so this case shows that special care is necessary in this type of surgery since it shows the severe potential complications that could occur in an apparently low-risk type of surgery as a result of the significance of the structures surrounding the spine. Immediate performance of a central laparotomy was highly effective, for which reason we relieve it is mandatory to be expeditious when confronted with this kind of complication.

Conflict of interests

The authors have declared that they have no conflict of interests.

References

1. Goodkin R, Laska LL. Vascular and visceral injuries associated with lumbar disc surgery: Medicolegal implications. *Surg Neurol.* 1998;49:358-70.
2. Vanichkachorn JS, Vaccaro AR, Cohen MJ, Cotler JM. Potential large vessel injury during thoracolumbar pedicle screw removal. A case report. *Spine.* 1997;22:110-3.
3. McAfee PC. Vascular injury during anterior lumbar spine surgery. *Spine J.* 2005;5:118 author reply 118-9.
4. Lacombe M. Vascular complications of lumbar disk surgery. *Ann Chir.* 2006;131:583-9.
5. Smith DW, Lawrence BD. Vascular complications of lumbar decompression laminectomy and foraminotomy. *Spine.* 1991;16:387-90.
6. Hernigou P, Germany W. Evaluation of the risk of mediastinal or retroperitoneal injuries caused by dorso-lumbar pedicle screws. *Rev Chir Orthop Reparatrice Appar Mot.* 1998;84:411-20.
7. Faraj AA, Webb JK. Early complications of spinal pedicle screw. *Eur Spine J.* 1997;6:324-6.
8. Minor ME, Morrissey NJ, Peress R, Carroccio A, Elozy S, Agarwal G, et al. Endovascular treatment of an iatrogenic thoracic aortic injury after spinal instrumentation: Case report. *J Vasc Surg.* 2004;39:893-6.
9. Smythe WR, Carpenter JP. Upper abdominal aortic injury during spinal surgery. *J Vasc Surg.* 1997;25:774-7.
10. Kakkos SK, Shepard AD. Delayed presentation of aortic injury by pedicle screws: Report of two cases and review of the literature. *J Vasc Surg.* 2008 May;47(5):1074-82.