

Case Report

Acute Abdominal Aortic Aneurysm Rupture Following Hernia Repair

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Delayed diagnosis and surgical intervention of ruptured abdominal aortic aneurysm (rAAA) can be fatal. In clinical practice, to maintain a high index of suspicion of rAAA after abdominal surgery may be challenging for clinicians, especially in patients without previous history of aortic aneurysm. We present the case of a 65-year-old, hypertensive man who underwent laparoscopic herniorrhaphy and suffered from intractable abdominal pain postoperatively. Hemodynamical instability and unknown cause of anemia were also noticed in the post-anesthesia care unit. Because of the unusual presentation of course after hernia repair, abdominal computed tomography (CT) was arranged an hour after operation. The results of CT demonstrated a retroperitoneal hematoma suggesting a ruptured infrarenal abdominal aortic aneurysm. Subsequently, cardiovascular surgeon was consulted and endovascular aneurysm repair with Medtronic Endurant II endoprosthesis was arranged. The procedure was completed uneventfully and the patient was discharged from hospital three weeks later. We present this case to raise awareness about this clinical scenario among physicians and review the literature focusing on concomitant abdominal aortic aneurysm in elderly men with a history of inguinal hernia.

Key words: hernia, abdominal aortic aneurysm, pain

Introduction

Ruptured abdominal aortic aneurysm (rAAA) typically manifests with severe abdominal pain, hemodynamic instability,

and a pulsating abdominal mass.¹ However, rAAA may be misdiagnosed after abdominal surgery due to the presence of surgical pain and the use of analgesics, leading to difficulty in early diagnosis. Herein, we present a patient with rAAA which occurred immediately after

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Received: March 29, 2018 Accepted: May 31, 2018

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hernia repair in an attempt to alert physicians' awareness of this clinical condition. An association between AAA and inguinal hernias in the literature was also discussed.

Case Report

A 65-year-old man (height: 165 cm, weight: 85 kg, BMI: 31.2 kg/m²) American Society of Anesthesiologists (ASA) physical status III was admitted for hernia repair because of a painful bulging mass in left inguinal area for more than two days. His medical history included hypertension and a right inguinal herniorrhaphy 7 years ago. He did not have any previous history of myocardial infarction, stroke, and chronic renal failure. Preoperative physical examination and laboratory examination (e.g., hemoglobin: 16.1 g/dL) were unremarkable. The initial blood pressure (BP) was 190/120 mmHg with a heart rate of 111 beats/minutes. As there is no evidence of target organ damage (e.g., headaches, altered level of consciousness, or chest pain) and severely elevated BP may be associated with preopera-

tive anxiety (e.g., tachycardia), the minimally invasive procedure was not postponed. After anesthetic induction and tracheal intubation, laparoscopic herniorrhaphy was performed with carbon dioxide (CO₂) insufflation pressure of 14 mmHg under general anesthesia. During operative period, mean BP ranged from 90 mmHg to 56 mmHg and heart rate was from 70 to 80 beats per minutes. Operation was performed smoothly with minimal blood loss and an operation time of 75 minutes.

In post-anesthesia recovery room, the patient presented with intractable abdominal pain with an unstable hemodynamic profile (BP: 70/50 mmHg; HR: 125 beats per minute). On physical examination, the abdomen was found to be distended with muscle guarding without any pulsatile abdominal mass. A follow-up of artery blood gases demonstrated drop in hemoglobin concentration from 13 to 9.4 g/dL. His hemodynamic profile was stabilized after blood transfusion with two units of packed red blood cells. As the anesthesiologist was concerned about possible occult surgical bleeding, abdominal computed tomography (CT) was arranged an hour after operation and demonstrated a retroperitoneal hematoma suggesting a ruptured infrarenal abdominal aortic aneurysm (AAA) (Fig. 1). Cardiovascular surgeon was consulted and endovascular aneurysm repair (EVAR) with Medtronic Endurant II endoprosthesis was arranged. Intraoperative aortography revealed an infrarenal AAA with maximum diameter of 6.8 cm. The procedure was completed uneventfully and the patient was discharged from hospital three weeks later.

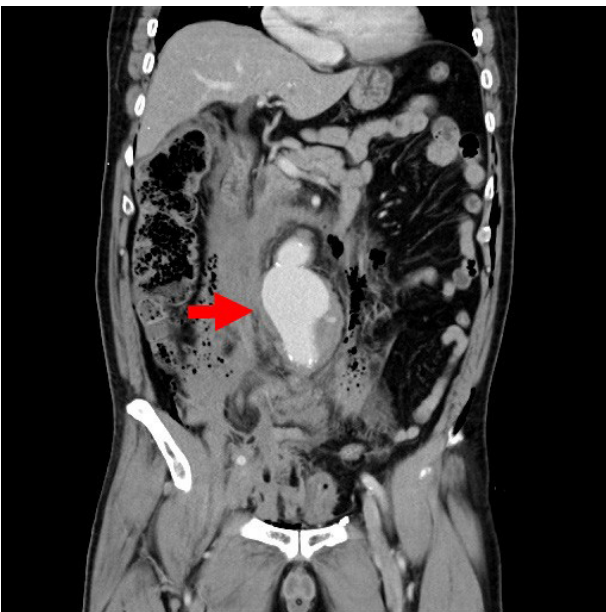


Fig. 1 Abdominal computed tomography (CT) an hour after herniorrhaphy demonstrating a retroperitoneal hematoma suggestive of a ruptured infrarenal abdominal aortic aneurysm (arrow).

Discussion

The development of ruptured abdominal aortic aneurysm (rAAA) in the early postoperative period is rare. Delayed diagnosis and surgical intervention of such a surgical emergency can be fatal. The symptoms of rAAA

may sometimes be atypical and can present as an orthopedic, urological, neurological disorder, or even as a cardiac problem.² Previous report has described a number of patients with rAAA being misdiagnosed as having inguinal hernia because of their initial presentation of inguinal pain.³ By contrast, our patient, who had an established diagnosis of inguinal hernia, presented with intractable abdominal pain, unknown cause of anemia, and unstable hemodynamics as the symptoms and signs of rAAA. In our case, the rAAA may develop during surgery or in the early postoperative period, as typical sign of rAAA (e.g., hypotension) was not observed and there was no notable decrease in hemoglobin before surgery (i.e., 16.1 g/dL).

Literature review showed that the impact of immediate preoperative hypertension on postoperative cardiovascular complications remains equivocal. Although a previous study demonstrated that there may be an increased risk of perioperative cardiovascular complications in patients with poorly controlled arterial hypertension (i.e., diastolic blood pressure of 110 mmHg) immediately before surgery,⁴ other authors have shown that untreated hypertensive patients with DBP of 120 mmHg were not at increased risk for cardiovascular complications.⁵ In a prospective, randomized, large-sample study (n = 989), Weksler et al. demonstrated that patients with preoperative diastolic pressure between 110 and 130 mmHg could undergo successful anesthesia after BP control without increasing the risk of cardiovascular complications.⁶ As maintenance of the intra-operative BP within acceptable range is a common practice for anesthesiologists and there was no pre-operative target organ damage in this patient, the minimally invasive surgery was not postponed. Both poorly controlled intraoperative BP and large swing of BP are possible significant risk factors for AAA rupture. In addition, laparoscopy surgery-associated pneumoperitoneum, which

causes a rise of intra-abdominal pressure, has been reported to compress AAA.⁷ Therefore, in our patient, a causal relationship may exist between AAA rupture and the surgical (i.e., increased intra-abdominal pressure) as well as anesthetic (i.e., poorly controlled intraoperative BP) procedures.

Several previous studies reported an increased risk of concomitant AAA in elderly men with a history of inguinal hernia.^{8,9} Lehnert and Wadouh reported a significantly higher rate of inguinal hernias among patients with AAA (41.1%) as compared to those with cardiovascular diseases (18.1%) or other aortic pathology (18.5%, $p < 0.001$) (n = 498).⁸ Pleumeekers et al. found that the incidence of AAA was significantly higher at 12.5% in patients with previous inguinal hernia repair compared with an incidence of 3.7% in patients without a history of inguinal hernia repair.⁹ Despite inconsistent findings,¹⁰ a meta-analysis on 14 studies also demonstrated a significant association between primary abdominal wall hernia and AAA.¹¹ The high coincidence of inguinal hernias and AAA in men could be explained by the altered connective tissue metabolism contributing to the development of both diseases, which eventually lead to degradation of supportive tissue in the aortic wall and the rectus muscle.¹²

In real-world clinical practice, diagnosis of rAAA based on the classic triad (i.e., hypotension, abdominal pain, a pulsatile abdominal mass)¹ is not applicable in patients undergoing general anesthesia during the intra-operative and early postoperative periods when the symptoms of rAAA may be masked by surgical pain, residual anesthetics, or the use of analgesics. Besides, although the pulsatile abdominal mass may have a good chance to be visualized in supine position after complete paralysis, detection may be difficult in our obese patient (BMI: 31.2 kg/m²).

High body-mass index (BMI), smoking, hypertension and family history of AAA were

risk factors for men suffering from AAA.¹⁰ However, in addition to family history of AAA, other risk factors are often non-specific for elderly surgical patients. Considering the high possible coincidence of concomitant inguinal hernias and AAA,^{8,9} preoperative abdominal sonography has been recommended for elderly hernia patients with risk factors for aortic aneurysm (e.g., hypertension and smoking) because ultrasound examination is inexpensive and has been shown to improve outcome.¹³ For this subgroup of patients without pre-operative ultrasound examination, physicians should examine the presence of a pulsatile abdominal mass before surgery. In addition, maintenance of stable perioperative hemodynamic profile is also important in elderly men with a history of inguinal hernia as a precaution against rAAA before a definite diagnosis is made. Intraoperatively, the presence of intra-operative blood in the spermatic cords should alert the operator for this possibility of rAAA during hernia repair.¹⁴ If an un-usual postoperative course was found in patients with multiple risk factors for AAA, physicians should keep in mind that the unusual presentation may be the manifestation of rAAA. Contrast-enhanced CT scan is recommended for all dubious cases at an early stage.

In conclusion, familiarity with atypical manifestations of rAAA (e.g., presentation of inguinal pain) and maintaining constant vigilance about the possibility of coexisting hernia and AAA may enable rapid diagnosis and timely intervention, especially on encountering elderly hernia patients with perioperative shock or anemia of unknown causes.

Competing interests

No external funding and no competing interests declared.

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