Chronic Contained Rupture of an Abdominal Aortic Aneurysm Causing Vertebral Erosion: Two Case Reports

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Abstract

We report here two cases of a chronic contained rupture of an infrarenal abdominal aortic aneurysm (CCR-AAA) which eroded a lumbar vertebra. One patient underwent a graft replacement of the aneurysm without any orthopedic intervention and remains in good health 4 years after the operation with improvement to the vertebral injury. Another patient underwent endovascular aortic repair (EVAR) without orthopedic spine stabilization due to his poor general condition. Afterwards, a remaining type II endoleak possibly progressed vertebral destruction. The patient became bedridden and died of pneumonia 21 months later. Surgery is necessary to prevent the re-rupture of CCR-AAA. However, EVAR could be an incomplete treatment in respect of its insufficient decompression of intra-aneurysmal pressure. Graft replacement should be considered to be the principle procedure for this often fatal condition.

Keywords: Abdominal aortic aneurysm; Chronic contained rupture; Vertebral erosion

Case Presentation

Case 1

A 72-year-old male was referred to our institution for worsening low back pain that began three months prior. His body temperature was normal, and laboratory examinations indicated no abnormal elevation of inflammatory response. A CT and MRI of the abdomen and lumbar spine revealed a 59 mm infra-renal abdominal aneurysm which demonstrated destruction of the second and third lumbar vertebrae (Figure 1a-c). At the operation, there was a true aneurysm of the native aorta with a posterior wall rupture in the direction of the vertebral body, resulting in a retroperitoneal pseudoaneurysm. The orifice of the ruptured pseudoaneurysm was 3 × 3 cm in size. An aorto-bilateral iliac bifurcated graft was implanted.

The patient did well postoperatively and was discharged on the 11th postoperative day. There was no additional spine reconstruction procedure, but the patient’s pain subsided. Four years after the operation, the patient has no back pain and remains fully ambulatory. Follow-up plain CTs have shown that the damage to the vertebrae is improving (Figure 1d).

Case 2

An 87-year-old man, with a past medical history of brain infarction, was admitted to the GI
tract surgery department because of epigastralgia and pyrexia. A CT revealed acute gangrenous cholecystitis. The patient was in a state of septic shock and needed an emergency operation. The CT scan and MRI also confirmed an 80mm aneurysm and a scalloping of the third and fourth lumbar vertebral bodies (Figure 2a-c). After a successful laparoscopic cholecystectomy, his inflammatory response returned to normal, but his general condition was unstable. Eventually, he underwent an endovascular aortic repair (EVAR) operation without orthopedic spine stabilization 40 days after the cholecystectomy.

The recovery after the EVAR operation was uneventful, and he went back to his nursing home 11 days after the EVAR operation. Contrast enhanced CT prior to discharge showed a type II endoleak from the IMA. Follow up CTs showed the enlargement of the AAA probably due to the type II endoleak and severe progression of the vertebral destruction (Figure 2d). The patient became bedridden and died from pneumonia 21 months later.

Discussion
A chronic contained rupture of an abdominal aortic aneurysm (CCR-AAA) is a well-known phenomenon first described by Szilagyi “et al.” [4] in 1961. While AAA is a common disorder, CCR-AAA constitutes only 2.7% of infra-renal aortic aneurysm operations [2]. The combination of AAA-CCR and vertebral erosion is rare [5,6]. It

Figure 1: A) Contrast enhanced CT scan of the abdomen: Axial section at the level of L3. CT shows a 59mm infra-renal abdominal aneurysm. The eroded part of the vertebral body doesn’t have any contrast effects. B) 3D-CT: 3D-CT shows destruction of the third lumbar vertebrae. C) T2 weighted imaging on MRI: MRI shows an aneurysm in the abdominal aorta and the destruction of the L3 vertebral body. Lt Psoas muscle adjacent to the CCR-AAA doesn’t show any affected findings except exclusion. D) Plain CT. Axial section at the level of L3. Four years after the graft replacement operation, CT shows that the damage to the vertebrae is improving.

Figure 2: A) Plain CT scan of the abdomen. Axial section at the level of L4. The aneurysm was 80mm in maximum short diameter. CT shows a hematoma “draping” over the eroded spine and a loss of continuity in the rim of aortic calcification. B) Contrast enhanced CT. Axial section at the level of L4. The eroded spine has no contrast effects. C) T2 weighted imaging on MRI: MRI shows an aneurysm in the abdominal aorta and the destruction of the L4 vertebral body. Bilateral Psoas muscle adjacent to the CCR-AAA doesn’t show any affected findings except exclusion. D) Plain CT. Axial section at the level of L4. One year after the EVAR operation, CT showed the enlargement of the AAA. The L4 vertebral body was seriously destructed.
is believed that the continuously pulsating aneurysm compressing the vertebral body produces extensive bone destruction. The diagnosis is a problem for clinicians. The differential diagnoses of this challenging subject are cancer, fracture, infection, vertebral spondylitis or discitis, osteoporosis, degenerative disc disease, retroperitoneal abscess, and visceral diseases [7]. A CT is a sensitive diagnostic imaging tool to diagnose CCR-AAA causing vertebral erosion. Characteristic features include a well-corticated, curvilinear erosion in the anterior segment of the vertebral body and the ‘draped aorta’ sign, defined as a draping of the posterior aortic wall on the anterior margin of the vertebral body [8,9]. Surgical repair of CCR-AAA is mandatory to prevent re-rupture and progressive vertebral destruction. Surgical options include open surgery or EVAR, the selection of which depends on the patient’s general condition [10-12]. Considering that EVAR has become the procedure of choice for a growing majority of infra-renal AAAs, CCR-AAA cases are likely to be treated with EVAR. Arici “et al.” [1] reported a postoperative death rate as high as 14% for open AAA repairs, but even then still discouraged the use of EVAR in patients with uninfected degenerative AAAs because of the belief that there might be a higher risk for endoleaks in a posterior aortic wall that had been disrupted by a contained rupture. This was true of our case also. Endoleaks didn’t reduce the intra-aneurysmal pressure and the AAA grew further because its posterior wall was a frail saccular pseudoaneurysm. Thus, the destruction of vertebrae gradually worsened. We believe that an EVAR operation should not be performed in cases where it is assumed that an endoleak will remain after the EVAR procedure. Graft replacement should be considered to be the principle procedure for this often fatal condition.

References


