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Original Article

Laparoscopic pyeloplasty through transperitoneal access – operative results of the first 12 cases in our practice

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Summary: Objective: To present our initial experience of the 12 cases performed with laparoscopic transperitoneal pyeloplasty in patients with obstruction of the pyeloureteral segment.

Materials and Methods: For the period from 2022 to the beginning of 2024- total of 12 laparoscopic surgical interventions were performed on patients with obstruction of the pyeloureteral segment(UPJ) through transperitoneal access. The patients were 8 women and 4 men. Regarding the age indicator, the patients were in an active, "young" age, between 25 years and 49 years. For diagnosis preoperatively we used a computer tomographic examination of the abdomen and pelvis with intravenous contrast material and an excretory urographic phase.A double JJ stent was placed before the pyeloplasty. Regarding the cause of the obstruction,in 4 patients we diagnosed the presence of an aberrant vessel,in the remaining 8 we had a stenosis of the UPJ and in two we had a kidney stone in the pyelon of the kidney.

Methods: For the treatment of UPJ we performed a laparoscopic transperitoneal pyeloplasties.The patients were operated on by one operative team with operator Dr. S. Stanimirov in two hospitals. Accordingly, 9 patients were operated on in the "St. Anna" Hospital - city of Varna and 3 patients in University Hospital "Deva Maria" - city of Burgas. The team had previous laparoscopic experience in kidney and prostate surgery. Considering that to start laparoscopic pyeloplasty, it is necessary to have enough acquired laparoscopic experience. The operative team was composed of operator, assistant and operating nurse. All patients were under general intubation anesthesia. The patient was placed in a lateral position on the operating table. In all patients, the Hasson's method was used to place the optical laparoscopic port. Two 10mm trocars were used and two 5mm. 0 degrees optics were used in the first 9 operative interventions and 30 degrees in the last 3 patients. We used the following laparoscopic instrument set: bipolar clamp - Johan type, ultrasonic scissors - Ultrasision type, monopolar scissors, dissector, grasper, needle holders. For the suture, we used an interrupted suture, with thread 3-0, slow resorption, needle ½, 19-21mm. Working pressure of CO2-12mm.Hg.

Conclusion:
Laparoscopic transperitoneal pyeloplasty is possible for our team. The initial results are encouraging and we can expect them to improve as the number of cases progresses.

Key words: Laparoscopic surgery, pyeloplasty, stenosis of the PUS, transperitoneal access

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Introduction:

Pyeloplasty is a method of surgical treatment for congenital obstruction of the pyeloureteral junction (UPJ), caused by stenosis or the presence of an aberrant vessel pressing externally. As a result- hydronephrosis of the kidney is observed, requiring the performance of deobstructive measures. Today the classic method for open pyeloplasty is displaced by the laparoscopic technique. He history of laparoscopy dates back to 1901, when Georg Kelling from Dresden, Germany performed a diagnostic laparoscopy on a dog. Laparoscopic kidney surgery dates back more than 30 years [1]. Laparoscopic pyeloplasty as an option for the treatment of ureteropelvic junction (UPJ) obstruction combines advantage of open reconstruction with direct enlargement of the image and the possibility of precision plastic surgery. First described as a minimally invasive treatment option by Schuessler et all in 1993. As a transperitoneal approach, while the initial retroperitoneal approach in pyeloplasty was first reported by Janetschek et all in 1996 [2].

Objective: To present our initial experience of the first 12 cases of laparoscopic transperitoneal pyeloplasty performed in patients with pyeloureteral segment obstruction.

Materials and Methods: For the period from 2022 to the beginning of 2024 a total of 12 laparoscopic surgical interventions were performed on patients with UPJ obstruction, through transperitoneal access. The patients were 8 women and 4 men. Of these in 5 patients the pathology was found on the right kidney, in the remaining 7 on the left kidney. Regarding the age indicator, the patients were in an active, "young" age, between 25 years and 49 years old. The patients were initially diagnosed by ultrasound examination-with established hydroneurosis of the corresponding kidney. For preoperative diagnosis, we used a computer tomographic examination of the abdomen and pelvis with intravenous contrast material and an excretory urographic phase. A double JJ stent was placed before the pyeloplasty was performed. Regarding the cause of the obstruction-in 4 patients we diagnosed the presence of an aberrant vessel, in the remaining 8 we had a stenosis of the UPJ, and in two we had KIDNEY STONE in the pyelon of the kidney. In one of the patients, a hybrid method was used - a laparoscopic pyeloplasty was performed, with a stone previously extracted from the pyelon. Due to the presence of three stones located peripherally in the calyx system, a flexible renoscope was inserted through one of the working laparoscopic trocars and the stones were extracted using basket.fig.1, fig.2.

Fig.1: CAT of abdomen - data on hydronephrosis of the left kidney caused by an aberrant vessel (own clinical case).

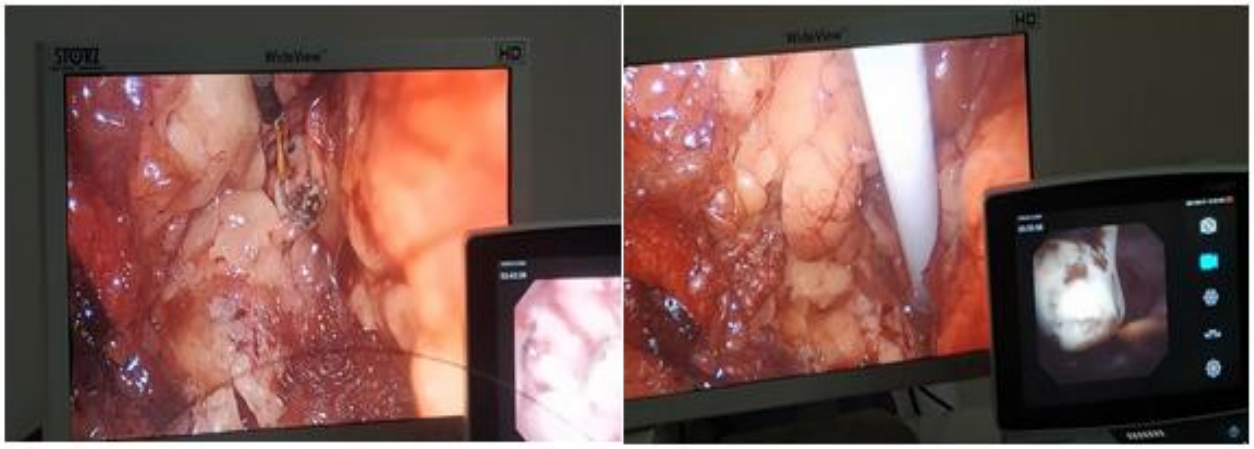

Fig.2: Hybrid technique. Laparoscopic Y-V plasty with flexible extraction of stones (own material)

Methods: For the treatment of UPJ obstruction, patients underwent laparoscopic, transperitoneal pyeloplasty. As with any surgical intervention, there are indications and contraindications for performing laparoscopy which the operator must comply with. One of the first steps knowledge of the history of previous operative interventions, as well as comorbidity. Comorbidities, especially Chronic obstructive pulmonary disease should be discussed in detail with the anesthesiology team, due to the possibility of difficult breathing during laparoscopic surgery. All standard investigations that are performed during any intervention under anesthesia are also required during laparoscopy.

There are several absolute contraindications for laparoscopy. These are:1. Presence of an infectious process - presence of peritonitis or abscess, since increased pressure can lead to septicemia. 2. Massive hemorrhages in the peritoneum or retroperitoneum. After trauma or previous surgery, because with impaired visualization and lack of effective bleeding control mechanisms.3.Uncorrected hemorrhagic diathesis.4.Large aortic aneurysm. There are also several relative contraindications such as: previous operative interventions, suspected adhesions from traumatic and inflammatory preceding diseases, size of the removed organ (eg, in case of large Tumor formations of the kidney), the presence of ascites, pregnancy.[3]

The patients were operated on by one operative team with the operator Dr. S. Stanimirov in two hospitals. First 9 patients were operated on in "St. Anna" Medical Center - city of Varna and 3 in "Deva Maria" Medical Center - city of Burgas. Team had previous laparoscopic 4. Experience in kidney and prostate surgery. Considering that sufficient laparoscopic experience is necessary to start laparoscopic pyeloplasty. The operative team was composed of an operator, an assistant and an operating nurse. All patients were under general intubation anesthesia in the supine position.

A urethral catheter was then inserted. The patient was placed in the lateral position on the operating table after that. A soft pad was placed between the two lower limbs, limiting possible traumatic damage to the points of greatest pressure, as they were bent at the knees. Shoulders and hips are protected by the rubber or foam mat that is placed on the operating table. The head and neck are supported by both pillows or a rubber head ring to keep them in a neutral position. In a patient with right-sided kidney pathology, the position is the left lateral position at an angle of 110° relative to the horizontal. The operative table is moved at the level of the navel by approximately 10-15°.The patient is positioned on the table towards the edge of the table facing the surgeons. This favors the normal handling of the instruments during the procedure and facilitates the ergonomics of the surgeon. The patient's thoracic and lumbar regions are supported in a lateral position with table attachments that are well padded and must be securely fixed to the table.[4],[5].

In all patients the Hasson's method is used to place the optical laparoscopic port.We consider the method to be safe, fast enough and suitable for an operating team that is involved in laparoscopic kidney surgery,following the recommendations of published scientific reports by Bulgarian and foreign authors.[6].

Two 10mm trocars were used and two 5mm. We used zero degrees optics in the first 9 operative interventions and 30 degrees in the last 3 patients. We used the following laparoscopic instrument set: bipolar clamp - type Johan, ultrasonic scissors - type Ultrasicion, monopolar scissors, issector, grasper, aspiration pump, needle holders.

After placing the working ports, the surgical intervention continues by reaching the retroperitoneum. For this purpose we open the parietal layer of the peritoneum along Told's line. The ureter is visualized and prepared. In the presence of an aberrant vessel, we carefully prepared it as well. In 4 of the patients we performed a transposition, and in one of them, in addition to the transposition we also performed an Anderson-Hynes pyeloplasty. In the remaining 8 cases-in 3 we performed an Anderson-Hynes pyeloplasty, while in 5- Y-V pyeloplasty (in 2 cases combined with pyelolithotomy. For the suture we used an interrupted suture with thread 3-0, slow resorption, needle ½,19-21mm.Working pressure of CO2-12mm.Hg.We used a tubular drain 16Ch.Subsequent peritonization.

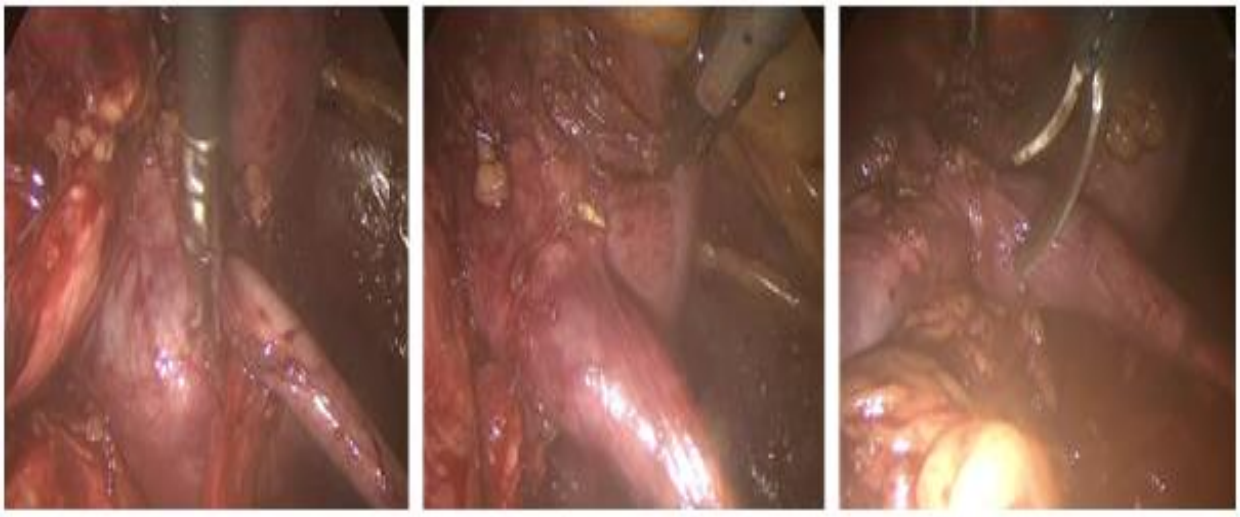

Fig. 3: Laparoscopic pyeloplasty according to Anderson-Hynes. (Own photo material)

Results: Operative time from the first skin incision to the restoration of the trocar hole on average was 155 minutes (from 120 min. to 200 min./.Average blood loss-150 ml.(between 100 and 180 ml.).Blood transfusion was not performed in any of the patients. In none of the cases did not require conversion to open surgical treatment. No suppuration of the operative wounds was reported and normal healing was observed.

Early postoperative period -it went smoothly except for two of the cases in which we had leakage of urine from the contact drain. We observed this at the beginning of the learning curve - up to the first 5 operative interventions. In the end, the leakage was controlled with the placement of percutaneous nephrostomies. In one of the cases we had a superimposed secondary infection as a result of leakage of urine into the abdominal cavity and subsequent peritonitis. This necessitated an open surgical revision. As a standard we performed a postoperative antibiotic prophylaxis - Ceftriaxone. (Before surgery, all patients had sterile urocultures). We used Fraxiparin 0.4 fl. The patients were verticalized on the first postoperative day.

Conclusions: Laparoscopic transperitoneal pyeloplasty is performed using the methods of classical laparoscopy. It skillfully replaces open surgical treatment. At the same time it takes a comparable length of operation time. Blood loss is insignificant and does not require blood transfusion. Favorable postoperative period with minimal postoperative pain and short hospital stay.

Discussion: Despite the initial technical difficulties in the use of laparoscopy for UPJ plastics -prolonged operative time, unsatisfactory results with the accumulation of sufficient experience, these difficulties were overcome. Today, the use of the laparoscopic approach has a number of advantages over the routinely used open access in the past.[7]

Table 1: summarizes data from 6 series of published studies after laparoscopic pyeloplasty.[8-14]

TABLE 1. SIX LARGEST REPORTED SERIES OF LAPAROSCOPIC PYELOPLASTY

Series	No. pts	Approach	Mean operative time(min)	Mean follow-up(mos)	Mean hospital stay(days)	Percent with complications	Percent successful
Turk et al. 2002	49	Trans	165	23	3.7	2.0	97.7
Zhang et al.2006	50	Retro	80	22	7.0	3.6	98.0
Soulie et al.2001	55	Retro	185	14	4.5	12.7	88.0
Janetschek et al.1996	67	Both	123	25	-	-	98.0
Rassweiler et al.2007	143	Retro	124	-	-	6.3	94.4
Inagaki et al.2005	147	Trans	246	24	-	8.8	95.0
Moon et al.2006	170	Retro	140	22	3.0	7.1	96.2

Trans -transperitoneal; Retro -retroperitoneal

From the study of the results presented by various authors, as it is clear that laparoscopic pyeloplasty today is the method of choice, combining all the advantages of laparoscopy and excellent postoperative results for the patient (all authors report a high success rate).The operative time is within quite wide limits according to the different centers, but this is an expected result. Since this type of surgery is invariably associated with a learning curve and is suitable for an advanced team in this type of surgery. At the same time all of them have a low rate of complications and a small number of days of hospital stay.

As for our clinical cases, they took place in a variable operating time and we cannot note a significant trend towards its reduction. This is naturally expected given the need for additional experience. However the operating time was within reasonable limits and approaching some of the centers published in table 1 We observed single cases of early post-operative complications with us-mainly leakage of urine in the first cases, with which we have a higher percentage of complications than the published ones. Naturally, here again there is a dependence on the learning curve. After the initial cases, they were also kept to a minimum here.

Conclusion: Laparoscopic transperitoneal pyeloplasty is feasible for our team. The initial results are encouraging and we can expect them to improve as the number of cases progresses.

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