

# Pseudoaneurysm of the Abdominal Aorta Following Blunt Trauma

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## ABSTRACT

Pseudoaneurysm of the abdominal aorta may occur as a consequence of blunt abdominal trauma. Immediate surgery should be performed, once the diagnosis of aortic disruption is made because it is potentially lethal injury. We present a case of a young man, who underwent successful surgical treatment of abdominal aortic pseudoaneurysm following blunt trauma.

**Key words:** Blunt trauma. Abdominal aorta. Pseudoaneurysm.

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## INTRODUCTION

Pseudoaneurysm of the abdominal aorta is a rare entity, accounting for only 1 percent of all abdominal pseudoaneurysms.<sup>1</sup> Delayed pseudoaneurysm of the abdominal aorta is an exceedingly rare but potentially fatal complication following blunt abdominal trauma.<sup>2</sup> Origin of the mesenteric artery is the most common area for blunt traumatic abdominal aortic injuries.<sup>3</sup> Most of the post-traumatic abdominal aortic pseudoaneurysm following blunt trauma involves suprarenal aorta. Infra-renal aortic involvement is uncommon.<sup>4</sup> We are reporting the case of a patient who developed pseudoaneurysm of the abdominal aorta following blunt trauma in infra-renal aorta.

## CASE REPORT

A 19-year-old man presented to the emergency room. He was a motorbike rider and following road traffic accident was injured in the right forearm and also had abdominal trauma.

He had been suffering from pain in the left side of abdomen. On clinical examination, vital signs was normal. The head and neck and the chest did not show any sign of injury. Moderate tenderness was detected on his abdomen in left upper quadrant (LUQ) and left lower quadrant (LLQ). The patient was admitted under surgical care. On the first and second days of hospitalization, urine analysis and abdominal sonography were performed twice. In two times of urine analyses, 2+ hematuria had been observed consecutively. No abnormality had been reported in both abdominal sonographies. Thus, enhanced computed

tomography of the abdomen was performed on the second day, and revealed perirenal hematoma and intraparenchymal bleeding in the upper and middle poles of the left kidney. No evidence of vascular extravasation was observed. Then, he was admitted under urology care. On the third day, sonography of the abdomen and kidney was performed again and it showed the same results as the previous ones, so the patient was discharged.

Fifteen days later, he came back with generalized abdominal pain. On clinical examination, he had generalized abdominal tenderness specially in hypogastric area. Laboratory findings were a leukocytosis about  $13.5 \times 10^3$  with cellular differentiation of 70 percent polymorphonuclear. The result of urine analysis was normal. The patient underwent surgery with acute appendicitis diagnosis. Twenty-five hours later, he was discharged in fair general conditions.

Twenty-five days later (40 days after the initial trauma), he experienced abdominal pain again. The pain was continuous and located on his left abdomen and became worse, whenever he was in upright position. He had referred to surgeon's office, and an abdominal sonography was requested for him. It was reported that in the left upper quadrant of the abdomen, next to the vertebral column, a cystic mass was seen, which was extended downward the tail of the pancreas measuring 63 x 81 mm. The aorta could not be detected. According to these results pancreas pseudocyst or pseudoaneurysm of abdominal aorta was suspected, so a Doppler sonography was suggested. In the radiologic centre, the patient had a generalized tonic clonic seizure for about one minute. Then he was referred to the emergency room immediately. He could not move from the bed because of the intensity of the pain. He was confused, pale and had cool sweat. Blood pressure was 70 mmHg/pulse and pulse rate was 120/minute. Distal pulses were not palpable. The abdomen was visibly distended and a pulsatile mass measuring 10 x 8 centimeters was observed. Generalized tenderness mainly in the left upper quadrant (LUQ) and left lower

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quadrant (LLQ), and abdominal involuntary guarding were detected. The patient was taken to the operating room immediately. At that time, he was in grade III shock. Because the patient was sent to operating room, urgently computed tomography was not performed.

During laparotomy, a retroperitoneal hematoma measuring 25 x 30 centimeters was found. Abdominal aorta was compressed by surgeon in infrarenal and lesser curvature regions on vertebral column. Immediately, left thoracotomy was done and descending thoracic aorta in the left supradiaphragmatic area of the posterior mediastinum was clamped. An expanded hematoma consisting of clotting and fresh blood ejected.

Following clamping of aorta, distal to the renal artery, proximal clamp of aorta was removed for renal reperfusion. By exploration of pseudoaneurysm, a disruption measuring 1.5 centimeters was observed in the left lateral wall of abdominal aorta. Graft replacement was performed using a Dacron graft. The patient was shifted to intensive care unit (ICU) after surgery.

After 9 days, he was removed to surgical care, and 5 days later, he was discharged without any complications.

## DISCUSSION

Blunt abdominal trauma can cause any kind of intra-abdominal injuries, but abdominal aortic injury particularly aortic rupture due to blunt trauma is rare.<sup>5,6</sup> Pseudoaneurysm formation following blunt trauma in abdominal aorta is more rare than aortic rupture and potential lethal event.<sup>5-7</sup>

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 presents a pulsatile hematoma surrounded by periaortic tissue. If a communication persists between the artery and the hematoma sac, a pseudoaneurysm develops.<sup>7</sup>

In blunt trauma caused by traffic accidents, patients suffer from either acceleration or deceleration injury. On the other hand, cause of injury in mid to distal part of the descending aorta might be direct trauma to the aorta itself or secondary injury by spinal fracture or extreme extension of the spine.<sup>8</sup> This patient had suffered from injury to the left kidney. He was thin, therefore, his aorta might be directly injured.

Clinical presentation of aortic pseudoaneurysm may be dramatic, but most patients (upto 75 percents) are asymptomatic at the time of diagnosis. Discovery is usually incidental and is made during an ultrasound examination or computed tomography done for unrelated reasons, or occasionally during a physical

examination when a pulsatile epigastric mass is palpated.<sup>4</sup>

The symptoms of unruptured aortic pseudoaneurysm are usually due to leakage, pressure on adjacent structures (such as the biliary tract, vena cava, and renal arteries). These include distal ischemia, loss of pulses, distal embolization and abdominal or back pain.<sup>4,5,7</sup> Spontaneous rupture induces sudden, severe back and/or mid abdominal pain increased while walking, followed by hypovolemic shock and signs of peritonitis. It carries a mortality rate that approaches 100 percents.<sup>4,5</sup> The time interval from initial injury to symptomatic display may range from 4 days to 32 years.<sup>4</sup> In this patient, who presented with continuous abdominal pain increased, while standing and a palpable, tender, pulsatile mass, the diagnosis was clinically suspected, specially because of the past abdominal trauma.

Imaging plays an important role in patients with aortic pseudoaneurysm who are hemodynamically stable. Ultrasound is a simple, repeatable, less expensive modality for detection and follow-up of abdominal aortic and is currently the screening test of first choice.<sup>4</sup> Abdominal computed tomography is the gold standard for studying the size and extent of the aneurysm, involvement of the iliac vessels and renal perfusion.<sup>5,7</sup> It is most important to recognize the computed tomography features of an extravasating pseudoaneurysm. The exact site of extravasation is crucial for the surgeon in planning the surgical procedure.<sup>9</sup>

Immediate operation should be performed when the diagnosis of abdominal aortic disruption is made or suspected. The operative field includes the chest, abdomen and both thighs.<sup>4,10</sup> Intraoperatively, first priority is to gain proximal control of the aorta, which is frequently achieved by performing supraceliac clamping below the diaphragm.<sup>5,10</sup> Distal control in emergency situation is also obtained with intramural catheters.<sup>10</sup> The aneurysmal sac is then dissected carefully, avoiding injury to inferior vena cava and the renal vessels.<sup>4,5,7,10</sup> The anesthesia team should be alerted for possible hypotension and cardiac dysrhythmias.<sup>10</sup> Intra and postoperative correction of hypovolemia, hypothermia, and coagulopathy is crucial for patient survival and prevents complications of renal insufficiency and myocardial infarction.<sup>4,10</sup>

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