Diagnostic and therapeutic protocol in the treatment of hypofunctional kidney

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INTRODUCTION

Laparoscopic nephrectomy is indicated in the treatment of many benign conditions of the kidneys. Hydronephrosis caused by obstruction of the ureter, either internal, or external, is one of the main indications for laparoscopic reconstruction. If an obstruction is prolonged, consequently, it leads to chronic inflammatory process accompanied by persistent and recurrent pain with fever, which eventually become resistant to therapy. If not operated sufficiently fast to resolve the causes, as a consequence it leads to hypofunction and ultimately a function of affected kidney. In such a situation, the only therapeutic option is surgical treatment. By analyzing the case, we will try to illustrate the diagnostic algorithm and therapeutic treatment modality.

Key words: Laparoscopic nephrectomy, “hand-assisted” laparoscopic nephrectomy, exploratory ureterorenoskopija (URS), dysfunctional kidney, hypofunctional kidney, MSCT, scintigraphy, percutaneous nephrostomy (PCN).

CASE REPORT

We report a case of 32-year old female patient MM, a veterinarian by profession from Belgrade, otherwise in sports very active since she was a permanent participant of half marathon contest. The patient was first reported to the urologist in the health center in Obrenovac (Belgrade municipality) in July 2013, with a pain type of renal colic of surgical treatment. As an alternative to open conversion some authors, to solve complicated cases, alleged and “hand-assisted” laparoscopic nephrectomy. Successfully resolve of dysfunctional tubercular altered kidney can be performed in this way. State department also cited some other benign renal disease that can be successfully solved by laparoscopic nephrectomy such as multicystic dysplastic kidney or symptom manifest graft rejection.

Compared with a conventional classical open surgery, laparoscopic nephrectomy is superior in terms of better control of pain and shorter recovery time. Control and coupling of postoperative pain is up to four times less compared to traditional open surgery. The number of hospital days was lower by 50% and the time to full recovery of the patient is significantly reduced. The first publications dealing with laparoscopic nephrectomy, stated that duration of surgery was 300 minutes. With more experience, advancement of technology and the operational techniques as well as training accessories, duration of surgery is significantly reduced.

As outlined above, the hydronephrosis caused by obstruction of the ureter, either internal, or external nature has been a major indication for laparoscopic reconstruction. If an obstruction is prolonged, consequently it leads to chronic inflammatory processes accompanied by persistent and recurrent pain with fever (pyelonephritis), which eventually become resistant to therapy. If it does not operate sufficiently fast to resolve the causes, as a consequence it leads to gradual hypofunction and ultimately a function of affected kidney. In such a situation, the only therapeutic option is surgical treatment.
on the left flank, as well as fever and irritative disorders when urinating. Antibiotic and analgesic therapy was administered, after which the pain was subsided. After three months, there was a recurrence of symptoms. This time, analgesic therapy was not successful. Ultrasound confirmed the existence of renal deterioration on the left side with orderly ultrasonographic finding the opposite kidney. It was suspected that the cause of problems was stuck stone in the left ureter. The patient was referred to a Clinic of Urology, at Clinical Center of Serbia.

At the first examination in our hospital patient gave the same details of the history of the beginning of the disease. On this occasion, the pain was intense, it was localized to the left flank with propagation to the left inguinal region, and was followed by episodes of fever and persistent irritant urination. CBC showed elevated values of leukocytes (13 000), the biochemical analysis was not deviated from the reference values, and the urine sediment was normal. SE was accelerated (25), and urine cultures was sterile. The patient failed to refer to the existence of previous disease or information about previous surgical treatment. On ultrasound exam there was seen a stone in the left kidney, as well as third degree of renal deterioration. The left kidney was smaller (longitudinal diameter was about 85 mm, while the transverse dimension was 35 mm). Parenchyma of the left kidney was with maximum thickness up to 8 mm. All of this suggested the chronic disease. With the patient was made plan roentgen of the urinary tract with intravenous urography (IVU) and descending cystography (DU) (Figure 1).

On the plan roentgen there was no clear sign of calculus in the projection of the urinary tract. Right kidney properly secreted and excreted contrast agent with good concentration with no sign of renal deterioration. Right ureter was gracias it was followed continuously to the bladder. On the left side there was a lack of secretion and excretion of contrast. DSCG referred to the normal findings in the bladder.

Based on everything said, it was decided to perform exploratory ureterorenoscopy (URS) on the left side. During the intervention, after the easy identification of the left orifice, dilatation introduction of the ureterorenoscope was perform. Only the distal portion of the left ureter was explored, prevezikalo. The stricture was encountered 5 cm from the orifice during ureterorenoscopy that could not passed. We performed stenting of stricture with flexible guide but exploration of the left ureter was still compromised. After that the procedure was stopped. Since it was a case of small, hypoplastic kidney with deterioration of the third degree. The next step led to placement of percutaneous nephrostomy (PCN) in the left kidney. The patient was discharged on the second postoperative day from hospital in good general condition with the established diuresis on left PCN (about 350 ml) and an antibiotic therapy was engage.

Three weeks after hospitalization, the ante grade pyeloureterography was made as well as retrograde ureteropielography (Shewassu) for clear visualization of the entire lumen of the left ureter and left kidney cavity, and to assess the character of a possible stricture of the left ureter (Figure 2,3).

Thus committed imaging with contrast clearly shows the stricture of pelvic region of the left ureter 5 cm from the left orifice, approximately at the same level as shown during ureterorenoscopy. Constriction was approximately 3 cm in length (Figure 4,5). Further discussion with the
patient, by paying attention to the detailed personal history, was first obtained medical history of previous frequent adnexitis that the patient had during adolescence. Adnexitis were always left sided and could be blamed for the resulting localized stricture of the pelvic ureter, exactly corresponds to the position of the left ovary.

During the conversation with the patient, paying attention primarily on the age, it was decided not to perform aggressive surgical treatment. It was suggested that monitoring of the patient should be performed during the next three months with continuous percutaneous drainage of the left kidney to allow maximum recovery of renal function.

After estimated time of monitoring of the patient again was made evaluation of the situation of renal function, primarily through examination of biochemical analysis, monitoring of diuresis on PCN and calculating creatinine clearance, as well as through renal scintigraphy (Figure 6,7,8,9).

Biochemical analyzes showed regular values of the parameters of renal function. Over time diuresis on PCN decreased so that at the end of the third month of follow-up was less than 100 ml. Creatinine clearance showed significant afunction of left kidney. Renal scintigraphy showed decreased of clearance of DTPA: a result of total GFR was 29% lower than limit of the normal range for a given age (the lower limit of normal values: 86 ml/min). The left kidney was with preserved perfusion and function (afunctional). Right kidney was with preserved perfusion and relatively preserved function. Total GFR was at 69 ml/min, a separate assessment showed involvement of the right kidney with 88% and left with only 12% (Figure 8.9).

Based on a complete made diagnosis and guided by the results of the monitoring of the patient, there has not been any improvement in the patient condition. So it was proposed to patient a left side laparoscopic nephrectomy, which was made four months after the first contact with the patient.

The patient was initially placed in a supine position due to premedication and introduction of general endotracheal (GETA) anesthesia. Nasogastric tube was placed in order decompression of the stomach and urinary catheter also to monitor the fluid balance. After that patient was placed in the right decubital position to perform cleaning the operating field (Figure 10).

After preparation of the operative field, we engage surgical procedure.

Instrumentation (general):
- Scalpel;
- Two Aliso grips;
- Surgical forceps;
- Scissors;
- Needle holder;
- Sutures for reconstruction of subcutaneous tissue (1/0);
- Sutures for the reconstruction of the skin (3/0).
- Ports:
  - One 10 mm working port (metal port);
  - One 11 mm optical port for the placement of the camera - plastic port;
  - Two 5-mm working plastic port;
  - Reduction of 10 mm port;
  - Bipolar cable A60003C,
  - Monopolar cable A0357.
- Laparoscopic instrumentation:
  - Monopolar scissors A64320A (WA608800C sleeve, handle WA60101C);
  - Monopolar hook A64320A (sleeve WA608800C);
  - Bipolar Merryland dissector WA6430C (sleeve WA60800C, handle WA60101C);
  - Hem-o-Lock larger (L);
  - Suction;
  - Endobag 10 mm (XL);
  - Laparoscopic Needle Holder , Storz 26173KAF.
Pneumothorax was established through placement of the Veress needle along the left edge of the m. rectus, 4 cm laterally and cranially from umbilicus. During placement Veress’s needle we respected all postulates for safe port placement. After establishing of pneumothorax in the same place as it was in case Veress needle was introduced 11 mm optical trocar. We explored a peritoneal space for incidental intestinal trauma. Afterwards the working ports were placed. One 10 mm working port with the gear was placed on the four finger breadths from the optical port, and diagonal to the optical port on the middle line of the anterior superior iliac spine and the umbilicus we placed second 5-mm working port. Another 5-mm working port was placed near the xifoid for traction and additional manipulation (Figure 11). This intervention, typically carried out with three ports, was in our case performed with four ports.

The initial step was to release lineal flexure to the level of the iliac vessels. By freeing and lowering the colon, next step was incision of the peritoneum along the avascular Told’s line. The kidney was completely free on its lateral side from surrounding tissues. After that one approaches incision of Gerot fascia in height of the lower pole of the left kidney. Soon noticed a clear plan of the lower pole of the left kidney from m. psoas. At this point, it was easy to identify the left ureter, as well as the left gonadal vein, which was ligated with two hem-lock clips and cut. Continued with further release of the ureter distal to the level of the iliac blood vessels. At the level of the iliac vascular structures ureter is ligated and cut, and it continued to serve for traction and as guide for further preparation blood vessels of the renal hilum. Careful disassociation is done entirely releasing the entire lumen of the renal veins. After that the renal artery was identified whose position was somewhat cranial and posterior of renal vein. Renal artery was ligated after a sufficient release with hem-lock machine. We waited a few minutes for the renal outflow realize in full witch was confirmed by collapsing of renal vein.

After that the ligation of the renal vein was done. This was done by the two hem-on-lock clips proximally and distally. Vein was cut, giving a clear plan to renal artery which is further prepared to a suitable length necessary for safe ligation (3 cm in length). Afterwards, the placement of the two hem-loc clips was done, proximally and distally, and renal artery was cut. With this a vascular pedicle of the left kidney was entirely restrained. Then we approached for the easy and safe deliberation of upper pole of the right kidney along a clear plan to the adrenal gland. By freeing the upper pole of the kidney it was easily released from the lateral abdominal wall and posterior of m. psoas. Thus, the left kidney was entirely freed and ready for extraction.

Endobag was introduced through a 10 mm port for sample extraction. In the intervention we did not use morselator. The kidney was drawn through extended cut on the front of the abdominal wall with a length of 3.5 cm, with its longitudinal position (Figure 12,13). The muscles of the anterior abdominal wall were only dissociated, not cut. We performed additional control of hemostasis of renal lodge, the position of the hem-o-lock’s was checked, after what the drain was placed through 10 mm port. Then the evacuation of the remaining gas from the abdominal cavity was made, ports were removed, and the reconstruction of the surgical wounds was done. The bandages on operational openings were placed (Figure 14).

**DISCUSSION:**

On the day of surgery the patient received an antibiotic from the group carbapenems, and she continued to receive it in next three days. After three days of antibiotics administration the diarrhea was occur (suspicious in-
Infection with Clostridium difficile. The stool sample was taken. The previous therapy is replaced. Orvagil is administered according to a protocol, and after two days, there was normalization of stool. The duration of surgery was 140 minutes. There was no Intraoperative blood loss. Quantity of insufflated gas (CO$_2$) was 532 liters. During recovery, the patient did not feel any pain, diuresis on urinary catheters was approximately 2250 ml per day, and the drain was not evacuated any content.

The nasogastric tube was removed immediately after the procedure. On the first postoperative day, the patient was translated to semi-intensive care ward. Drain was removed the second postoperative day, during first two postoperative days there was no evacuation through the drain. The urinary catheter was removed at the second postoperative day, the patient voided clear urine in good quantity. Due to the suspicion on clostridial infection hospitalization was prolonged. The patient was discharged on fourteenth postoperative day, after having the result of negative finding on coprocultures, in generally good condition. During hospitalization, the patient wasn’t febrile. Operative incisions were healed primarily. Sutures were removed on tenth postoperative day. Histopathologic findings, spoke in favor of the following diagnoses: ureteritis et periureteritis chronicum cum fibrosis. Hydronephrosis. Chronic pyelonephritis (PH number of biopsies: 585-92/14, PH 57/14, Figure 15).

CONCLUSION

This case is a good illustration how even the slightest historical information is important in setting up a correct diagnosis. In the case of younger patients, with hydronephrosis of unknown etiology, it is necessary to exhaust all possible diagnostic procedure in terms of setting up a proper diagnosis. That should not be confined only on one specialty. Preferably, the multi-disciplinary approach is preferable in order to provide better and more accurate diagnosis. Finally, as a therapeutic modality, it is necessary to offer patient more therapeutic suggestions of solving the problem. For each of these modalities it is necessary two-way talk with the patient with sufficient information for easy understanding. At the end the patient is the one who decides. Laparoscopic nephrectomy, in these particular case was the most appropriate solution.

SUMMARY


Ključne reči: Laparoskopska nefrektomija, “hand assisted” laparoskopsku nefrektomiju, eksplorativna uretorenoskopija (URS), afunkcionalni bubreg, hipofunkcionalni bubreg, MSCT, scintigrafija bubrega, perkutane nefrostome (PCN)
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