CASE REPORT OLGU SUNUMU

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Iatrogenic Iliac Arteriovenous Fistula Presenting with Heart Failure Symptoms After Ruptured Ovarian Cyst Surgery

Over Kist Rüptürü Operasyonu Sonrası Kalp Yetersizliği Semptomları ile Prezente Olan İyatrojenik İliyak Arteriyovenöz Fistül

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ABSTRACT Iatrogenic arteriovenous fistulas (AVF), which are increasing in the literature with the increase of surgical closed vascular interventions in diagnosis and treatment, are rare but have fatal complications. AVF may present with congestive heart failure symptoms, cardio-pulmonary symptoms, and leg edema immediately after the operation or over the years, depending on the size of the fistula. Diagnosis can be made by imaging examinations such as Doppler ultrasonography, computed tomography, or magnetic resonance angiography in patients with suspected AVF. The endovascular stent-grafting approach seems to be more popular in eligible patients due to surgical treatment's high morbidity and mortality rates. We aimed to report a rare case of iliac arteriovenous fistula that developed after a laparoscopic intervention due to ovarian cyst rupture and successfully grafted with an endovascular covered stent.

Keywords: Arteriovenous fistula; stents; heart failure; ruptured ovarian cyst surgery

ÖZET İyatrojenik arteriyovenöz fistüller (AVF) nadir ancak tanı ve tedavide cerrahi kapalı vasküler girişimlerin artmasıyla literatürde sıklığı artan ölümcül olabilen komplikasyonlardır. AVF, fistül büyüklüğüne bağlı olarak operasyondan hemen sonra veya yıllar içinde konjestif kalp yetersizliği belirtileri, kardiyo-pulmoner belirtiler ve bacak ödemi ile prezente olabilir. AVF düşünülen hastalarda Doppler ultrasonografi, bilgisayarlı tomografi veya manyetik rezonans anjiyografi gibi görüntüleme çalışmalarıyla tanı konulabilir. Cerrahi tedavinin yüksek morbidite ve mortalite oranları nedeniyle uygun hastalarda endovasküler stent greftleme yaklaşımı daha popüler görünmektedir. Over kist rüptürü nedeniyle laparoskopi sonrası AVF gelişen ve endovasküler kaplı stent ile başarılı greftleme yapılan nadir bir iliyak arteriyovenöz fistül olgusu bildirilmesi amaçlanmıştır.

Anahtar Kelimeler: Arteriyovenöz fistül; stentler; kalp yetersizliği; over kist rüptürü operasyonu

Iatrogenic arteriovenous fistulas (AVF) arises from an abnormal connection between the artery and vein. It is classified as congenital or acquired. Acquired AVF usually occurs iatrogenically, secondary to post-traumatic vascular injury or surgical operations around the main vessels.[1] The development of iatrogenic AVF is increasing in the literature with the advancement of surgical procedures and the increase in closed vascular interventions in both the diagnosis and treatment. AVF diagnosis depends on the severity of the clinical findings. It can be detected immediately after the operation or over the years, depending on the size of the fistula. Treatment consists of closing the fistula and repairing both vascular structures. Morbidity and mortality rates are lower because endovascular interventional therapy is minimally invasive compared with open surgery. We aimed to report a rare case of iliac arteriovenous fis-

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tula that developed AVF after laparoscopy due to ovarian cyst rupture and successfully grafted with an endovascular covered stent.

CASE REPORT

A 16-year-old female patient was referred to our clinic with a pre-diagnosis of pulmonary embolism. She had edema in both legs and palpitation, fatigue, and shortness of breath complaints. It was learned that the patient had a history of acute abdomen due to ovarian cyst rupture, and she underwent laparoscopic surgery one month ago in another health facility. The patient's right common iliac artery was damaged as a perioperative complication, and surgical repair was performed. The patient developed respiratory distress and marked edema in the lower extremity one week after the operation. She had tachypnea and tachycardia during the physical examination. Respiratory sounds were decreased bilaterally. She also had bilateral pretibial edema, mons pubis edema, in addition to abdominal ascites, and hepatomegaly.

There was a 2-3/6 systolic murmur in her cardiac auscultation and a 3/6 systolic-diastolic murmur in the abdomen. In the echocardiography of the patient, the right cardiac structures and left atrium were enlarged. She also had right-sided pericardial effusion, 3rd-degree tricuspid regurgitation, moderate pulmonary hypertension, and a markedly enlarged inferior vena cava (2.5 cm). In the thorax computed tomography (CT) angiography taken for the differential diagnosis of pulmonary embolism, the main pulmonary artery and its branches were open, and there was no evidence of pulmonary embolism in the peripheral and mediastinal parenchymal area. There was a fluid collection reaching 4 cm in the right pleural space and 2 cm in the left. Compressive atelectasis changes due to pleural effusion dominantly on the right hemithorax were visible. A 10-mm-wide fistula was detected between the right common iliac artery and the right common iliac vein on abdominal CT performed for the preliminary diagnosis of AVF since the patient had an abdominal murmur and a history of previous operations (Figure 1A, 1B). Accordingly, the inferior vena cava and hepatic veins were quite dilated, and saccular aneurysm areas in the right common iliac artery with 4 mm located proximally and 6x5 mm located distally in sizes were observed. Surgical grafting with an endovascular-covered stent for high flow AVF was planned. An abdominal aortogram was performed by entering through the right femoral artery via angiography. A 10-mm-wide fistula was observed between the right common iliac artery and the right common iliac vein (Figure 1C). A covered graft stent was placed to cover the fistula and saccular aneurysms in the right common iliac artery. Then, the stent lumen was dilated with a balloon. The fistula tract was closed, and the vascular structures in the right lower extremity have reached normal potential (Figure 1D). The patient was recommended to use aspirin and clopidogrel for one month and maintenance treatment with aspirin alone after one month. In the control Doppler ultrasonography (USG), it was observed that the fistula tract was closed, the vascular structures of the right lower extremity reached normal potential, the right ventricular dimensions were normal in echocardiographic evaluation, and there was an improvement in pulmonary hypertension and pericardial effusion. Complete improvement was achieved during the patients' further follow-ups.

A written and informed consent was obtained from the patient informing her about the publication of case and pictures in this study.

DISCUSSION

Although iatrogenic fistulas are rare, they can occur after lumbar disc surgery, orthopedic operations, diagnostic or therapeutic catheter procedures, and percutaneous biopsies.[2] According to literature reviews, it is seen that iatrogenic fistulas are the most common after lumbar disc surgery and especially in the iliac vein.[3] Although diagnostic and therapeutic laparoscopic procedures are commonly performed for gynecological procedures, vascular damage occurrence is extremely rare. Fistula development after vascular damage can be as acute as it was in our case, or it can occur as a long-term complication even after several decades.[4] The size of the fistula between the artery and vein is an important determinant for the patient's clinical presentation. While 80% of those patients have murmur on the fistula area, congestive heart failure is observed in 35%, cardio-pulmonary symptoms in 65%, and leg edema in 40%.[5] Depending on

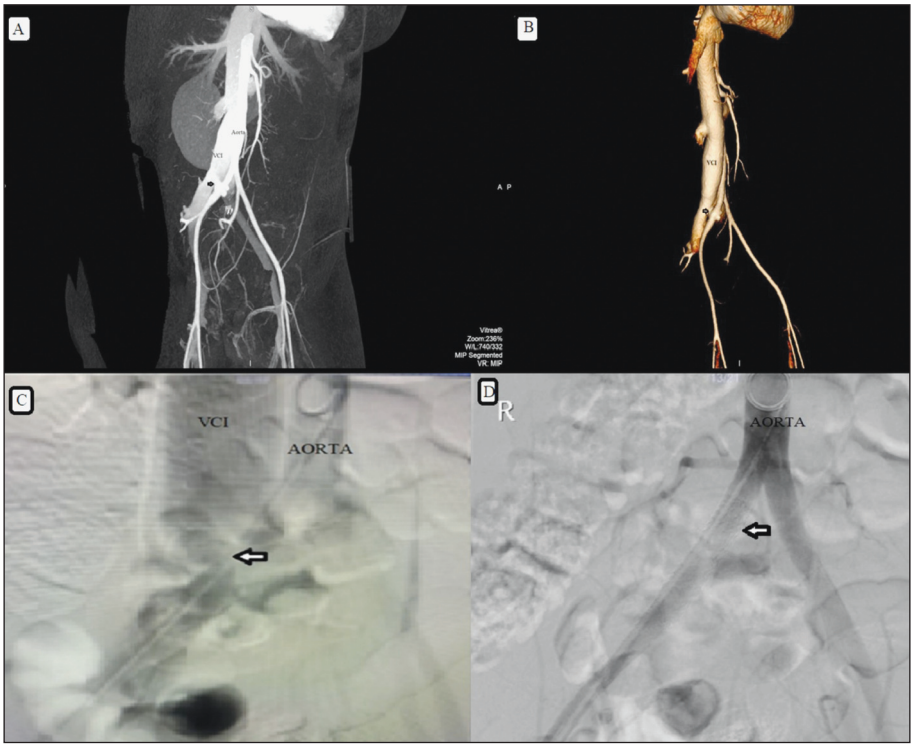

FIGURE 1: Computed tomography angiography of the aorta. Three-dimensional reconstruction images **(A, B)** showing the large communication between the right common iliac artery and the right common iliac vein and a significant dilatation of the VCI (arrow). **C)** Angiogram of the abdominal aorta showing a large fistulous tract between the right common iliac artery and the right common iliac vein (arrow). **D)** Covered stent was placed to cover the fistula and saccular aneurysms in the right common iliac artery. No residual fistula was observed after stenting. Arrow indicates the position of the stent.
VCI: Vena cava inferior.

the size, the fistula can be detected immediately after the operation or with signs of decompensated heart failure over the years.[6]

Therefore, early diagnosis and treatment of fistula are vital in terms of preventing complications that may occur. Although pulmonary embolism is often considered for existing respiratory distress in immobile patients with surgical intervention history, the iatrogenic fistula should also be considered in the presence of vascular damage history. Our patient was misdiagnosed with deep vein thrombosis and pulmonary embolism due to the respiratory distress that occurred after the operation. At this stage, advanced imaging with Doppler USG and CT angiography is important for differential diagnosis. As a matter of fact, the absence of a pulmonary embolism which could have explained the symptoms in our patient's thorax CT angiography, in addition to the abdominal murmur and abdominal surgery history, has led us to perform Doppler USG and abdominal CT angiography imagings, which resulted with the detection of the fistula tract. In the treatment, the aim is to close the fistula tract between the artery and vein entirely so that normal vascular continuity should be ensured. The closure of fistulas with open surgery was the standard treatment before the development of endovascular treatments, but especially in patients with cardiac decompensation due to large intraabdominal AVF, endovascular techniques developed in suitable patients due to excessive circulatory overload, risk of pulmonary embolism, bleeding risks, and mortality rates of 9%-34% seem to offer safer alternative options.[7]

In conclusion, as in all laparoscopic interventions, mastering the pelvic anatomy in the laparoscopic approach to ovarian masses is extremely important regarding the success of the intervention and the prevention of complications. Successful

grafting with an endovascular covered stent is an important treatment option in patients with cardiac decompensation and excessive circulatory overload, as in our patient, instead of surgical closure due to high mortality.

Source of Finance

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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: *Fatoş Alkan, Fatih Düzgün;* ***Design:*** *Fatoş Alkan, Fatih Düzgün;* ***Control/Supervision:*** *Fatoş Alkan, Fatih Düzgün;* ***Data Collection and/or Processing:*** *Fatoş Alkan, Fatih Düzgün;* ***Analysis and/or Interpretation:*** *Fatoş Alkan;* ***Literature Review:*** *Fatoş Alkan, Fatih Düzgün;* ***Writing the Article:*** *Fatoş Alkan;* ***Critical Review:*** *Fatoş Alkan.*

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