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# THE FIRST RENAL ARTERY THROMBOSIS TREATMENT WITH PERCUTANEOUS ANGIOPLASTY IN THE REPUBLIC OF KOSOVO: CASE REPORT

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**Abstract**

Renal artery thrombosis is organ-threatening condition, which is not easy to be recognized. We present the first case of acute renal thrombosis treated with percutaneous angioplasty in the Republic of Kosovo, diagnosed in a public and successfully treated in a private institution as a result of integrated healthcare system.

***Kew words:*** renal artery thrombosis, percutaneous angoplastu, sten, thrombus aspiration.

## Introduction

Renal artery thrombosis (RAT) is one of the acute organ-threatening conditions that mimics various common pain syndromes, enduring the early diagnosis and treatment. This rare condition can be successfully recognized in a healthcare system that provides multidisciplinary and interactive approach of a vigil emergency department physician, accurate laboratory and imaging techniques.

Another challenge for the healthcare system is the disposal of advanced interventional treatment options depending on the clinical course and stage of the disease.

We present the first case of acute renal thrombosis treated with percutaneous angioplasty in the Republic of Kosovo, diagnosed in a public and successfully treated in a private institution as result of integrated healthcare system. A successful treatment of renal artery thrombosis highlights the role of the interprofessional team in the care of patients with RAT.

## Case report

A 45-year-old male presented at the emergency department of the University Clinical Centre-Prishtina with a complaint of sudden onset of crushing right flank pain accompanied by nausea and vomiting for 30 hours (since 1,5 days). He denied trauma, acute or chronic kidney disease and previous episodes of similar events.

The medical history revealed central left retinal artery occlusion in 2017, no hypertension and diabetes. The patient smoked 20 cigarettes per day. He did not take warfarin, NOACs (non-vitamin K anatagonist oral anticoagulants ) or drugs for kidney disease. Physical examination revealed that the patient had mild fever ($38.0^0$C), blood pressure of 140/80 mmHg, regular heart rate of 76 beats per minute, respiratory rate of 18 breaths per minute and saturation of 96% on room air.

Apart the tenderness on palpitation in right flank, there were no other marked abdominal signs of rebound, guarding, distension or organomegaly. The pulse on the right radial artery was filiform and on the left was absent, and the other palpable arteries were with normal pulse. The initial emergency department evaluation included an electro-cardiogram and echocardiography, both of which were normal.

Laboratory results showed serum creatinine of 161 μmol/L (normal range, 65–119 μmol/L), high CRP 275mg/L, and WBC count (28 *$10^/$U/L). The coagulation profile was within normal limits (D-dimer - 274 μg/L, normal range: 500μg/L). Serum lactate dehydrogenase was elevated to 1.912 U/L (normal range 100 U/L). The PCR test for SarsCov2 was negative and positive for IgG antibodies.

The patient was ignorant about previous COVID-19 infection. Prior to admission, he underwent an abdominal computerized tomography (CT) with contrast at the University hospital, which revealed right kidney hypoperfusion and right renal artery occlusion (Picture 1).

The patient was hydrated with normal saline before CT was performed. With no delay, he was referred to our interventional cardiology department at the American Hospital-Prishtina by the vascular surgeon.

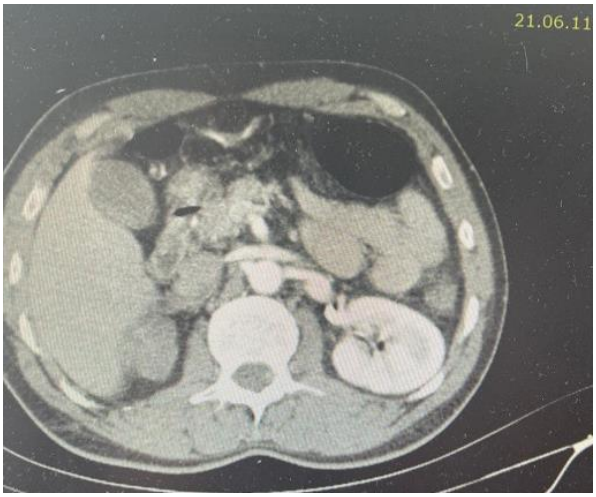


**Figure 1**. Abdominal computerized tomography with contrast reveals right kidney hypoperfusion and right renal artery occlusion

After right radial artery was punctured as an initial vascular access, due to right brachial artery occlusion access site was switched to right femoral. A 6-Fr sheath was placed percutaneously in the right common femoral artery. Then 7000 units of heparin were given by intra-arterial injection. The initial angiogram of the abdominal aorta revealed that the left renal artery was patent, and the right renal artery was with proximal occlusion. Selective right renal angiogram showed a total thrombotic occlusion (Figure 2A) [Video -1].

The thrombotic occlusion was traversed by using a coronary workhorse BMW 0.014-in guidewire to the distal portion of the right renal artery.

Angiogram was again performed and it showed extensively occluded branches of the renal arterie with no parenchymal enhancement of the nearly total right kidney (Figure 2B) [Video-2].

Multiple thrombus aspirations were performed with 6 F export advance aspiration catheter in all three branches with slightly improved blood flow. Bolus of GPIIbIIIa inhibitor (Tirofiban) was injected into the renal artery, followed by continuous venous infusion according to protocol adjusted to body weight.

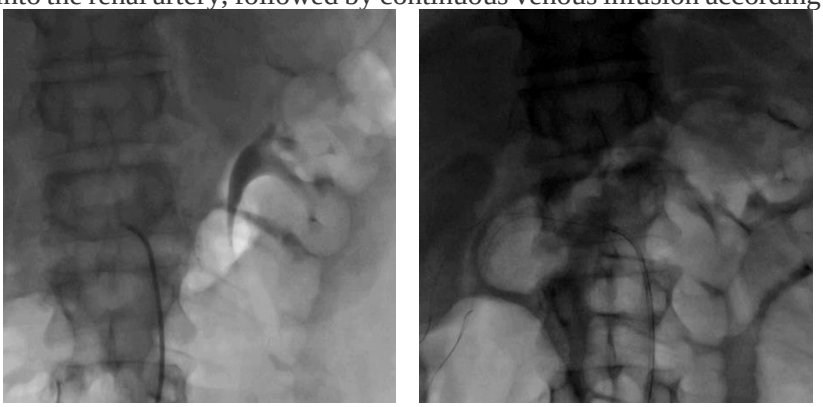

**Figure 2:** A: Angiogram of the abdominal aorta reveals left renal patent artery and abrupt occlusion of the right renal artery. B: Selective right renal angiogram reveals a total thrombotic occlusion.

The lesion was pre-dilated with 3.0x21 mm. flow was restored, but again renal flow diminished due to residual stenosis.

So, it was decided to stent the artery and subsequently 4.0x28 mm drug eluting stent was deployed at high pressure and good end result was obtained (Figure 3A) [Video-3]; post-dilatation was performed with 4.5x15 mm non-compliant balloon. A final angiogram demonstrated that the majority of thrombosis

in those branch arteries was eliminated, and the right renal perfusion was significantly improved (Figure 3B) [Video - 4].

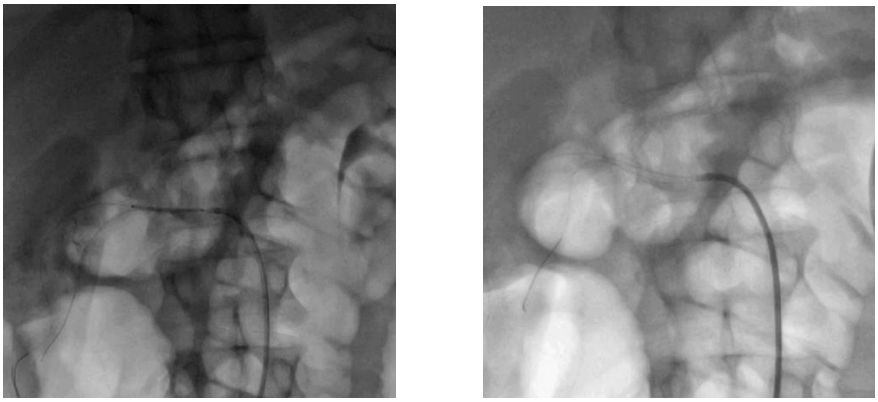

**Figure 3**: A: Selective right renal angiogram after thrombectomy with consecutive pre-dilatation and stent deployment. B: Final angiogram demonstrates post-dilatation effect with majority of thrombosis in branch arteries eliminated, and the right renal perfusion significantly improved

The patient was given oral aspirin 300 mg, oral clopidogrel 600 mg, and 7000 units intraarterial unfractionated heparin before the wiring of the artery and activated clotting time (ACT) was maintained around 300 msec.

The patient's flank pain was entirely resolved after the interventional treatment, and the serum creatinine decreased to 99 μmol/L on the fourth day, LDH 206U/L.

Kidney ultrasound showed that blood flow was sufficient in the right renal artery and parenchyma, although it was slightly worse than in the left kidney.

There was also discrete hydronephrosis. Furthermore, hypercoagulable state work up was done, which was found to be positive for lupus anticoagulant and hence, rheumatology consultation was recommended.

The patient was discharged with advice to take aspirin 100 mg/day and an additional prescription of rivaroxaban 20 mg/day for anticoagulation and clopidogrel 75 mg/day, not only for renal artery thrombosis but also for diffuse occlusive artery disease. Follow-up serum creatinine level at three months post-procedure was normal (90μmol/L).

However, the patient refused to make nuclear medicine scan in the follow-up period because of his fear of radiation effects. The control angiogram revealed fully patent right renal artery with no significant in-stent restenosis, bilateral brachial artery occlusion, distal right femoral artery stenosis. Coronary and anterior cerebral circulation fully patent (Figure 4) [Video-5].

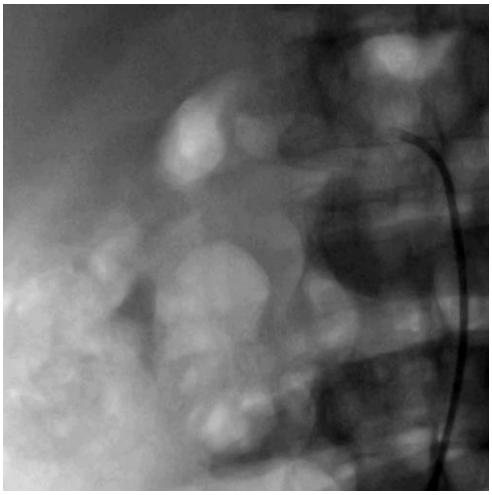

**Figure 4.** Control angiogram of renal, coronary and peripheral upper and lower extremities arteries at two months follow-up: Fully patent right renal artery with no significant in-stent restenosis, bilateral brachial artery occlusion, distal right femoral artery stenosis. Coronary and anterior cerebral circulation fully patent [Video-5]

**Discussion**

The renal artery thrombosis is a rare and not easily recognizable emergency medical condition, as it mimics many other abdominal syndromes [1-3].

The most common encountered causes are related to embolization [4,5] rather than in situ thrombosis, but also general hypercoagulable states as in malignancy [6] and systemic diseases induce its occurrence [7].

Our patient had a history of previous thrombosis of the ophthalmic artery and bilateral chronic radial artery occlusions with collaterals with normal d-dimers on admission, but positive lupus anticoagulants, never diagnosed before. Also, he had no anticoagulant therapy on going at the time of the onset. There is lack of strict recommendations regarding renal artery thrombosis treatment. In spite of the traditional treatment with anticoagulation, there is emerging evidence on interventional techniques including percutaneous thrombectomy, catheter thrombus aspiration, intraarterial thrombolysis and angioplasty [8-10].

Percutaneous vascular interventions are performed in Kosovo for more than a decade, but as far as we know there is no information of total renal occlusion treated by percutaneous approach. Hereby we present the first case of angioplasty treatment performed in the Republic of Kosovo, in the private American Hospital. The patient was diagnosed and referred from a public hospital by a vascular surgeon. Along with the successful interventional cardiology performance, an interactive and interprofessional team approach from both hospitals was applied.

This was a real challenge for the healthcare system including vascular surgeon, radiologists, nephrologists, rheumatologists etc. from different hospitals. Since the patient came for the intervention 30 hours from the first pain onset, the struggle for the renal tissue solvency was against time.

The literature states that prolonged warm ischemia defines the amount of renal functional capacity [11], meaning that after two hours of complete occlusion only 30-50% of tissue could be saved. In our case the patient was painless immediately after intervention, arterial tension and the creatinine resolved after 6 days. We hypostatize that the occlusion in our patient was chronic, maybe related to artery stenosis contributed by compromised coagulation and probably arteritis.

Our theory was also supported by the findings of chronic occlusions at arms circulation combined by collaterals and history of another similar acute event of thrombosis. The two months follow-up revealed a normal angiogram of both renal arteries and parenchyma. Unfortunately, the patient did not perform the

scan to evaluate the renal function otherwise. Still, the creatine level remained within normal ranges and the patient painless under anticoagulant therapy, with recommended supervision of a rheumatologist and a nephrologist.

**Conclusion**

The renal artery thrombosis can be treated effectively by interventional angioplasty when needed. It is not only a medical-treatment problem but also a real healthcare system challenge, especially in developing countries. The interactive professional approach diminishes boundaries and brings success and promotes collaboration for every single organ or life to be saved.

**Supplementary material**

**Video 1:**
Pre-interventional – complete right renal artery occlusion.
**Video 2:**
Intervention – thrombus aspiration
**Video 3:**
Intervention – stent deployment
**Video 4:**
Final angiogram after procedure
**Video 5:**
Final angiogram after procedure

**Refernces**


1. Tsai SH, Chu SJ, Chen SJ, Fan YM, Chang WC, Wu CP, et al. Acute renal infarction: a 10 years experience. International Journal Of Clinical Practice. 2007;61(1):62–67. [PubMed] [Google Scholar]
2. Lopez VM, Glauser J. A case of renal artery thrombosis with renal infarction. J Emerg Trauma Shock. 2010;3(3):302.[PMC free article] [PubMed] [Google Scholar]
3. Singh S, Wang L, Yao QS, Jyotimallika J, Singh S. Spontaneous renal artery thrombosis: An unusual cause of acute abdomen. North American Journal Of Medical Sciences. 2014;6(5):234. [PMC free article] [PubMed] [Google Scholar]
4. Koivuviita N,Tertti R,Heiro M,Manner I,Metsärinne K, Thromboembolism as a cause of renal artery occlusion and acute kidney injury: the recovery of kidney function after two weeks. Case reports in nephrology and urology. 2014 Jan [PubMed PMID: 24847350]
5. Antopolsky M, Simanovsky N, Stalnikowicz R, Salameh S, Hiller N (2012) Renal infarction in the ED: 10-year experience and review of the literature. Am J Emerg Med30: 1055-1060. Link: http://bit.ly/2OLWWbA
6. Otoupalova E, Blankenship L, Bazzi J, Ardary C, Nguyen T, Kelekar AK and Momin F. A Case Report of Renal Artery Thrombosis in a Patient with Occult Neuroendocrine Tumor . Ann hematol Ocol. 2017 (4);2 ISSN 2375-7965. www.austinpublishinggroup.com
7. Arache W,Bahadi A,Kabbaj DE, [Renal artery thrombosis revealing antiphospholipid antibody syndrome]. The Pan African medical journal. 2018; [PubMed PMID: 31037210]
8. Sauerberg N, Khan YS. Renal Artery Thrombosis. 2021 Aug 23. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan–. PMID: 33232050.
9. Kumar, B., & Kumari, S. (2017). Spontaneous Renal Artery Thrombosis Successfully Intervened with Drug Eluting Stent: A Primary Renal Artery Angioplasty. Journal of clinical and diagnostic research : JCDR, 11(9), OD14–OD15. https://doi.org/10.7860/JCDR/2017/28893.1066010.
10. Naiding, Zhang & Guiya, Xiong & Yifeng, Pan & Changming, Shao & Jian, Wang & Bing, Chen & Zhenjie, Liu. (2019). Acute renal artery thrombosis treated with combination use of multiple

interventional techniques. Journal of Cardiovascular Medicine and Cardiology. 6. 088-091. 10.17352/2455-2976.000099.

11. Silverberg D, Menes T, Rimon U, Salomon O, Halak M (2016) Acute renal artery occlusion: Presentation, treatment, and outcome. J Vasc Surg64: 1026-1032. Link: http://bit.ly/2sFK4uV.