

CASE REPORT

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Iatrogenic Pseudoaneurysm after Laparoscopic Bilateral Inguinal Hernia Surgery: Treatment with Endovascular Coil Embolization

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ABSTRACT Although laparoscopic interventions have provided significant achievements in hernia surgery, they may cause complications such as pain, hematoma, intestinal injuries, testicular complications, and sometimes arterial pseudoaneurysms. Arterial pseudoaneurysms are a very rare complication of laparoscopic inguinal hernia surgery. Pseudoaneurysms have serious various causes such as inflammation, trauma, and iatrogenic injury. The patient was diagnosed with bilateral inguinal hernia and a laparoscopic total extra-peritoneal repair was completed. Pelvic bleeding developed on the first postoperative day. A pseudoaneurysm that was 80x70x50 cm was detected in an abdominal computer tomography angiography. In this case because of having high rate morbidity and mortality of open surgery, we selected endovascular angio-embolization instead of open surgery in the treatment of pseudoaneurysm which occurred after laparoscopic inguinal hernia surgery.

Keywords: False aneurysm; laparoscopy; hernia repair; endovascular procedures

For patients, laparoscopic intervention provides several advantages such as early discharge, getting back to work early, and a lower rate of wound infection. However, complications such as bleeding, hematoma formation, intestinal injuries, testicular complications, and pseudoaneurysm may occur. Pseudoaneurysms may develop in any artery in the body. They are usually found after femoral artery angiograms.¹ Iatrogenic pseudoaneurysm of the deep circumflex iliac artery (DCIA) is a rare entity. A review of the literature revealed 11 reports of DCIA pseudoaneurysms, which includes cases encountered after anterior iliac bone graft harvesting.²

In laparoscopic hernia surgery, there is an increase in the complication rate due to the uncontrolled use of devices such as electrosurgical devices, staplers, tackers. These complications often occur in the field of the triangle of doom, or after excessive dissection of the

hernia sac towards the retroperitoneum.¹ Severe complications and their consequences can be prevented by experience, appropriate case selection, and appropriate surgical techniques, which avoid excessive dissection.

CASE REPORT

A 41-year-old male patient was operated on the left varicocele 20 years ago. Laparoscopic intervention total extra-peritoneal was planned for the patient who was diagnosed with bilateral inguinal hernia.

The patient was operated on under general anesthesia through three suprapubic ports. A 10 mm incision was made just under the navel. Gas pressure was adjusted to 12 mmHg. The preperitoneal area was insufflated by inserting a 10 mm trocar. The dissection was started initially with a 30-degree camera. Monopolar electrosurgical instruments were used for dissection. Important

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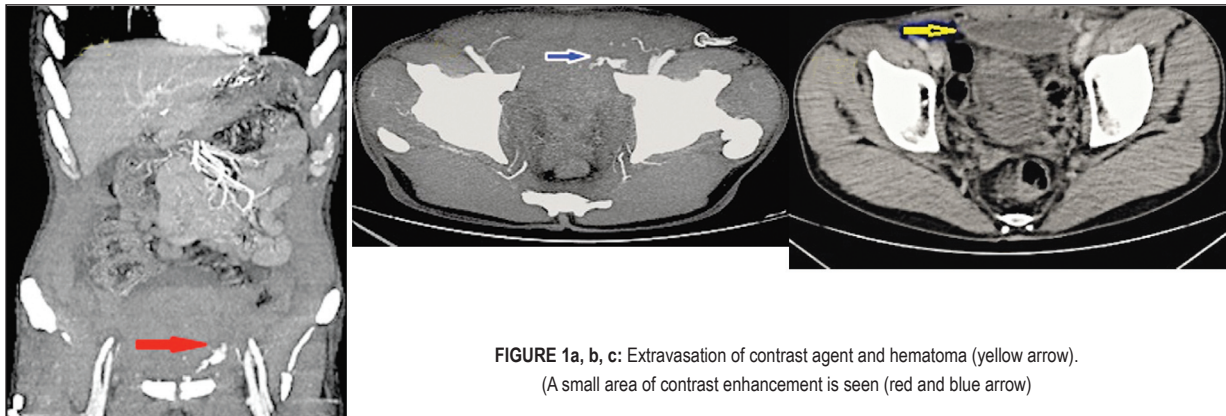
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landmarks such as the pubic tubercle and inferior epigastric vessels were observed. Indirect hernias were seen on both groins. The Bogros area was prepared.

Adhesions related to the previous varicocele operation on the left side were dissected. Hernia sacs were dissected toward the peritoneal reflexion. During sac dissection, a small peritoneal tear occurred at the left side which caused gas to escape into the abdomen, and therefore, our sight became restricted. A veress needle was inserted into the peritoneal cavity from the subcostal area to adjust the gas pressure (Palmer's point).

Propylene mesh (15x12 cm) was placed on the hernias on both sides and fixed using an absorbable tacker (bilateral mesh hernioplasty). No perioperative complication was detected.

Dizziness, nausea, weakness, and mild abdominal pain began on the first postoperative day. The patient's vital signs and hemogram parameters were as follows; fever 36.8°C; pulse 87/min; blood pressure 109/59 mmHg; respiratory rate 21/min; sPO₂ 98; white blood cell (WBC): count 8.04x10³ u/L; hemoglobin (Hb): 9.5 g/dL; hematocrit (Hct): 28.7%; red blood cell (RBC): 3.15x10⁶ u/L; platelet 206x10³ u/L. The patient's preoperative hemoglobin and hematocrit values were 14.2 g/dL and 41%, respectively.

An abdominal ultrasonography (USG) revealed minimal fluid collection in the pelvic area. However, USG findings were not considered adequate for the patient's clinical situation. An abdominal computed tomography (CT) angiography was requested. An 80x70x50 mm hematoma and extravasation of the con-

trast agent were detected in the pelvic region (Figure 1a, b, c). Patient's complaints deteriorated despite two units of erythrocyte suspension. Decreases in hemogram and blood pressure continued. In total, 5 units of erythrocyte suspension and one unit of fresh frozen plasma were given in two days. Because the bleeding did not stop, the patient was referred to the interventional radiology unit for diagnosis and treatment. A pseudoaneurysm was reported at one end branch of the anterior iliac artery via angiogram scans. Endovascular embolization was concurrently applied and bleeding was stopped (Figure 2a, b, c).

The patient was discharged five days after surgery. In the clinical and radiological follow-up (after discharge), the hematoma was found to be resolved without any problem at the end of the third month (Figure 3).

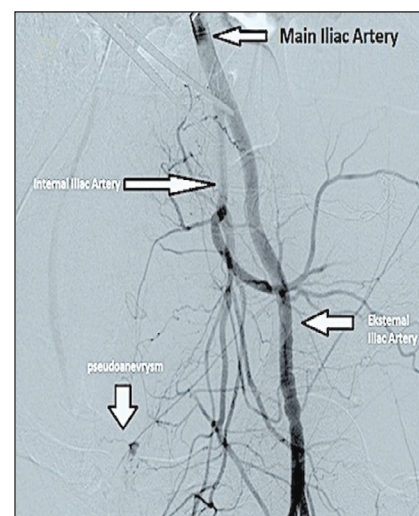


FIGURE 2a: Extravasation detected in angiography (white arrow).



FIGURE 2b, c: Endovascular coil embolization.

DISCUSSION

Pseudoaneurysms, also referred to as false aneurysms, occur when blood begins to flow into the surrounding tissues from the defect formed in the artery. This defect may lead to a persistent connection between the artery and the adjacent cavity without early intervention and will cause the formation of pseudo-cavities. Hematoma begins to be organized to create a fibrous wall for pseudoaneurysm.²⁻⁷

Pseudoaneurysms sometimes create pressure on the neighboring organs causing ruptures and infections.⁶⁻⁸ Pelvic iatrogenic pseudoaneurysms are usually caused by common femoral artery catheterization or by various endovascular procedures.^{4,5} Pseudoaneurysms that are smaller than 2 to 3 cm may recover due to the formation of spontaneous thrombosis. Follow-up is recommended for asymptomatic, stable, and negligible cases. A wait-and-watch strategy is recommended for these patients.⁵

Symptomatic pseudoaneurysms, whether intermittent or continuous, should be treated. However, the clinical condition of the patient, the structure of the aneurysm and the comorbidities of the patient should be considered.⁷

Pseudoaneurysms can be diagnosed using USG, magnetic resonance angiography (MRA), conventional angiography, and/or CT angiography. CT an-



FIGURE 3: Hematoma was disappeared after three months.

giography is superior to MRA and angiography because CT angiography provides more detailed information about both the tissues and vessels compared to MRA and angiography. MRA is also not practical for use in patients with trauma. MRA is a valuable tool in the imaging of pseudoaneurysms in patients with impaired renal function or allergies to contrast material, which is used during CT angiography. Pseudoaneurysms, arteriovenous fistulas, and vascular malformations are better differentiated by angiography, which provides a diagnostic tool with concomitant therapeutic potential if detected.⁷ However, the specificity and sensitivity of the CT angiography are greater than other types of examination.

What should be our approach to bleeding or pseudoaneurysms after laparoscopic hernia surgeries?

According to which criteria should the follow-up and treatment be applied? Should our treatment approach be an invasive or less invasive intervention? Traditionally, pseudoaneurysms have been treated with surgical repair. However, surgical treatment is invasive and is often associated with significantly higher morbidity and mortality rates. Over the past few years, minimally invasive radiologic treatments have been developed as alternatives to surgery. These include USG-guided compression, direct percutaneous USG-guided thrombin injection, and endovascular procedures.^{3,7} USG-guided compression is more appropriate for superficial pseudoaneurysms, but USG-guided thrombin injection is also suitable for deep aneurysms. Coil and other embolic materials can be administered directly or endovascularly into pseudoaneurysms. These applications have dramatically improved the morbidity and mortality of patients with pseudoaneurysms.^{5,8}

We believe that the complications of laparoscopic inguinal hernia surgery may decrease with adequate surgical experience, the selection of appropriate cases, and the controlled use of electro-surgical instruments. Asymptomatic small pseudoaneurysms sometimes undergo thrombosis spontaneously. Therefore, the wait-and-watch strategy in these patients may be appropriate.

Because the rupture and mortality risk is high in arterial pseudoaneurysms, some authors recommend early definitive treatment.³ Iatrogenic hematoma or

pseudoaneurysms may cause other serious problems such as dislocation and rejection of mesh, a pelvic abscess and recurrence of hernia after inguinal hernia surgery. Upon diagnosis of a pseudoaneurysm, it was thought to be appropriate (for our case) to apply angio-embolization, which is less invasive than surgical interventions. Informed consent was obtained from the patient.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Abdullah Yıldız, Muhammet Kadir Yıldırak; **Design:** Abdullah Yıldız, Muhammet Kadir Yıldırak; **Control/Supervision:** Abdullah Yıldız, Muhammet Kadir Yıldırak; **Data Collection and/or Processing:** Abdullah Yıldız; **Analysis and/or Interpretation:** Abdullah Yıldız; **Literature Review:** Abdullah Yıldız, Muhammet Kadir Yıldırak; **Writing the Article:** Abdullah Yıldız, Muhammet Kadir Yıldırak; **Critical Review:** Abdullah Yıldız.

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