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SPONTANEOUS RUPTURE OF RENAL CELL CARCINOMA IN ANURIC PATIENT ON AUTOMATED PERITONEAL DIALYSIS

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Brief title: CARCINOMA RUPTURE IN APD PATIENT
**Introduction.** We present the first case described in the literature of successful continuation of the full regimen of peritoneal dialysis, that started immediately after urgent nephrectomy was done due to the spontaneous rupture kidney cancer.

**Case report.** 55-year old man had received continuous ambulatory peritoneal dialysis during 5 years for end stage renal disease secondary to hypertensive nephropathy. He was switched to Automated Peritoneal Dialysis two months before sudden worsening of his health condition, which was presented with strong left flank pain. Abdominal contrast enhanced computerized tomography revealed suspicion on retroperitoneal hematoma. The patient underwent left radical nephrectomy and restarted peritoneal dialysis immediately after surgery. The patient was discharged 5 days after his operation without any complications. The pathology report showed papillary renal cell carcinoma.

**Conclusion.** Although renal cell carcinoma is the most common malignant tumor of the kidney, it has been rarely presented with spontaneous subcapsular or perirenal hematomas. However, radical nephrectomy with retroperitoneal approach is a requirement for minimising damage as well as keeping peritoneum integrity, allowing the continuation of Automated Peritoneal Dialysis immediately after surgery without complications.

**Uvod.** Dat je prikaz prvog slučaja opisanog u literature uspešnog nastavka lečenja punim režimom peritoneumsk edijalize, koja je bila započeta neposredno nakon urgentne nefrektomije eurđene zbog spontane rupture carcinoma bubrega.

**Prikaz slučaja.** Muškarac star 55 godina, lečen je kontinuiranom ambulatornom peritoneumskom dijalizom u trajanju od 5 godina zbog terminalnog stadijuma bubrežne slabosti u čijoj je osnovi hipertenzivna nefropatija. Bolesnik je preveden na automatsku peritoneumsku dijalizu dva meseca pre iznenadnog pogoršanja koje se manifestovalo intenzivnim bolom u levoj lumbalnoj loži. Na osnovu kpmjuterizovane tomografije abdomena sa kontrastom postavljena je sumnja na retroperitonealni hematom. Bolesnik je urgentno podvrgnut levojradikalnoj nefrektomiji i u neposrednom postoperativnom toku lečenje je nastavljeno peritoneumskom dijalizom. Otpušten je 5-og dana nakon operacije, bez komplikacija. PH nalaz bioptata je ukazao na karcinom bubrežnih ćelija.

**Zaključak.** Iako je karcinom bubrežnih ćelija najčešći maligni tumor bubrega, retko se prezentuje spontanim subkapsularnim ili perirenalnim hematomom. Radikalna nefrektomija sa retroperitonealnim pristupom je uslov za minimano oštećenje i očuvanje integriteta
peritoneuma, čime se omogućava nastavak automatske peritoneumske dijalize neposredno nakon operacije.

**Key words:** retroperitoneal hematoma, radical nephrectomy, retroperitoneal approach.

**Introduction**

Spontaneous subcapsular or perirenal hematomas are relatively uncommon but often diagnostically challenging conditions. The appropriate treatment of such patients is based firstly on the diagnosis that a subcapsular or perirenal hemorrhage has occurred, and secondly on the determination of its cause. An accurate diagnosis of the cause requires a combination of clinical information and radiologic imaging [1]. It is especially difficult when the patient is anuric and receive some renal replacement modality.

**Case report**

A 55-year old male patient had received continuous ambulatory peritoneal dialysis (CAPD) for 5 years for end stage renal disease (ESRD) secondary to hypertensive nephropathy. Patient was anuric for the longer period and his peritoneal dialysis (PD) prescription was adjusted to that condition. He was switched to automated peritoneal dialysis (APD) two months before sudden worsening of his health condition which was presented with left flank pain without other subjective symptoms. On the admission, the patient had normal body temperature, with mild atrial tachyarrhythmia and hypertension (150/90) and had strong left flank pain with tenderness of the left renal lodge on the percussion, without any change in physical findings on other systems. On the admission, his laboratory findings revealed the following values: sedimentation (SE) : 80.0 mm/h, red blood cell (RBC): 3.40\times 10^{12}/L, hemoglobin (HGB): 100 g/L, white blood cell (WBC): 15.96\times 10^{9}/L, granulocytes % (GRAN): 89.8 %, urea: 26.5 mmol/L, creatinine: 1396 umol/L, potassium (K): 4.6 mmol/L, C-reactive protein (CRP): 68.6 mg/L, procalcitoin (PCT) 0.36 ng/mL and leukocytes in the peritoneal effluent 0.00 \times 10^{9}/l. Abdominal ultrasonografy showed right kidney in normal size, wavy contoured with reduced parenchymal thickness, and with a larger number of cortical cysts, and enlarged left kidney - diameter 147x84 mm, thickened hypoechogenic and slightly inhomogenic parenchyma.

On the basis of clinical, laboratory and ultrasound diagnosis, the patient was treated for having acute pyelonephritis, and has begun treatment with dual parenteral antibiotic therapy: quinolones (ciproflox 200 mg twice a day – b.i.d.) and cephalosporins of III generation (ceftriaxon a 2 gr qd - once a day). Patient was performing his APD program by
himself every night, without any changing in monitored parameters - ultrafiltration (UF), body weight (BW), arterial blood pressure (ABP), and without changing in pulse rate, with completely clear dialysis effluent. The pain ceased after 24 hours and after that patient complained only on strong weakness. After two days a repeated laboratory findings revealed a slight fall in RBC $3.07 \times 10^{12}/l$ and HGB: 95 g/l and unchanged leucocytes WBC $16.63 \times 10^{9}/l$, GRAN 81.7 % despite the applied antibiotic therapy. Antibiotic therapy was changed due to the inadequate response to therapy and meropenem a 500 mg iv. qd 24hr was introduced. On the third day the RBC significantly fell to $2.55 \times 10^{12}/l$ and HGB: 75 g/l, so it arose suspicion on intra-abdominal hematoma development, and urgent abdominal contrast enhanced computer tomography (CECT) was done, which confirmed enlarged left kidney with inhomogeneous parenchyma and completely disrupted structure (Fig. 1 and 2). Patient underwent left open radical nephrectomy by retroperitoneal approach and restarted PD immediately after surgery. Patient was discharged 5 days after his operation without any complications. The laboratory finding on the discharge day were as follows: RBC: $3.00 \times 10^{12}/L$, HBG: 87 g/L, WBC: $12.48 \times 10^{9}/L$, CRP: 145.2 mg/L, urea: 19.9 mmol/L, creatinine: 1088 umol/L, K: 4.4 mmol/L. The pathology report showed papillary renal cell carcinoma (RCC) (Fig. 3).

**Discussion**

Renal cell carcinoma is a rare but serious complication in ESRD patients. The incidence of RCC is 20–40 times higher in these patients than in the general population [2]. Our patient had multiple risk factors for RCC: hypertension, tobacco smoking, obesity as well as pre-existing kidney disease and male gender [3]. RCC are usually discovered as ‘incidentalomas’ thanks to renal ultrasonography, which is responsible for 97% of the incidental diagnosis, in contrast to the classic presentation, as was the case with our patient [4]. Spontaneously ruptured RCC in ESRD patients are very rare and to our knowledge, there are only 5 cases reported in the literature, all of which were in Japanese men [5,6]. The spontaneous bleeding of the kidney (subcapsular and/or perinephritic space) was first described by Wunderlich. Classically, Wunderlich Syndrome is described by the presence of Lenk’s triad which constitutes acute flank/lumbar pain, palpable tender mass and features of active internal bleeding like hypotension, tachycardia and anemia. Clinically however, this triad is rarely seen and is commonly presented with abdominal pain (67%), hematuria (40%) and hypovolemic shock (26.5%) [7]. The clinical presentation in our patient was not so obvious, due to his having only abdominal pain from classical triad and
the fact that patient was anuric made the correct diagnosis more difficult. Most causes of Wunderlich syndrome are benign while neoplastic causes accounted often in these cases, in different percentages to different authors. Moreover, the tumor size and rupture frequency were not correlated, and spontaneous renal rupture even when tumor size was only 1 cm has been reported [8]. A possible mechanism underlying the spontaneous rupture of renal cell carcinoma was thought to be renal vein congestion due to tumor thrombosis, vessel rupture due to exponential tumor growth, and direct invasion of the tumor into the renal vessels, but these are apparently not the major causes of ruptures [9]. PH findings of renal biopsy verified the cause of spontaneous bleeding, which according to the literature data is detected in 60% of all cases [10]. Therefore, the potential risk of an underlying renal tumor as a cause of spontaneous kidney rupture, should always be considered when making decision between a conservative and surgical therapy for these patients. Kendall and authors have proposed radical nephrectomy as the appropriate approach for treating these patients because there is a strong correlation between pararenal hemorrhage and small RCC [11].

CT is the most reliable modality in diagnosing retroperitoneal hemorrhage and RCC [12]. However, the efficiency of CT to diagnose RCC at the time of bleeding is an area of concern, because of its inability to identify the RCC in 60% of cases, at the time of the initial CT [13]. In our case, tumor was not recognized as a cause of retroperitoneal hemorrhage before the operation. Nephrectomy can be performed by the transperitoneal or the retroperitoneal route [14]. Transperitoneal procedures can be troublesome for patients requiring PD. It has traditionally been recommended that patients interrupt PD for at least 6 weeks after an open abdominal surgery to avoid complications and removal of the PD catheter, which may be required [15]. In that case temporary hemodialysis would be indicated with all risks of catheter related bacteriemia, infections and other complications [16]. Therefore, we made a decision to apply retroperitoneal approach which can minimize damage to the peritoneum and preserve its integrity [15]. Theoretically, a PD regimen can be restarted immediately after surgery, but there is little supporting evidence in the literature except for 3 patients who returned to PD after retroperitoneal radical nephrectomy, in a case report by Chiao-Ying Hsu and authors with no negative effects on postoperative recovery. They referred that during postoperative care, the dialysate volume was reduced to about one half or two thirds, and was titrated slowly upward according to patient’s clinical condition [15]. In the case of our patient, we applied
full CAPD regimen for the first postoperative day (Exreaneal 2L during night started immediately after operation, followed with 2 exchanges with Dianeal 2L 2,24% glucose and with 2 exchanges with Dianeal 2L 3,61% glucose alternately), until evening of the first postoperative day, when the patient himself started the whole previously prescribed APD regime on the second postoperative day (2x5L + Extraneal 2 L, with filling volume of 1700 ml). With intensive dialysis exchanges we have achieved a satisfying depuration and ultrafiltration, and also enabled adequate volume loads for fluids and blood transfusion.

Patient did not experience peritoneal leakage, poor wound healing, incisional hernia or impaired ultrafiltration after surgery. To our knowledge our case report is the first one which describes open retroperitoneal radical nephrectomy in a patient with spontaneous kidney rupture, where full CAPD and APD regime was started immediately after surgery.

**Conclusion**

There is a high risk of complications in immunocompromised patients such as patients treated with PD. Prompt selection of appropriate diagnostic procedures and surgical approach allows maintaining of PD treatment modalities in these patients. We want to emphasize that in such patients RCC occurrence is more frequent and therefore they need to have USG or CECT/NMR control more often, indicated by their nephrologist. The aim of repeated controls is to discover this tumor on time, but not to wait for its spontaneous rupture on the background of previously undiagnosed and unrecognized RCC which has been developing over time.

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Figure 1. Abdominal CT image (reconstruction): enlarged left kidney with longitudinal diameter 14 cm, erased cortico-medular line, completely disrupted structure, inhomogeneous density.
Figure 2. Abdominal CT image - Retroperitoneal space on the left is entirely increased in density with hyperdense bands. The posterior part of the left pararenal space is fulfilled with inflamed-necrotic content of approximately 15 mm.

Figure 3. Microscopic view: "Papillary renal cell carcinoma," Fuhrman grade 2nd. Type 1 papillary renal carcinoma

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