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Delayed Fatal Lumbar Artery Bleeding following Less Invasive Posterolateral Decompression and Fusion

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Study Design: A case report

Objective: To outline the potential risks of late bleeding from the segmental vessels following less invasively dorsolateral approaches to the thoracolumbar spine.

Summary of Background Data:A low risk of major intraoperative bleeding, associated traditional dorsolateral approach to the lumbar spine is reported , but segmental arteries and great vessels maybe rarely damaged. Spine surgeons who are involved with these approaches should be aware of these rare but potential dangerous vascular complication because they could be life threatening, particularly in elderly patients with increased morbidity, and/or metastatic disease to the spine.

Methods: A 76-year-old Caucasian woman with a comminuted osteoporoticfracture of the L1-vertebrae with spinal canalencroachment underwent a corpectomy and a 360° fusion with the use of a titanium mesh cage,through a less invasively dorsolateral approach.

Results. Despite the lack of visible intraoperative bleeding and uneventful postoperative period, the patient died on the seventh postoperative daydue to massive bleeding from a segmental artery at the level of L3 vertebrae body, two levels below our intervention area.

Conclusions. This paper describes a rare complication of delayed and fatal bleeding of thesegmental L3 left vertebral artery following less invasively L1 corpectomy, mesh cage insertion and pedicle screw fixation in a elderly female patient with history of two malignancies. Although injury to large vessels must always be preventedduring these procedures, an injury to the segmental vessels occurs more frequently. The dorsolateral approach and other retroperitoneal approaches to the thoracolumbar region are established methods for the surgical stabilization of comminuted vertebral body fractures , especially on

the hands of experienced spine surgeons. Great care should be given postoperatively for signs of bleeding and hematoma and the surgeon should be aware for these life threatening complications.

Key Words:fatal bleeding, segmental artery, dorsolateral approach, delayed complication, corpectomy, spinal fusion, death, thoracolumbar spine, fracture

Level of Evidence:5

Introduction

Life threatening bleeding following less invasively dorsolateral approach in thoracolumbar junctionis exceptional. There are only few reports on intraoperative injuries to great vessels and segmental arteries during anterior or lateral approaches to the lumbar spine[1,2].To the authors' knowledge, this is the first reportof a postoperative massive bleeding of L3 segmental artery following less invasive dorsolateral L1 corpectomy in a 76-year-old woman with fatal outcome.

Materials and methods

A 76-year-old woman presented to the authors' institution with a 6-month history of progressive pain in the thoracolumbar spinewithout neurologic deficits. A pathological fracture of the L1 vertebra was disclosed in plain roentgenograms and CT-scan(Figures 1a,b). In the past,the patient had a right colectomy for malignancy anda total abdominal hysterectomy plusbilateral salpingooopherectomy for ovarian malignancyfifteen and ten years respectively before this admission.

Because ofthe high perioperative morbidity (elderly, previous abdominal operations) associated with an traditional anterior approach, a less invasively left dorsolateral retroperitoneal approach was selected.The preoperativelytranspedicular biopsy of L1 disclosedno malignancy, whiletheCT-angiography did not reveal vessel malformation or pathologically increased blood supply to the anterior thoracolumbar spine.

Surgerywas performed in a prone position. A skin incision was made 1 cm left to the midline of the spinous processes.Theleft side dissection,included unilateral detachment of the paravertebral muscles and removal of the transverse processes ofT12, L1 and L2and T12 rib

headretroperitoneal to the lateral vertebral wall of T12-L2 vertebrae. Pedicle screws in the vertebras T11, T12,L2 and L3 were inserted on the left side. The left nerve root of L1-nerve root was prepared, ligated and cut. Meticulousintraoperative control of bleeding following ligation of the segmental vessels T12-L2.Following partial left corpectomya titanium mesh cage filled with allografts was inserted in the place of vertebrectomy .4 pedicle screws were transfascially inserted in T11, T12, L2 and L3 vertebras on the right side. The pedicle screws on both sides were secured withlongitudinal rods.Neuromonitoring was used.(figure 2).

Results

The postoperative period was uneventful without any clinical or laboratory signs of substantial bleeding.The patientwas ambulatory already on 2nd postoperative day with custom made orthosis under low molecular heparin anticoagulation and discharged from the hospital the 7th postoperative day. During the operation and the postoperative period the patient received 3 blood units in total. The HCT on the discharge day was 36.3%, Hb:12, PLTs:131000 and all the rest laboratory findings in normal values.

On the afternoon of the discharge day, while she was at home, the patient felt dizzy and she was transferred unconscious and hemodynamically unstable to the regional hospital. The HCT at the admission was 18,2% and the Hb 6,1. After the initial hemodynamic stabilization,she underwent a CT-angiography that revealed a hugeretroperitoneal hematoma with active bleeding possibly derived from the left L3-segmental artery (figures 3a,b,c). Due to her critical condition anembolization was suggested by interventional radiologists. However, her family denied any further intervention. The patient was transferred to the ICU where she died 8 hour later from diffuse intravascular coagulopathy (DIC).

Discussion

Thispaperreports the extremely rare fatal complication of a delayed diagnosed asymptomatic for a week postoperatively hematoma due to bleeding from the left segmental L3 vertebral artery following a semi-open left-side posterolateral decompression and L1 corpectomy in an elderly female patient.It is worth mentioning that in this particular case, the vessel that cause the bleeding was located two levels below the level of the corpectomy. The exact cause of this fatal complication is not establish in our particular case as an autopsy was denied by the relatives. The authors speculate that the cause of the L3 segmental vessels bleeding should be related to the previous malignancies and abdominal surgeries (colon cancer, ovarian malignancy) that induce vasculopathy, arteriovenal shunts and vessel fragility[3]. The surgical manipulations for the cage insertion at the upper border to L2 vertebra close to L3 vertebra, may provoked an accidental,minor, indirect laceration to the left L3 segmental artery and a potential hypertension crisis in the postoperative period could activated the vascular bleeding and in combination to the thromboprophylaxis treatment that the patient was receiving, the results were finally fatal. Another theoretical explanations for this unexpected initially symptomless complication could be an unrecognized puncture during spinal biopsy or pedicle screw insertion[4].

Less invasively lateral thoracolumbar approach for vertebrectomy is a technically demanding procedure because of the complex anterior anatomy and the narrow exposure of vital structures crossing this junction. The reported psoas hematoma in retroperitoneal transpsoas approach is relatively low (0,18%) and can be missed even a month after the initial surgery[5]. Injury of the L4 vertebral artery with the trocar during percutaneous vertebroplasty for L5 vertebral fracture with bleeding 10 days after the intervention has also been also reported[6]. In our case, despiteallthe necessary preoperative examinations including a CT angiography that was made for

the suspected malignancy of L1[7], this rare complication leaded to a delayed but significantbleeding and finally to the death of the patient 7 days after surgery.

We strongly believe that less invasive approaches to the thoracolumbar region are established methods for the surgical stabilization of comminuted vertebral body fractures , especially on the hands of experienced spine surgeons, but more strict criteria should be appliedon the selection of patients for these procedures. Elderlypatients, history of malignancies and prior radiotherapy to the abdominal area andto the spine could increase the potential risk for complications.If finally, a less invasively approach has been chosen, greatcare should begiven both, intraoperatively and postoperatively for signsof acute,or delayed bleedingin order to prevent this life threatening complication. An embolization of the L3 segmental artery might have saved the life of this particular patient.

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Legends

Figure 1a,b: Preoperative CT imagine in the sagittal (a) and axial plane (b) shown the pathological fracture of the L1 vertebrae and the bone fragments into the medullary canal. Calcification of the abdominal aorta can be seen in both images , signs of increased degeneration and fragility of the segmental vertebral arteries.

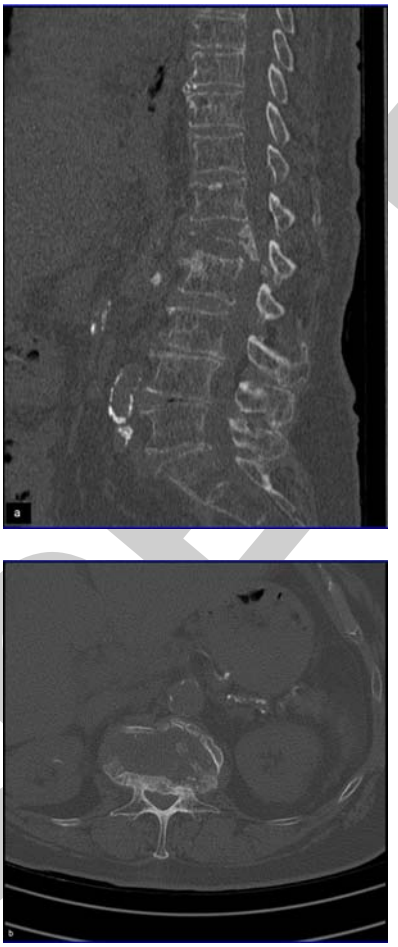

Figure 2: Postoperative X-Ray, bilateral transpedicular screws from T11 to L3 connected with longitudinal titanium rods. Titanium mesh cage filled with allograft at the L1 level.

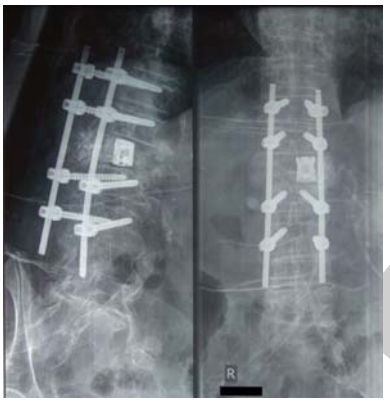

Figure 3a,b,c: CT angiography immediately after the initial stabilization of the patient. The route of the segmental artery can been seen (red arrows) leaded to a large retroperitoneal hematoma (white arrows)