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## Case report

# Lifesaving embolization in a massive lumbar artery bleeding: Interventional radiology management <sup>☆,☆☆</sup>

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## ABSTRACT

Vertebral fractures are the most frequent fractures associated with osteoporosis. Thus far, there are no reported cases in literature analyzing intervertebral bleeding as a result of an osteoporotic vertebral fracture. The authors report a case of an 85-year-old woman in hemorrhagic shock for an unusual vertebral fracture causing a massive bleeding, which was contained by the vertebral ligament system inside the body of L4, treated with an endovascular approach. Since there are no guidelines for a treatment for the case mentioned above or similar, our aim is to describe a possible approach to a potentially life-threatening rare event.

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## Introduction

Thus far, there are no reported cases in literature analyzing intervertebral bleeding as a result of an osteoporotic vertebral fracture. The authors illustrate a case report of an intervertebral hematoma due to a lumbar artery bleeding [1].

Literature data provides some clarity in this regard; lumbar artery bleeding might represent a life-threatening event, given the consequent retroperitoneal hemorrhages, which can provoke neurological complications [2,3].

In our case, the osteoporotic fracture of a lumbar vertebra resulted in a bilateral laceration of the lumbar arteries, which led to an intervertebral bleeding and 2 bilateral psoas hematomas.

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In this situation, considering the critical condition of the patient, the age and the anatomical characteristics (a severe scoliosis and atheromasia of the arteries), the endovascular embolization represented the only possible therapeutic option. Moreover, since the bleeding originated from several lumbar arteries the procedure was conducted with a bilateral approach.

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### Case report

An 85-year-old woman arrives at our emergency room for an accidental fall. In anamnesis hypertension, chronic anemia and colon cancer treated with chemotherapy and radiotherapy. The patient presented hypotension with a blood pressure of 60/40 mm Hg and no palpitations or respiratory alterations. Due to the low-pressure values and the anemia (Hb 8,6 g/dL), 4 blood bags and 1000 mL of Crystalloids were administered. However, given the unresponsiveness of the hypotension, a contrast enhanced Computed Tomography (CECT) was performed, revealing a fracture of L4 associated with an active blush, which appeared to be originating from the third right lumbar artery. This active blush had caused bilateral psoas hematomas and an intravertebral bleeding, the body of L4 was completely substituted by blood (Figs. 1 and 2).

Due to the CECT findings and the critical conditions of the patient, she was transferred to the Operating Room of the Emergency department, equipped with a C-ARM. Firstly, the angiography was performed using a right femoral approach, confirming the CECT findings, there was an active bleeding originating from the third right lumbar artery and the fourth left lumbar one.

The catheterization was performed with a Cobra 5fr (Cordis) and a Progreat 2.7fr (Terumo). Subsequently, the embolization of the aforementioned arteries was performed using three Coils 5 mm x 8 cm (Concerto coil) and gelatin sponge (Spongostan). Given the presence of multiple collateral circulations, arising from the iliolumbar artery, an embolization of the artery was also required using Coils 5mm x 8 cm and gelatin sponge (Spongostan) (Fig. 3).

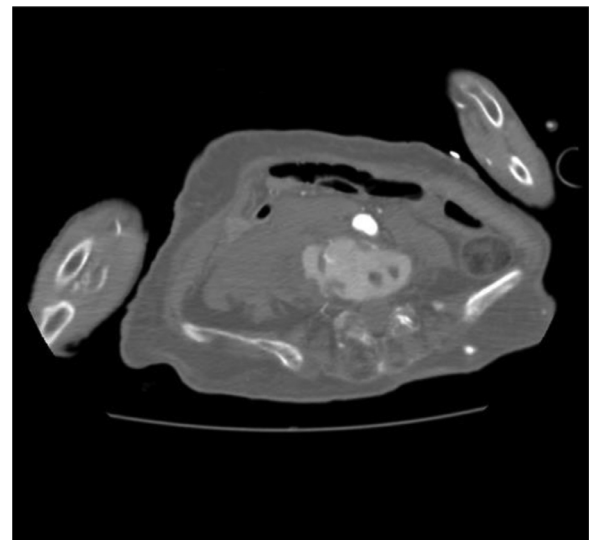
After repeated attempts it was not possible to locate the origin of the fourth right lumbar artery which led to the suspicion that it was closed by a calcific plaque.

Eventually, the procedure was concluded without evidence of residual active bleeding and with stable hemodynamic conditions.

However, the patient's conditions worsened, she was still hypotensive and in hemorrhagic shock, so a second CECT was performed highlighting a residual active bleeding from the fourth right lumbar artery which couldn't have been catheterized previously. Therefore, the patient was transferred to the Angio Suite (Philips Allura Clarity) at the Interventional Radiology Unit. A new angiography with contralateral femoral access (left) was performed and led to an easy and immediate catheterization of the artery in question with a Vertebral catheter 5fr (Cordis). The angiography above identified a big vascular blush from the artery that appeared lacerated at the origin and was embolized through the use of 5 mm x 10 cm



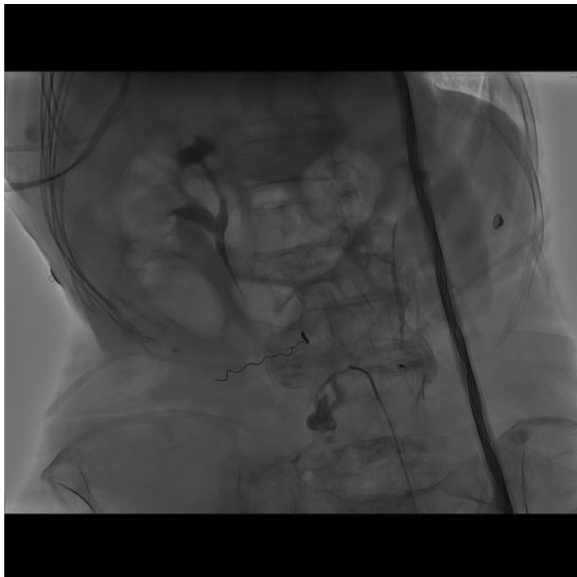
**Fig. 1 – Multiplanar reconstruction of contrast enhanced CT scan evidencing an intravertebral active bleeding in the L4 body.**



**Fig. 2 – Axial view of contrast enhanced CT scan showing the active bleeding in the L4 body.**



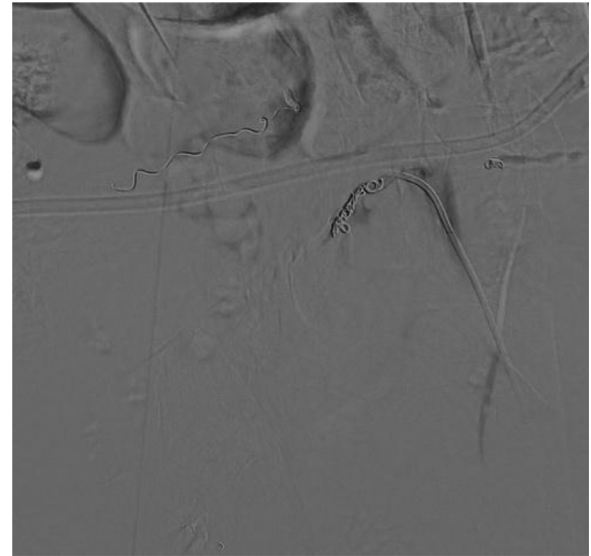
**Fig. 3 – Super-selective angiography of the third right lumbar artery showing an active blush.**



**Fig. 4 – Selective angiography of the fourth right lumbar artery showing a massive vascular blush.**

and 6 mm x 10 cm Coils, gelatin sponge (Spongostan) and glue (Glubran II + Lupiodol) (Figs 4 and 5).

Eventually, the bleeding was handled and ultimately stopped. The patient was hospitalized for the stabilization of the lumbar fracture, which was treated with a conservative approach. No neurological complications occurred and the patient was discharged after 10 days.



**Fig. 5 – Post-embolization angiography of the fourth right lumbar artery showing a good deafferentation of the vessel.**

## Discussion

In an osteoporotic patient, vertebral fractures are the most frequent ones. As previously stated, lumbar fractures can lead to retroperitoneal hemorrhages, which represent a potentially life-threatening event associated with neurological complications such as bone marrow ischemia and paralysis [2].

In the reported case, the lumbar fracture caused the rupture of 3 lumbar arteries (third right, fourth right and fourth left). The iliolumbar artery was also embolized due to the presence of multiple collateral circulations. The vertebral fracture we are focusing on is an uncommon type of fracture which is not reported in the AO (Arbeitsgemeinschaft für Osteosynthesfragen) spinal fracture classification [4]. In fact, the L4 body, appeared interrupted and comminuted only its anterior wall. In addition, the vertebral ligament system was intact, which allowed the bleeding to be limited and contained inside the vertebral body.

Lumbar artery bleedings can occur as a complication of other conditions like renal mass biopsies, spinal procedures or traumas. As mentioned above, there are few reported cases and no guidelines for the management of similar bleedings - a lumbar artery bleeding due to a vertebral fracture [5,6]. All the reported cases in literature evidence how the endovascular management should be the first line therapy [7]. In particular the study of Sclafani et al., underlines how the embolization is the first option for these bleedings and the importance of multiple embolization due to the presence of collateral circulations [2]. This case represents a challenging procedure for the presence of multiple arterial lesions, the patient's critical conditions and her anatomical characteristics, with a severe scoliosis and a great atheromatic disease. All of the reported factors made it increasingly difficult to catheterize the main bleeding artery, which required a bilateral approach. In fact, the procedure was performed with 2 different accesses;

firstly, the right femoral one, which allowed to treat 3 of the 4 involved arteries. Eventually, after several unsuccessful attempts, based on our own experience, a contralateral femoral access represented an easier catheterization of the artery and the final technical success of the procedure.

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## Conclusion

We are presenting a case of an unusual vertebral fracture that provoked a massive bleeding from multiple bilateral arteries, which was contained by the vertebral ligament system inside the L4 body. Since there are few other reported cases and no guidelines for the treatment of similar situations as the 1 analyzed in this paper, our aim is to describe a possible approach to a potentially life-threatening rare event. Moreover, we experienced how in critical catheterizations a contralateral access might lead to the technical success, therefore, we encourage the evaluation of this approach in similar procedures, complicated by unfavorable anatomies.

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## Authors contribution

LDM and GMR Writing; AA and MG Revision; GC and SAA supervision and data collection

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## Patient consent

Written informed consent was obtained from the subject in this study.

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## Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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