CASE REPORT

Intercostal artery pseudoaneurysm with spontaneous resolution in the setting of an artery of Adamkiewicz

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SUMMARY

We report an extremely unique and previously unreported case of a pseudoaneurysm arising from an intercostal artery that also gave origin to the artery of Adamkiewicz. Due to the potential risk of losing the artery of Adamkiewicz, a conservative approach was indicated. On short interval follow-up imaging, the pseudoaneurysm and associated hematoma spontaneously resolved with preservation of the intercostal artery. We performed a literature review of the natural course of pseudoaneurysm as well as their occurrence in the intercostal arteries.

BACKGROUND

Our case is unique for several reasons. Firstly, a pseudoaneurysm arising from an intercostal artery is rare, and hence there is a paucity of literature regarding an approach to its management. An artery of Adamkiewicz arising from such an intercostal branch is extremely rare, but it is an important condition to be aware of since there may be severe clinical consequences in the event of mismanagement.

Damage to the artery of Adamkiewicz or its intercostal supply during surgical or endovascular procedures may lead to spinal cord ischemia and infarction. A conservative approach may be an option for such a pseudoaneurysm. This has been successfully demonstrated in our case report.

Our case report also highlights that in the case of an intercostal artery pseudoaneurysm, it is important to delineate the anatomy, especially if intervention is contemplated, to ensure that the artery of Adamkiewicz is not arising from it.

CASE PRESENTATION

A 47-year-old woman was loading a sack of potatoes into her car. She lifted it with both hands, twisted, and flung it into the back of her car, and then suddenly experienced severe thoracolumbar back pain, radiating anteriorly and superiorly into her chest wall.

INVESTIGATIONS

Initial CT imaging showed retroaortic stranding and a focal area of enhancement with a prominent osteophyte anteriorly at the T10/T11 vertebral level (figure 1). In addition, a large umbilical hernia was noted. The retroaortic focal abnormality was initially misinterpreted as an enhancing lymph node with inflammatory changes. Based on the CT

Figure 1 Axial CT on day 0, showing retroaortic stranding and an area of enhancement with a prominent osteophyte at its base.

findings and abdominal pain, she was presumed to have a strangulated umbilical hernia for which she underwent urgent surgical repair. Follow-up CT at day 4 showed a more discrete pseudoaneurysm associated with the right T10 intercostal artery (figure 2A, B). There was no MRI evidence of discitis or osteomyelitis to suggest an underlying inflammatory or mycotic aneurysm.

Selective angiography demonstrated a false aneurysm arising from the proximal portion of the right T10 intercostal artery. Despite numerous runs and various projections, it was difficult to determine the origin of the aneurysm as being directly off the intercostal artery itself or alternatively from a tiny branch. The artery of Adamkiewicz supplying the anterior spinal artery was noted to arise from the same intercostal trunk a little more distally (figures 3 and 4A, B).

TREATMENT

Given the presence of a large artery of Adamkiewicz and the risk that therapeutic embolization might occlude or compromise this important branch, we elected to treat conservatively and intervene if there was evidence of progressive enlargement and/or rebleeding. The patient was advised against the combination of lifting a heavy weight and sudden forceful twisting.

OUTCOME AND FOLLOW-UP

CT performed at 3 weeks showed complete disappearance of the pseudoaneurysm (figure 5) with

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Figure 2 (A) CT on day 4, after repair of the umbilical hernia, demonstrating post-surgical pleural effusion and retroaortic hematoma and pseudoaneurysm bounded anterolaterally by the intercostal artery. (B) Sagittal reformat demonstrating retroaortic hematoma and pseudoaneurysm bounded anterolaterally by the intercostal artery.

Figure 3 Selective CT angiogram of the right T10 intercostal artery demonstrates opacification of the segmental artery, the pseudoaneurysm, and the anterior spinal artery.

Figure 4 (A) Anteroposterior projection of the right T10 intercostal artery angiogram showing the close relationship of the pseudoaneurysm to the parent artery and the artery of Adamkiewicz. (B) Oblique projection of the right T10 intercostal artery angiogram showing the close relationship of the pseudoaneurysm to the parent artery and the artery of Adamkiewicz.

Figure 5 CT scan at 3 weeks, showing resolution of the pseudoaneurysm, close association of the proximal right intercostal artery to the osteophyte, and preserved filling of the distal intercostal artery with mild persisting retroaortic soft tissue thickening.

only a thin (7 mm) rind of residual paravertebral soft tissue thickening remaining. DSA performed at 8 weeks showed resolution of the pseudoaneurysm (figure 6). The patient was completely asymptomatic by this time. The right T10 intercostal artery ran very close to the osteophyte at T10/T11, suggesting that it might have been responsible for lacerating the artery when she forcefully tossed the sack of potatoes into her car.

DISCUSSION

The intercostal or lumbar segmental arteries that arise from the descending aorta divide into an anterior branch and a posterior branch. The posterior branch subdivides into the radicular, muscular, and dorsal somatic branches. The radicular arteries may subdivide into a radiculomedullary artery to supply the anterior spinal artery, the radiculopial artery to supply the posterolateral spinal arterial plexus, and the radiculomeningeal artery to supply the dura of the spinal cord. The artery of Adamkiewicz is the most dominant anterior radiculomedullary artery.^{1 2} It anastomoses with the anterior spinal artery to form a

Figure 6 Angiogram at week 8, at the level of the right T10 intercostal artery, shows resolution of the pseudoaneurysm.

characteristic hairpin turn at connection. The origin of the artery of Adamkiewicz is variable but most commonly arises on the left (~80%) and at the level of the 9th–12th intercostal artery (~70%).¹

Damage to the artery of Adamkiewicz or its intercostal supply during surgical or endovascular procedures may lead to spinal cord ischemia and infarction. Ischemia from intercostal artery occlusion has been reported to cause spinal cord infarction and subsequent paralysis in up to 13% of patients.³ Therefore, vascular mapping of the artery of Adamkiewicz is important in reducing the risk of de novo or post-interventional spinal cord ischemia.² Presurgical localization of the intercostal and/or lumbar artery that supplies the artery of Adamkiewicz is of great interest when attempting to reimplant the intercostal artery or planning therapy.³

Intercostal artery pseudoaneurysms are extremely rare, with only a few cases reported in the literature. It has been reported after blunt trauma² and after iatrogenic injury, such as from retroperitoneal laparoscopic radical nephrectomy,⁴ percutaneous nephrolithotomy,⁵ and percutaneous biliary procedures.⁶ The standard practice is for embolization to be performed as interventional treatment as typically low risk and conservative management are not generally offered.

Reports of spontaneous resolution of an intercostal artery pseudoaneurysm are rare. We were only able to find one case

report in the literature where an iatrogenic intercostal artery pseudoaneurysm during laparoscopic radical nephrectomy resolved with conservative management after 8 months.⁴ It is not known whether this aneurysm was associated with the artery of Adamkiewicz.

Spontaneous closure of selected femoral artery pseudoaneurysms following iatrogenic injury is well documented.⁷ There are few case reports of spontaneous resolution of traumatic pseudoaneurysms of the middle meningeal artery.^{8,9} However, spontaneous resolution of an intercostal artery pseudoaneurysm also supplying the artery of Adamkiewicz is an interesting and exceedingly rare scenario that has not been described previously. In our particular case, we hypothesize that a prominent osteophyte lacerated the intercostal artery or its branch during a particularly aggressive maneuver when she flung a sack of potatoes into her car. This would fit the sudden onset of pain immediately after the maneuver, and the close association of the pseudoaneurysm to the osteophyte on imaging and subsequently the intercostal artery to the osteophyte once the pseudoaneurysm and hematoma resolved. Other possibilities include an underlying mycotic or inflammatory aneurysm but there was no other evidence to support this.

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Competing interests None declared.

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