

RARE COMPLICATION AFTER NEPHRON-SPARING SURGERY IN COMPLEX PT3A KIDNEY CANCER PATIENTS: A CASE REPORT

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Abstract. Benefit of partial nephrectomy compared to radical nephrectomy have shown by numerous studies as this preserves most of the functioning kidney, thus preventing onset of chronic kidney failure and potential cardio-vascular mortality. In the same time, partial nephrectomy is associated with slightly increase in the rates of post-operative complications such as perioperative bleeding and urinary fistulas which might lead to life-threatening conditions.

This case shows surgery, which was performed for 39 year-old male patient with intraparenchymal kidney cancer and the postoperative course, complicated with rare vascular abnormality – renal artery-renal pelvis fistula. It demonstrates multidisciplinary oncoursurgical and endovascular approach of treating kidney cancer lesions that may provide successful organ-preserving results. The possibility of such complication in centrally localized tumors should be taken into account.

Key words: kidney cancer, renal artery-renal pelvis fistula, rare post-operative complication

Introduction. Surgery in kidney cancer patients pursue two purposes – eradication of the cancer, and preserving the kidney parenchyma. This is technically feasible and does not compromise oncological principals of kidney surgery. Numerous studies have shown survival benefit of partial nephrectomy (PN) compared to radical nephrectomy (RN) for the early stages of renal cell carcinoma (RCC) and for the middle and high-risk organ-localized disease. Preservation of both kidneys leads to less deterioration of kidney function, and as a result – lower rates of cardiovascular comorbidities. [1-6] In the same time, PN is technically more complicated and requires high-skilled surgical team. [7]

Indeed, PN is associated with slightly increase in the rates of post-operative complications such as perioperative bleedings and urinary fistulas that account 4,3% and 4,6% of all cases respectively [2] [8-12]. Nevertheless, severe complications might appear due to very rare causes, which prolong time to diagnosis and disimprove overall prognosis. A few systems such as PADUA, RENEL were developed to estimate operation risk and to choose surgical approach. Being a good tool for surgery decision making, they fail in predicting the exact chance and type of complication. [13-15]

Aim of this report is to present the complex case of intraparenchymal kidney cancer in young male patient, which was managed with partial nephrectomy, and the postoperative course, complicated with rare vascular abnormality – renal artery-renal pelvis fistula.

Case report: 39 year-old patient with ECOG 0 performance status was admitted to the urology department on 26.04.2017 with no complaints. The ultrasound and CT scan of retroperitoneal space revealed incidental completely right-sided intraparenchymal renal tumor of 35mm in size with abundant neovasculature. (Fig.1).

The UISS risk was estimated as Intermediate with 5-years disease specific survival 80,4%. The PADUA nephrometry score equaled 10 which suggested performing either laparoscopic radical nephrectomy, or open partial nephrectomy. The probability of intra- and post-operative complications was assessed as “high”. The young age of the patient forced us consider performing open partial nephrectomy, which was done on 26.04.2017.

Intraoperatively it was found the tumor had intravenous thrombotic extension into the segmental renal vein of 8mm long. Renal vena thrombectomy was performed along with resection of the encapsulated tumor en-block. The closure of the defect of the renal parenchyma and vessels’ defects was performed in regular fashion. The time of the renal ischemia did not exceed the accepted limits of clamping the renal artery. The pathology report revealed clear cell renal cell carcinoma Fuhrman grade 3, both for tumor and venous thrombus, clear resection margins. (Fig. 2)

In early postoperative period the patient had several episodes of hematuria, which were successfully managed with hemostatic medications. On day 7 the patient was successfully discharged with no complaints. At the discharge the hemoglobin level was 126g/l, ultrasound of the operated kidney showed no hydronephrosis, inflammation of the renal parenchyma and accumulation of fluid in perirenal space. The diagnosis at the discharge – Cancer of the right kidney pT3aN0M0 stage 3.

Two weeks afterwards the patient was urgently admitted to the urology department with complaints of hematuria, right back pain, fever during one day. On ultrasound of the right kidney the uretero-hydronephrosis was revealed, right ureter was found distended along whole its way down to the urinary bladder, in perirenal space next to the renal suture the accumulation of fluid was found sized 6*3cm. The diagnosis at the admission was set as following – Ca ren



Figure 1. CT scan of kidney tumor

dextra stage 3, status post partial nephrectomy, renal bleeding, acute obstructive right-sided ureterohydronephrosis, perirenal hematoma (urinoma?). The patient was urgently operated with ureteropyelotomy, removal of blood clots from the ureter, stenting right kidney. No signs of current bleeding from the renal parenchyma was found at the moment of surgery. Postoperative course was uneventful, and on day 7 the patient was discharge with no complaints. The hemoglobin level was 124g/l.

Five days later the patient was again, for the third time urgently admitted to the urology department with symptoms of acute urinary retention and hemotamponade of the urinary bladder. For next three days the patient was managed in the intensive care unit due to massive blood loss with hemotransfusion and hemostatic medication. Upon stabilization of the overall condition on day 3 the patient underwent the contrast CT of the kidney, which revealed the clotted remnants of two segmental arteries and arteriovenous fistulas with connection to the collective system of the kidney.

For further treatment the patient was transferred to the endovascular department at the Shalimov National Institute of Surgery and Transplantology, where the patient successfully underwent transfemoral embolization of two branches of renal artery, forming the renal artery- renal pelvis fistula in the area of the bed of the removed tumor. (Fig. 3). The patient was discharged on day 3rd day after undergoing the embolization of the renal artery branches. One month later the stent was removed. The CT scan of the chest and abdomen one year after initial surgery showed

well-functioning both kidneys, normal creatinine levels, no signs of local recurrence or metastatic disease.

Discussion. The kidney cancer surgery deals with two major issues – removing the tumor with margin of healthy renal parenchyma, and preserving as much as possible of



Figure 2. Macroscopic appearance of the tumor



Figure 3. Angiography of the arterio-venous fistula with connection to the collective system of the kidney

renal parenchyma. The priority in renal cancer surgery is always on nephron-sparing approach, as this preserves most of the functioning kidney, thus preventing onset of chronic kidney failure and potential cardio-vascular mortality in 10-15 years from after the nephrectomy [3-4]. Nowadays it is well established that oncological outcomes after PN are comparable to such of RN both for low-risk tumors and locally advanced disease. [1-2][16-18] It is noteworthy that PN is more challenging procedure compared to RN and requires more complex surgical approach and experienced surgical team. The anticipated rate of postoperative complications is higher than after RN. Thus, early postoperative period after PN has a greater burden of perioperative morbidity such as urinary fistulas and bleedings, which might lead to life-threatening conditions. [8-9]

Central intraparenchymal location of the tumor adjacent to the renal hilum is considered to be most complex surgical case, which justifies either laparoscopic nephrectomy or open partial nephrectomy. The P.A.D.U.A. nephrometry score is highly valuable tool in making a decision regarding treatment approach. The expertise of a surgeon is a final argument in selecting a surgical plan, based on the anticipated complications. The most common complications after PN in case of centrally located intraparenchymal tumors are urinary fistulas and bleedings due to arteriovenal fistulas and pseudoaneurisms. [10-12] In rare arduous cases, e.g. centrally located tumors with vascular invasion, patient could develop other anatomical and vascular abnormalities. Among them – “renal artery – renal pelvis” fistula. This condition manifests with intermittent hematuria, clotting of the ureter and pelvis with subsequent renal colic symptoms. As to our knowledge no cases of arterio-pelvic fistulas after partial nephrectomy in patients with centrally located tumors stage pT3a had been previously reported. [19]

The fact of formation of arterio-pelvic (or caliceal) fistula is a dangerous and high-threatening phenomenon. Due to low stability and predictability of renal artery – renal pelvis fistula detrimental blood loss could occur. Accordingly, urologists should take into account the possibility of such complication in centrally localized tumors and be very caution.

Our case demonstrates the multidisciplinary and multimodal approach to treating kidney cancer lesions that may provide successful organ-preserving results even in complex cases with rare complications. This example emphasizes the importance of tight junction between surgical, radiological and interventional teams. The advantages of angiographic embolization have been shown by many studies. These techniques proved their effectiveness and higher safety compared to the classical approaches to perioperative bleeding. [20-22] Thus, endovascular surgery should be considered as suitable way to deal with post-operative complications in kidney surgery.

Conclusion. Kidney-preserving surgery for complex kidney cancer cases bears the risks of perioperative morbidity, including life-threatening bleeding, although has better long-term survival prognosis. Main reasons of post-operative hemorrhage include pseudoaneurisms and arteriovenal fistulas, but rare causes as renal artery – renal pelvis fistula should be taken into account. Multimodal oncoursurgical and endovascular approach to treating kidney cancer lesions may yield successful nephron-sparing results in most complex cases.

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