

Infrarenal Abdominal Aortic Pseudoaneurysm in a Case with Abdominal Aortic Atheromatous Plaque after Blunt Trauma: A Case Report and Review of the Literature

Abdominal Aortasında Aterom Plağı Bulunan Vakada Künt Travma Sonrası Infrarenal Abdominal Aorta Pseudoanevrizması: Vaka Sunumu ve Literatür Değerlendirmesi

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ABSTRACT

Pseudoaneurysm of the abdominal aorta as a result of blunt trauma is uncommon, due in part to its protected position in the retroperitoneum. This report describes the case of a 58-year-old man with atheromatous aortic plaques with isolated infrarenal abdominal aortic pseudoaneurysm was diagnosed 5 weeks after blunt trauma.

Key words: Pseudoaneurysm, Blunt trauma, Infrarenal Abdominal Aorta

ÖZET

Künt travmaya bağlı olarak gelişen abdominal aorta pseudoanevrizması retroperitonda aortanın bulunduğu pozisyon nedeniyle çok sık değildir. Bu vakada künt travmadan 5 hafta sonrası aterom plaklı aortasında pseudoanevrizma gelişen 58 yaşında erkek hastayı tanımladık.

Anahtar Kelimeler: Pseudoanevrizma, Künt travma, Infrarenal Abdominal Aorta

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INTRODUCTION

Pseudoaneurysm of the abdominal aorta as a result of blunt trauma is uncommon, due in part to its protected position in the retroperitoneum.^(1,2) Traumatic disruption of the abdominal aorta rarely results in a false aneurysm or a pseudoaneurysm, which may present months and even many years after an injury and potentially fatal condition. There are only few reports of delayed presentation of a traumatic aneurysm of the abdominal aorta.⁽³⁾

This report describes the case of a 58-year-old man having atheromatous aortic plaques in whom isolated infrarenal abdominal aortic pseudoaneurysm was diagnosed 5 weeks after blunt trauma.

CASE REPORT

A 58-year-old man involved in a motor vehicle crash sustained a side impact on the driver's side of the vehicle. He sustained blunt trauma to abdomen. On his arrival at an outlying community hospital mild abdominal tenderness. The patient was discharged from hospital after three days. During the next month, he continued to suffer abdominal pain. Therefore he was referred to our hospital. At his arrival in our emergency department, he had severe abdominal and bilateral back pain. Physical examination revealed a heart rate of 112, blood pressure of 110/70 mmHg, and tenderness and defance of the abdomen. Femoral and lower extremity pulses were palpable, and he was able to move all four extremities.

An ultrasonography of the abdomen was determined as normal. In abdominal tomography with contrast; disorder beginning from 6cm proximale and continuing until bifurcation segments were observed. Appearance which is thought to be due to contrast blotch was determined. Hemoragy was determined in paraaortic area of 19x30 mm diamater and the reason of this hemoragy is thought to be because of aortic injury at first sight. Bilateral renal artery which is originated left aorta was observed. Depending on injury, accessory renal artery supporting left bottom kidney pole, appeared to be obstructed. There was no contrast matter transition in left bottom kidney and it was thought that this situation was due to infarct related to obstruction in renal artery. There was an appearance in accordance with left and right perirenal hematoma. The other organs in abdomen were observed as normal (Fig.1).

Patient was taken into operation urgently. No pathology was observed in abdomen. By opening retroperiton, abdominal aort was reached. Hematom was observed in 5 cm above of iliac arters in region described by tomography. By tacturning to aorta, it was suspended in proximal and distal hematoma. After cleaning of hematoma, aorta was examined. When aorta the region next to lumbar vertebrae was checked, due to mass trauma in the region in where there was a plaque thorn and it was determined that aorta was injured from this side, plaque thorn was fixed to aorta wall and aorta was primarily repaired. Retroperiton was cleaned by fixing drainage to abdomen and retroperiton tissues were appropriately closed. Patient having no postoperative problem was discharged at sixth day of

hospitalization.

After one month of operation, patient having angina similar clinic applied to emergency department. Coronary arteries were determined as normal in angiography and it was seen that there was no problem in repaired aorta region (Fig.2).

Fig.1: Preoperative abdominal tomography with contrast showed aortic pseudoaneurysm (black arrow).



Fig.2: Postoperative angiography showed no problem in repaired aorta region.



DISCUSSION

Injury to the abdominal aorta caused by blunt trauma is rare in both adults and children. Fewer than 100 cases have been reported in the adult literature. Injury to the thoracic aorta after blunt abdominal trauma is more common. It has been estimated that 95% to 99% of all aortic disruptions are in the thoracic region. The abdominal aorta is rarely injured after blunt abdominal trauma and accounts for less than 5% of all aortic injuries. A recent multicenter review of 11,465 adult trauma admissions found only 194 instances of aortic

injury. Of these 194 instances, 174 involved the thoracic aorta whereas only 20 involved the abdominal aorta.⁽⁴⁾ Similarly, Michaels et al⁽⁵⁾ found 38 blunt force injuries to the aorta in 5676 trauma admissions, of which only seven involved the abdominal aorta. One reason for the rarity of abdominal aortic lesions in cases of blunt trauma is the highly protected position of the abdominal aorta.

Studies in the late 1930s and early 1940s reported an incidence of aortic (abdominal and thoracic) damage caused by fatal blunt trauma of less than 1%. More recent studies find an incidence of 10% to 15%.⁽⁶⁾ This increase is possibly due to faster motor vehicles, marked decrease in fatal head injuries because of improved motor vehicle design, and the use of seatbelts. Although seatbelts reduce the frequency of fatal head injuries, they are associated with a higher incidence of blunt abdominal aortic injury and a high incidence of associated intraabdominal injuries. Blunt aortic injuries are caused by motor vehicles in more than 70% of cases.⁽⁶⁾

Traumatic pseudoaneurysms of the abdominal aorta are rare, because aortic injury frequently results in death. Traumatic aneurysm, also known as a false aneurysm or a pseudoaneurysm, results from traumatic disruption of a normal arterial wall. It is a false aneurysm because it lacks all the three layers of a normal artery and actually represents a pulsatile hematoma surrounded by periadventitial tissue. If a communication persists between the artery and the hematoma sac, a pseudoaneurysm develops. Untreated arterial injury can lead to local hemorrhage with tamponade by surrounding tissues and a pulsatile hematoma. With absorption of the hematoma and fibrosis of surrounding tissue, a chronic pseudoaneurysm forms. A tubular mass adjacent to and inseparable from the aorta, enhancing to the same degree as the abdominal aorta, should be suspected to represent a pseudoaneurysm. This may be caused by either penetrating or blunt trauma. Gunshot and stab wounds are the most common causes, while iatrogenic injuries from invasive techniques are not uncommon in current.⁽³⁾

The location of traumatic pseudoaneurysms is normally around the aortic isthmus, other sites on the aorta being very rare. Posttraumatic abdominal aortic pseudoaneurysms (PAAPs) are rare. PAAPs of the infrarenal tract are quite rare. Posttraumatic pseudoaneurysm of the abdominal aorta has been diagnosed in patients ranging in age from 4 to 75 years. It reportedly has a male sexual predilection, and has been seen more in asthenic individuals.⁽⁷⁾

The mechanism of blunt abdominal aorta trauma is the result of both direct and indirect forces. The abdominal aorta is subjected to direct forces because it is relatively fixed by the vertebral column and lumbar vessels. Direct force can damage the aorta by violent compression against the spine or can be associated with a spinal fracture.⁽⁸⁾ Indirect force operates by compression of the adjacent organs building up a pressure of 1000 mmHg or higher in the aorta, leading to rupture.⁽⁹⁾ The nature of the accident and the physical examination of the victim are additional factors determining whether aortic damage will occur. Atherosclerosis has been implicated in the etiology of traumatic abdominal aortic rupture, intimal

disruption, and acute thrombosis. Atherosclerotic changes of the abdominal aorta may be associated with a weakening of the intima in addition to loss of elasticity and compliance and would make this site more susceptible to injury through trauma or sudden increases in intra-aortic pressure from ages 36 years and older.⁽¹⁰⁾ In our case was showed that the risk of abdominal aortic rupture increased in a case with atheromatous plaque.

The clinical presentation of posttraumatic abdominal aorta aneurysms appears to be extremely variable and sometimes bizarre. The most common report appears to be abdominal pain (62%).⁽⁵⁾ Clinical presentation of PAAP may be dramatic. Spontaneous rupture induces hypovolemic shock and carries a mortality rate that approaches 100%. The symptoms of unruptured PAAPs are variable, usually consisting of abdominal or back pain, or signs of compression on surrounding structures, such as the biliary tract, vena cava, and renal arteries. Upper gastrointestinal bleeding, thromboembolic phenomena, and sepsis have also been reported. The time interval from initial injury to symptomatic display has ranged from 4 days to 32 years. This variance suggests that abdominal aortic trauma should be considered as a possible cause at the time of the patient's presentation, even if exploratory laparotomy was performed at the time of the initial injury.⁽²⁾ The mode of presentation has included acute aortic or iliac occlusion, palpable mass, detectable bruit, and compression of renal arteries causing renovascular hypertension.⁽⁷⁾ Complete or partial vascular obstruction is the most common presentation, particularly if atheroma is present.⁽⁹⁾ Patients with traumatic abdominal aortic aneurysms are at potential risk for rupture, especially if they present with uncharacteristic symptoms that clinicians do not associate with an aneurysm. In our patient, who presented with severe abdominal pain and bilateral back pain, the diagnosis was not clinically suspected, probably because the abdomen by physical examination had not carefully.

The diagnosis of blunt injury to the abdominal aorta is usually not difficult. However, in some instances, as in our case presented herein, intimal disruption may be present without thrombosis and the diagnosis may be elusive. High levels of suspicion as well as knowledge of this condition are essential to the diagnosis. A rapid assessment of the abdomen by physical examination, abdominal ultrasonography, and diagnostic peritoneal lavage can provide immediate information regarding intra-abdominal injury and visceral bleeding. Blunt abdominal aortic injury may be evaluated by ultrasonography, color flow doppler scanning, computed tomography (CT), and abdominal aortography. Abdominal ultrasonography is promising, but its role is limited because it requires an interested imager and is heavily operator dependent. The diagnostic method for posttraumatic aneurysms has varied from intraoperative evaluation to ultrasound and CT scan. However, aortography is considered mandatory as a part of preoperative evaluation. Spiral CT provides a rapid and thorough examination of the abdominal aorta. Spiral CT after bolus administration of intravenous contrast material may provide the correct diagnosis and avoid

further time-consuming aortography. CT has a role screening examination in patients who are hemodynamically stable. Aortic arteriography continues to be the gold standard to confirm the diagnosis of abdominal aortic injury. It has been recommended that aortic arteriography should be performed, when possible, in all patients with blunt abdominal trauma showing signs of vascular involvement. Aortography should be performed in the stable patient to adequately define the number and location of the pseudoaneurysm(s) to allow proper planning of the surgical approach.⁽¹¹⁾

Various treatment options have been proposed in the current literature. Conservative therapy is very hazardous and associated with a 75% mortality rate. Late death was from rupture of a false aneurysm.⁽¹²⁾ The high mortality rate associated with spontaneous rupture mandates expedient repair of traumatic pseudoaneurysms of the abdominal aorta once diagnosed. In patients undergoing elective repair treatment depends on location, size, number of defects, and presence of infection. Options for repair include resection with graft replacement, aortorrhaphy, and patch aortoplasty.⁽¹³⁾ Intraluminal plaque thorn was fixed to aorta wall and aorta was primarily repaired in our patient and effectively excluded the pseudoaneurysm sac.

In conclusion, atheromatous aortic plaques may contribute to abdominal aortic pseudoaneurysm and rupture because less force is required to injure the intima over a plaque in a rigid atheromatous aorta. This case showed that especially in old peoples with arteriosclerosis risk, emergency physicians should be alert for abdominal aortic pseudoaneurysms and rupture after blunt trauma.

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