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SPONTANEOUS RUPTURE OF THE RENAL PELVIS DUE TO ACUTE OBSTRUCTION OF THE UPPER URINARY TRACT

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Cases of spontaneous rupture of the pyelocaliceal system of the kidney, not associated with the consequences of endourological surgery, are described extremely rarely in the literature. Most often, such a complication develops in patients with urolithiasis. The article analyzes the literature data on urinary tract apoplexy and presents its own clinical observations.

Keywords: spontaneous rupture of the renal pelvis; kidney rupture; renal apoplexy; urinoma; urolithiasis; renal colic.

СПОНТАННЫЙ РАЗРЫВ ПОЧЕЧНОЙ ЛОХАНКИ ВСЛЕДСТВИЕ ОСТРОЙ ОБСТРУКЦИИ ВЕРХНИХ МОЧЕВЫВОДЯЩИХ ПУТЕЙ КОНКРЕМЕНТОМ

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Случаи спонтанного разрыва чашечно-лоханочной системы почки, не связанные с последствиями эндоурологических хирургических вмешательств, в литературе описываются крайне редко. Чаще всего подобное осложнение развивается у пациентов с уролитиазом. В статье приведен анализ литературных данных, посвященных апоплексии мочевыводящих путей, и представлены собственные клинические наблюдения.

Ключевые слова: спонтанный разрыв почечной лоханки; разрыв почки; апоплексия почки; уринома; мочекаменная болезнь; почечная колика.

INTRODUCTION

Disruption of the anatomical continuity of the urinary tract can cause infection of the retroperitoneal fatty tissue, an abscess, a phlegmon, or urosepsis. Such a disruption is caused, as a rule, by blunt trauma or endourological surgical interventions [1–5]. However, cases of spontaneous rupture of the renal pelvis, as a complication of urolithiasis, have also been described [6–10]. According to S.M. Alferov et al. [1], spontaneous rupture of the pelvicalyceal system (PCS) occurs in 0.31% of patients with urolithiasis.

Despite the fact that PCS apoplexy is an urgent complication and requires immediate action, unified diagnostic algorithms and treatment approaches are lacking. There are instances of untimely diagnosis and unreasonable postponement of surgical interventions; as evidenced by our research. This article provides an analysis of the data on urinary tract apoplexy, and describes our clinical experience.

During 2010–2019; 3 patients diagnosed with spontaneous rupture of the renal pelvis with ureteral obstruction, due to the presence of calculus, were monitored and operated by us. Two patients were

transferred to our clinic from other medical institutions where the diagnosis of PCS apoplexy of the kidney was delayed by 5 and 7 days, respectively. In the third patient, apoplexy of the left renal pelvis was detected 1.5 hours after the occurrence of renal colic.

All patients had urodynamic impairment at the level of the ureteropelvic junction. The size of the calculus that caused the obstruction averaged 6.2 cm in diameter. (from 4.8 to 7.1 cm).

DESCRIPTION OF THE CLINICAL CASE

Patient M, 57 years old, was admitted to the emergency room of our clinic with a diagnosis of left-sided renal colic that had occurred 1.5 hours before arriving there. Patient's history revealed this to be the first such episode, and that the patient suffered from subcompensated type 2 diabetes mellitus and grade 3 hypertension. Clinical response to the spasmolytic and analgesic drugs administered by the ambulance team was poor. Upon arrival at the hospital, the patient noted a significant decrease in the severity of pain.

Laboratory examination revealed a leukocyte count of 20.1×10^9/l with severe neutrophilia (17.8×10^9/l). On urine analysis, microhematuria and leukocyturia were observed.

Ultrasound examination showed the accumulation of fluid in the left perirenal space along with pyelocalicoectasis. The right kidney had no pathological abnormalities. For a definitive diagnosis, contrast enhanced radiography was performed that revealed extravasation of the contrast agent and a calculus of 4.8 mm in the upper thirds of the left ureter (Fig. 1, *a*).

On multispiral computed tomography, a dense calculus was observed in the upper third of the left ureter. Further, a defect in the pelvis wall of the left kidney was noted in the area of the pyeloureteral segment with contrast enhanced urine flowing into the paranephric and paraurethral tissues (Fig. 1, *b*).

Under general anesthesia, an ureteral stenting of the left kidney was performed. From the retroperitoneal space, 300 ml of urine were evacuated by performing a puncture. Postoperatively, the severity of pain decreased, and the general condition and laboratory parameters were significantly improved. Control computed tomography showed no extravasation of the contrast agent from the renal pelvis. On the 6th day, the patient was discharged from the hospital in a satisfactory condition. A month later, endovideosurgical intervention to remove the calculus was successfully performed.

DISCUSSION

Most of the reported cases of spontaneous rupture of the PCS are caused by acute obstruction of the urinary passage due to the migration of urinary calculi [6, 7, 9, 11–13]. However, this may also be provoked by other reasons [14]. One of the largest studies on this topic was presented in 2011 by researchers at Boston Medical Center (USA). They analyzed 108 cases of rupture of the upper urinary tract over 15 years and came to a conclusion that etiology included urolithiasis, tumor masses, and iatrogenic trauma were the reason of the pathology in 74.1%, 22.2%, and 3.7% of cases, respectively [15]. Another clinically interesting report from South Korea described a case of spontaneous rupture of the ureter in a patient with chronic urinary retention [16]. These studies confirm that PCS rupture is a rare and urgent complication of various urological diseases; however, it often occurs due to the acute obstruction of the upper urinary tract by a calculus.

PCS rupture predominantly occurs in the region of the ureteropelvic junction; a finding that was confirmed by our own experience [14, 17, 18]. Its clinical diagnosis represents a significant challenge since, occasionally it may have an indistinct clinical presentation, as evidenced by our data as well [6, 17, 19].

Standard clinical and radiological diagnostic methods may be able to indicate PCS apoplexy, with high accuracy, at the initial presentation. However, in two of our patients (66.7% cases); the diagnosis was established with a significant delay. When patients were admitted to the emergency room at the other medical institution, they only underwent ultrasound examination that did not reveal the hydronephrotic deformity of the kidney. Timely radiographic examination enables the diagnosis of this urgent complication with a high probability. This was confirmed by the excretory radiograph of the patient with apoplexy of the left renal pelvis (Fig. 2) that clearly showed the extravasation of the contrast agent.

Further, multispiral computed tomography is a mandatory method for confirming the presence of PCS apoplexy of the kidney and urinoma [20].

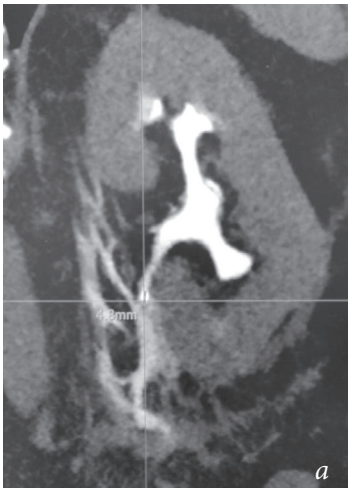
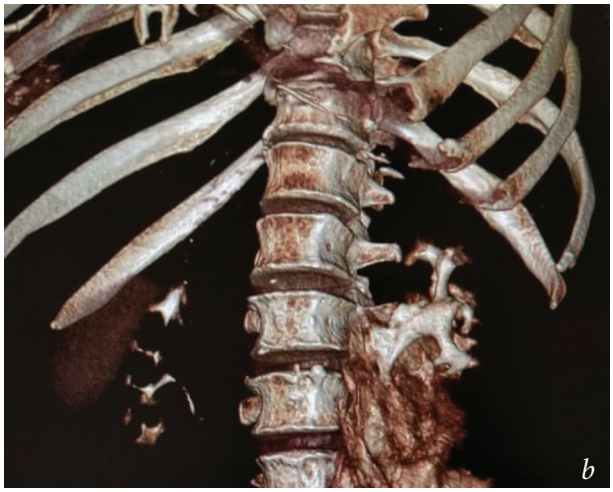

Fig. 1. Patient M., 57 y. o: *a* – X-ray of the urinary tract (calculus of the upper third of the left ureter); *b* – multispiral computed tomography (calculus of the upper third of the left ureter, urinoma of the retroperitoneal space on the left

Рис. 1. Пациент М., 57 лет: *a* — рентгенограмма мочевыводящих путей (конкремент верхней трети левого мочеточника); *b* — мультиспиральная компьютерная томография (конкремент верхней трети левого мочеточника, уринома забрюшинного пространства слева)

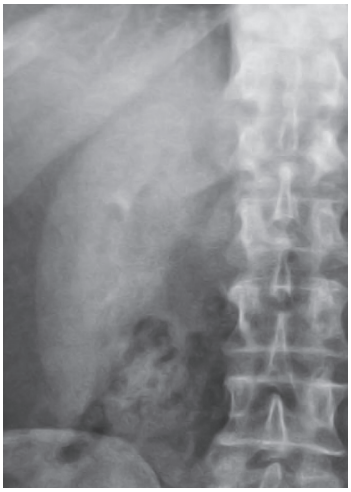

Fig. 2. Excretory urogram of a patient with apoplexy of the left kidney kidney disease

Рис. 2. Экскреторная урограмма пациента с апоплексией чашечно-лоханочной системы левой почки

In the absence of the signs of purulent-septic complications, the main treatment method for such conditions is urgent drainage of the kidney and urinoma. Some authors argue that only urgent stenting is viable in patients with renal PCS apoplexy and that percutaneous drainage of the kidney is inappropriate. For two of our patients, both retrograde stenting of the kidney and percutaneous drainage of the urinoma were performed which led to a satisfactory treatment results in the shortest possible time. The calculus was removed in the second stage; not earlier than one month after drainage.

CONCLUSION

Spontaneous rupture of the renal PCS is a rare complication of urolithiasis. Immediate drainage of the urine is imperative for successful treatment. Removal of the stone should be postponed until the integrity of the renal cavity system is completely restored, and infectious and inflammatory complications are relieved. In a patient with suspected renal colic, standard examination procedures, which include radiological methods, may help to avoid serious negative consequences and diagnose the disease in a timely manner.

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