RENAL ARTERY THROMBOEMBOLISM FOLLOWED BY RENAL INFARCTION: A RARE CAUSE OF ACUTE FLANK PAIN, MIMICKING APPENDICITIS

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Key words: renal artery thromboembolism, atrial fibrillation, flank pain, appendicitis

Summary
Renal artery thromboembolism (RATE) is a rare and serious condition, that is often hard to diagnose. It is very important for any physician to have in mind this pathology with unexplained flank pain, specially in patients with risk factors for this condition. Renal artery thromboembolism can cause partial or total renal infarction (RI), so early diagnostic and adequate treatment is necessary.

Materials and Methods: We present a case report in elderly woman with risk factors for peripheral thromboembolism. A review of articles was done with intention to discuss this case, including common presenting symptoms, risk factors, diagnostic particularities, treatment options and complications, prevention. Conclusions: In a presence of symptoms - localised flank pain, nausea, vomiting and elevated C-reactive protein, white blood cells, creatinine, d-dimers - contrast enhanced CT scan should be performed as soon as possible. Anticoagulation therapy is thought to be the safest treatment strategy. Unfractioned heparine, if possible, can be replaced by low mass weight heparin in order to prevent anticoagulation therapy complications. To prevent embolic complications of AF – warfarine therapy can be replaced by rivaroxaban therapy.

Introduction
Renal artery thromboembolism is a rare condition, that is hard to diagnose, due to the nonspecific clinical manifestation. It accounts for 2% of peripheral thromboembolism events. Many cases of acute renal artery occlusion occur in a present of thromboembolic events, blunt abdominal trauma, hypercoagulable conditions or are unknown etiology. However, the most common cause of RI is atrial fibrillation (AF) - 64% of published cases [1]. There were 0.004%–0.007% incidence of RI in emergency department according to some studies [2,3]. Clinical symptoms of RI varies, but the most common are localised pain, fever, nausea, vomiting and hematuria [4,5]. Also, it is known, that cancer can have influence on thromboembolic events because of hypercoagulable state and the prothrombotic effects of it’s treatment, but usually it occurs in vein system [4,6].

We present a case report of 83 years old women with chronic AF and breast cancer. The patient was hospitalised with unexplained pain in pelvic area with suspected appendicitis.

Case presentation
In November 2017, a 83 year old female was admitted to the emergency room (ER) because of nausea, vomiting and constant right flank pain, which at first was covering the entire abdominal area, then after 12 hours localised at the right flank (8 points of VAS).

Her medical history included breast cancer, three ischaemic strokes few years ago and chronic atrial fibrillation, essential hypertension. She was taking: Tamoxifen 20mg/day, Digoxin 0.25mg/day, Metoprolol 100mg/day, Isosorbide dinitrate 20mg/day and vit. K antagonist 2.5-5mg/day, which dose depended on International normalized ratio (INR). Nonsmoker.

Patient physical examination showed subfebrile body temperature - 37.4°C, blood pressure of 148/80 mmHg and heart rate of 82 beats/minute. The auscultation revealed nonregular heart beats. There was no tenderness in abdominal area, but painful palpation in the right flank. Jordan symptom negative. Other systems were unremarkable.

Laboratory tests revealed a white blood cell count 22.6 x 10⁹/l which has decreased after four days till 11.5 x 10⁹/l, erythrocytes 4.3 x 10¹²/l, haemoglobin 130g/l, platelets 172
C-reactive protein raised from 7.5 mg/l on the first day to 60.2 mg/l two days later. Potassium all of the hospitalisation time was in the normal range from 3.7 to 4.7 mmol/l, but urea was elevated to 10.8 mmol/l. Creatinine has reached the peak at fourth day of hospitalisation – 135.8 µmol/l, in the end of treatment it has decreased 117.3 µmol/l. Troponin I was increased to 0.126 µg/l on hospitalisation date, in the second day had reached 1.18 µg/l and eventually dropped down to 0.016 µg/l few days later. D-dimer was slightly elevated till 1.18 µg/ml. During hospitalisation, INR was in normal range 2.3-2.2-1.5, Prothrombin time (PT) – 24 %. Before RATE, the patient had not reached therapeutic INR interval several times.

Liver function was insignificantly increased - ALT 62 U/L, AST 82 U/L. P-amylase was 24 U/L, diagnosis of acute pancreatitis was rejected. Uroanalysis was positive for red blood cells (50 cells/µL) and leukocytes (500 cells/µL), protein – negative, bacteria – positive, nitrite – negative, urinal infection and pyelonephritis was excluded. The ECG showed an abnormal heart rhythm: atrial fibrillation – 139 beats per minute with T inversion in V2, V3, V4 chest leads.

Firstly, infectious disease of unknown etiology was suspected and denied after laboratory tests results came. Then patient was transferred to surgical department for further investigation and treatment of acute abdominal pain. The patient was consulted by surgeon and gynecologist. Later was performed abdominal ultrasound, which identified free-flowing stretch of liquid in the lower right abdominal area, about 1.1 cm thickness, the appendix was not visualised. Ultrasound did not show any renal abnormalities, so surgeons diagnosed acute appendicitis.

In surgery department patient was treated with drotaverin 80 mg/4 ml, ketoprophen 100 mg/2 ml and metoclopramid 10 mg/2 ml intramusculous injections and intravenous 0.9 % 500 ml sodium chloride.

Because of chronic AF, patient was transferred to intensive care unit (ICU) for preoperative preparation. As patient still remained symptomatic, a contrast-enhanced CT scan was performed in order to identify the etiology of pain localised on the right flank. D-dimer was increased to 1.18 µmol/l at that moment. Artery thrombosis was suspected. The CT scan showed right renal artery contrast defect (0.6 x 0.5 x 2.1 cm floating thromb) followed by renal infarction signs - hypodensal DI, not accumulating contrast in the inferior pole of the kidney (Figure 1). Additionally, the CT scan revealed some fluid in the pleural cavity: in the right cavity 1.1 cm, in the left – 0.7 cm thickness and 0.4 cm thickness stretch of liquid near liver.

The echocardiography revealed ejection fraction 48%, I° MV, AoV, TV regurgitations. Dilation of heart chambers or thrombi was not detected.

The diagnosis of renal artery thromboembolism with acute renal infarction was made. Thrombolysis or thromboaspiration was declined because of additional procedure risk. The patient was treated with heparin 1000 IU/hour, following on APTT.

After 2 days in ICU an improvement of patient general status was noticed, so she was transferred to department of Internal medicine, where anticoagulation therapy was continued with heparin (50000 IU overall). After 5 days of treatment with heparin, it was replaced by fraxiparin 0.6 ml x 2/d (10.8 ml overall) for 9 days, then fraxiparin was replaced by rivaroxaban 15 mg x 1/d (45 mg overall) for 3 days.

During anticoagulation therapy, patient bleed from gastrointestinal tract. Fibroesophago-gastroduodenoscopy was performed and shown few hemorrhagic erosions in stomach. Hemoglobin was decreased to 86 g/l. After examination two units of erythrocyte mass transfusion was done, because of tissue hypoxia.

Eventually, abdominal pain have disappeared, signs of kidney supuration or other complications have not been observed. The renal function partially recovered and the serum creatinine was 117 µmol/l in the end of the treatment. The patient after discharge was recommenced to continue the treatment with rivaroxaban, metoprolol, tamoxifen and omeprsol and was suggested to perform a renal ultrasound after a month. From that time till now, patient had not experienced any anticoagulation therapy complications.

Discussion
Renal artery thromboembolism is a rare condition, that is hard to diagnose, due to the nonspecific clinical manifestation. It accounts for 2% of peripheral thromboembolism.

![Enhanced CT scan - right renal artery contrasting defect with noncontrast right kidney](image-url)
Renal artery thromboembolism is a rare condition, that can mimic any other acute abdomen cause with nonspecific clinical manifestation. In a presence of symptoms triad - lower pole hipodensity – ischaemia sign. Contrast enhanced CT scan was the most popular diagnostic tool in most RI cases [8]. According to literature, wedge - shaped non-contrasting, lower density peripheral areas with cortical rim sign was seen in most CT scans [12,13].

RATE treatment can be divided into intravenous, oral anticoagulation, thrombolytic therapy, thrombectomy or renal angioplasty [8,12]. However, the most common treatment options for RATE followed by RI were unfractioned and low molecule mass heparins, warfarin (82.2% cases). Conservative treatment methods is thought to be much safer than invasive techniques in some cases. It is due to greater risk of contrast nephrotoxicity or additional invasive methodologies during the procedure. Invasive techniques are proper in situations, when urgent and aggressive intervention is needed to ensure residual renal function in patients with function impairment or if only one kidney is left [8]. The treatment strategy mostly depends on the scale of affection and renal function impairment. In our case, the risk of invasive treatment strategy was evaluated and patient received anticoagulation therapy with unfractioned heparin, which, was replaced by fraxiparine and later by rivaroxaban. During the treatment with anticoagulants, the patient bled from gastrointestinal tract, so erythrocyte mass transfusion was done in order to correct blood loss. According to literature, the major complication of anticoagulation therapy is bleeding. It is known, that low mass weight heparin is associated with fewer bleeding risks in compare to unfractioned heparin [14]. Metaanalyses support the inference that low mass weight heparin does not result in an increased risk of major bleeding compared with unfractionated heparin [15].

RATE and RI prevention is closely associated with adequate treatment strategy. There is evidence, that not reaching therapeutic INR interval can lead to thromboembolic events or even death. According to danish nationwide cohort study, the majority of thromboembolic events occurred during subtherapeutic INR and after warfarin interruption, independently of reasons for interruption [16]. For better and much comfortable anticoagulation therapy control, rivaroxaban is much more recommended to use than warfarin [17].

Conclusions

Renal artery thromboembolism is a rare condition, that can mimic any other acute abdomen cause with nonspecific clinical manifestation. In a presence of symptoms triad - localised flank pain, nausea, vomiting and elevated C-reactive protein, white blood cells, creatinine, d-dimers - contrast enhanced CT scan should be performed as soon as possible. Treatment option should be chosen depending on renal function and patient overall health status: for elder and non-
complicated patients - anticoagulation therapy is thought to be the safest treatment strategy. Unfractioned heparin, if possible, could be replaced by low mass weight heparin in order to prevent anticoagulation therapy complications. To prevent embolic complications of AF – warfarine therapy can be replaced by rivaroxaban therapy. In our clinical case rivaroxaban was chosen because of bleeding from gastointestinal tract. This choice was much more safer and comfortable to control for our patient.

Conflicts of Interest: the authors declare no conflict of interest.

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INKSTŲ ARTERIJOS TROMBOEMBOLIJA IR JOS SUKELTAS INKSTO INFARKTAS: APENDICITĄ IMITUOJANTIS ŠONO SKAUSMAS
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Raktažodžiai: įskirčių arterijos tromboemboliacija, prieširdžių virpėjimas, šono skausmas, apendicitas.

Santrauka

Įskirčių arterijos tromboemboliacija (IATE) – reta ir rimta būklė, dažnai sukelti diagnostinių problemų. Kiekvienas gydytojas, savo darbe susidūręs su sunkiai paaiškinamuoju šono skausmu, ypač esant rizikos veiksniams, turėtų prisiminti šią patologiją. IATE gali sukelti dalinį arba visišką inkstų infarktą, todėl būtina įprastina ji. Tikslins gydymas yra veiksmingas apendicititės gydymui, todėl būtina ankstyva diagnozė bei adekватūs gydymas. Šiuo tikslu pristatome klinikinį atvejį bei literatūros apžvalgą, apimantį dažniausius IATE simptomus, rizikos veiksnius, diagnostikos bei gydymo patumą, prevenciją.

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Gauta 2019-05-08