

Case Report / Olgu Sunumu

## Development of subcapsular hematoma in the pelvic kidney during peripheral angioplasty

*Periferik anjiyoplasti sırasında pelvik böbrekte subkapsüler hematoma gelişimi*

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### ABSTRACT

Pelvic kidney is a mostly asymptomatic pathology resulting from failure of the kidneys to superior migration in fetal development. Herein, we report a 47-year-old female patient who presented with intermittent claudication in her right leg at 100 m. Significant stenosis was detected in the right superficial femoral artery and popliteal artery by computed tomography angiography. Peripheral angioplasty was performed for the treatment of consecutive lesions in the right lower extremity. Severe back pain developed during the procedure. Postprocedure computed tomography angiography showed a 35 mm wide subcapsular hematoma surrounding the pelvic kidney. The patient was followed up with conservative treatment on the first day. However, the next day, the patient's hemoglobin values decreased, and the pain persisted, thus angiography was performed. In the pelvic arteriography, an arteriovenous fistula was observed in the artery supply to the upper pole of the pelvic kidney. The fistula was closed with endovascular coil embolization. The patient who had no decrease in hemoglobin and no symptoms was discharged three days later. It is necessary to pay attention to the pelvic kidney during peripheral angiography, and it should be kept in mind that rare complications such as renal subcapsular hematoma may develop.

**Keywords:** Pelvic kidney, peripheral angioplasty, subcapsular hematoma.

### ÖZ

Pelvik böbrek, fetal gelişimde böbreklerin superior migrasyon yapamamasından kaynaklanan, çoğunlukla asemptomatik bir patolojidir. Bu olguda, 100 m'de sağ bacağına intermitan kladikasyon şikâyeti ile başvuran 47 yaşında bir kadın hasta sunuldu. Bilgisayarlı tomografi anjiyografide sağ yüzeysel femoral arter ve popliteal arterde belirgin darlık saptandı. Sağ alt ekstremitede ardışık lezyonların tedavisi için periferik anjiyoplasti yapıldı. İşlem sırasında şiddetli sırt ağrısı başladı. İşlem sonrası çekilen bilgisayarlı tomografik anjiyografide, pelvik böbreği çevreleyen 35 mm genişliğinde bir subkapsüler hematoma görüldü. Hasta ilk gün konservatif tedavi ile takibe alındı. Ancak ertesi gün hastanın hemoglobin değerlerinin düşmesi ve ağrısının devam etmesi üzerine anjiyografi yapıldı. Pelvik arteriyografide pelvik böbreğin üst kutbunu besleyen arterde arteriovenöz fistül izlendi. Fistül endovasküler koil embolizasyonu ile kapatıldı. Hemoglobinde düşme görülmeyen ve semptomu olmayan hasta üç gün sonra taburcu edildi. Periferik anjiyografi sırasında pelvik böbreğe dikkat edilmeli ve renal subkapsüler hematoma gibi nadir komplikasyonların gelişebileceği akılda tutulmalıdır.

**Anahtar sözcükler:** Pelvik böbrek, periferik anjiyoplasti, subkapsüler hematoma.

Pelvic kidney is a mostly asymptomatic pathology resulting from failure of the kidneys to superior migration in fetal development.<sup>[1]</sup> Pelvic kidney incidence is 1 out of 2,100 to 3,000 births.<sup>[2]</sup> The

blood supply to the pelvic kidney is very variable. The pelvic kidney has one or more arteries. The pelvic renal arteries are usually associated with the aortic bifurcation and the common iliac arteries.<sup>[3]</sup> Renal

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subcapsular hematoma can usually be encountered after renal trauma, after urological surgery, or spontaneously.<sup>[4,5]</sup> In this case report, we reported a subcapsular hematoma developed in the pelvic kidney during peripheral angioplasty.

### CASE REPORT

A 47-year-old female patient presented with intermittent claudication (IC) in her right leg at 100 m. The patient had been treated for hypertension for 10 years, had no history of any other disease, and was not a smoker. On examination, right femoral pulses were palpable, but the right popliteal artery and more distal arteries were not palpable, and ankle brachial pressure index measurement was 0.69. Duplex ultrasound revealed significant stenosis in the right superficial femoral artery and popliteal artery. Computed tomography angiography (CTA) was performed to support the diagnosis (Figure 1). There was no abnormality in laboratory data (complete blood

count, chemistry, and coagulation). Serum creatinine was measured as 0.6 mg/dL, platelet was  $320 \times 10^9/L$ , and the international normalized ratio was 0.92 and within normal limits. Peripheral angioplasty was performed for the treatment of consecutive lesions in the right lower extremity. A retrograde 6F sheath was placed on the left common femoral artery. The wire (ZIPwire angled, 0,035-260 cm stiff; Boston Scientific/Scimed, Natick, MA, USA) was directed toward the right common iliac artery by a catheter (IMA, 6F-100 cm; Medtronic, Minneapolis, MN, USA). In the first attempt, the wire went to the superior artery of the pelvic kidney (Figure 2). The wire was gently pulled back without any strain. The wire was led to the right common iliac artery, which is the correct position. The initial sheath was changed with a longer one (Destination, 6F-65 cm; Terumo Interventional Systems, Terumo Medical, Tokyo, Japan). Stenosis in the right superficial femoral artery and popliteal artery were revealed with angiography. The patient was administered 5000 IU of intravenous heparin, and the lesions were crossed with a support catheter (Navicross, 4F-150 cm, angled; Terumo Interventional Systems, Terumo Medical, Tokyo, Japan) treated by balloon angioplasty (Mustang, 6×150 mm; Boston Scientific/Scimed, Natick, MA, USA). Due to the development of increasing back pain during the procedure, angiography



**Figure 1.** Computed tomographic angiography before peripheral angioplasty.



**Figure 2.** Angiographic view of the superior pole arteries of the pelvic kidney.



**Figure 3.** Subcapsular hematoma in the right pelvic kidney.

was performed on the abdominal aorta and pelvic renal arteries. Since no extravasation was observed, it was decided to perform a CTA after the procedure. Computed tomography angiography showed a 35 mm wide subcapsular hematoma surrounding the pelvic kidney (Figure 3). The patient was consulted with a urologist. Conservative treatment was recommended, suggesting intravenous antibiotics, tranexamic acid, and blood transfusion if needed. On the second day of the patient's follow-up, her hemoglobin value decreased from 14.2 to 10.1, and her pain continued. An interventional procedure was planned for the patient, who was again consulted with urology and interventional radiology. In the pelvic arteriography, an arteriovenous fistula was observed in the artery supply to the upper pole of the pelvic kidney. The fistula was closed with endovascular coil embolization. The patient who had no decrease in hemoglobin and no symptoms was discharged three days later.

## DISCUSSION

Pelvic kidney is in the migration anomalies subgroup of congenital kidney anomalies. In vascular surgery practice, we encounter problems with the pelvic kidneys more often in the presence of an abdominal aorta aneurysm and iliac artery aneurysm. A radiological study showed that 0.18% of patients undergoing abdominal aortic aneurysm surgery had a pelvic kidney.<sup>[6]</sup> The vascular supply of the pelvic kidney is also abnormal. The arterial blood supply of this kidney usually originates from the aortic bifurcation, common iliac artery, external iliac artery, and rarely the inferior mesenteric artery.<sup>[1]</sup>

Contrast-induced acute kidney injury is the most common renal complication in peripheral angiography. In our case report, we showed the development of

subcapsular hematoma in the pelvic kidney during peripheral angiography as a rare kidney complication. Two case reports demonstrate the development of subcapsular hematoma in the kidney during angiography.<sup>[7,8]</sup> In both reports, subcapsular hematoma occurred in the normally located kidney. Our study is the first case report describing subcapsular hematoma formation in the pelvic kidney and during peripheral angioplasty.

As in most renal subcapsular hematomas, the main complaint in our patient was loin pain.<sup>[9]</sup> We immediately performed computed tomography on the patient, whom we knew had a pelvic kidney, and diagnosed subcapsular hematoma. Afterward, the patient developed hematuria, and there was a 4.1 g/dL decrease in hemoglobin.

Treatment of renal subcapsular hematomas is controversial. Small hematomas may resolve spontaneously. The process can be managed with antibiotics and pain control.<sup>[10]</sup> However, if the hematoma develops rapidly, blood transfusion is needed, or the patient's vital signs indicate a critical condition, surgical or percutaneous intervention may be required. In such cases, the planned treatment may be directed towards the formation mechanism of subcapsular hematoma, as in our case report.<sup>[5,10]</sup> In this case, the manipulation of the guidewire created an iatrogenic arteriovenous fistula in the region supplied by the pelvic renal superior artery. Approximately 70% of renal arteriovenous fistulas are acquired or iatrogenic.<sup>[11]</sup> Renal arteriovenous fistulas, most of which are asymptomatic, show different symptoms depending on their size and location. Specific clinical manifestations are flank pain, hematuria, acute urinary retention, high-output heart failure, heavy bleeding, or thromboembolic events.<sup>[12]</sup> Similarly, our case rapidly exhibited symptoms, including back pain, hematuria, and renal subcapsular hematoma. The symptomatic arteriovenous fistula was successfully closed with endovascular coil embolization.

In conclusion, we think that it is vital to evaluate the presence of the pelvic kidney by CTA before peripheral angiography. It is necessary to pay attention to the pelvic kidney during peripheral angiography, and it should be kept in mind that rare complications such as renal subcapsular hematoma may develop.

**Patient Consent for Publication:** A written informed consent was obtained from patient.

**Data Sharing Statement:** The data that support the findings of this study are available from the corresponding author upon reasonable request.

**Author Contributions:** Idea/concept: M.B.; Design: M.B., Z.M.D.; Control/ supervision: Ö.K., Ü.A.; Data collection and interpretation: M.B., Ö.K.; Analysis: M.B., Ü.A.; Literature review: M.B., Z.M.D.; Writing the article: M.B., Z.M.D., Ö.K., Ü.A.; Critical review: Ö.K., Ü.A.; References: M.B.

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