Introduction

Modern urologic procedures had even more diverged from classic Bergman Israel incisions and minimally invasive interventions are coming to the front. The aims of minimal invasivity are to cause the least handicap and to give the best result for the patient. Methods allow that there will be either no, or only little wound on the patient's skin and muscles, that is how postoperative pain is decreased and convalescence time is getting shorter.

Percutaneous renal surgery and laparoscopic urologic interventions were introduced into hungarian urology in 1984 and 1992 respectively. This dissertation deals with those percutaneous and laparoscopic urologic interventions which give new for the hungarian urology.

Urinary tract from the kidneys to the prostate can be successfully operated with laparoscope. Most of these intervention means operations which were had been done by extended incisions of skin and abdominal wall for decades.

Two basic method of urologic laparoscopy are known depending on the point of access, and surgical place. These are *transperitoneal* and *retroperitoneoscopic* laparoscopy. Retroperitoneal organs can be operated by laparoscope in three different ways: transperitoneally, hand-assisted transperitoneally, and retroperitoneoscopically. Regardind the kidney, the simplest procedure is renal cyst resection. Nephrectomy can be performed because of afunctional chronic pyelonephritis, hypoplasia, hydronephrosis, tumor. In the presence of appropriate indication kidney resection can also be performed. Nephroureterectomy can be done because of renal collecting system tumors. To solve pyeloureteral junction (UPJ) stricture beside endopyelotomy (EPT), we introduced laparoscopic pyeloplasty. Stones impacted at the middle part of the *ureter* can be removed either percutaneous or laparoscopic ureterolithotomy. Retroperitoneal laparoscopic *lymph node dissection* (RPLND) can be performed in patients with *testicular*-or *prostate* cancer as curative treatment or tumor staging. Open retroperitoneal lymphadenectomy because of testicular cancer means a large abdominal incision for the young patient from the xyphoid processus to the symphysis. RPLND can be performed via four access points each are one centimeter in diameter. *Bladder* diverticulum causing complaints, moreover, the radical removal of the whole bladder is possible through laparoscopic way. In cases of organ confined *prostate* cancer laparoscopic radical prostatectomy can be performed. Testicles remained in the abdomen can be found, fixed (orchidopexy), or also can be removed if necessary.

In Hungary, history of laparoscopy began in 1992. E. Holman and Cs. Toth performed the first laparoscopic varicocelectomy in that year. Nowadays there are only few laparoscopic interventions are performed in our country. Only sproradically, in some certain departments deal with urologic laparoscopy with little number of patients.

In our department we have been performing urologic laparoscopic procedures since 10th November, 2000. Laparoscopic varicocelectomy is routinely performed by all urologist and the only resident in our department. All of the above mentioned laparoscopic procedures on the kidney (transperitoneal, hand-assisted, retroperitoneal nephrectomy, renal cyst resection, renal tumor resection or enucleation, pyeloplasty) are exist in our department. We performe nephrectomy and pyeloplasty also in the childhood. In cases of impacted ureteral stones unsuccessfully treated by extracorporeal shock wave lithotripsy (ESWL), we perform laparoscopic (retroperitoneoscopic) ureterolithotomy or percutaneous ureterolithotomy (PCUL). We make RPLND in cases of testicular cancer or before radical prostatectomy. Moreover, we also use other combined operations as: laparoscopically assisted percutaneous nephrolithotomy (PCNL), laparoscopic renal cyst resection and mini-PCNL in the mutual

presence of renal cyst and kidney stone, laparoscopic pyeloplasty and renal stone removal. After RPLND, if frosen section is negative, operation is continued with radical perineal prostatectomy in the same session. RPLND was also performed by hand-assistes manner, and contralateral renal gland metastasis of renal tumor is also removed by laparoscope.

This dissertation summarizes our experience and results has been gained during laparoscopy till know, emphasizing my aims, of which establishment belongs to my work and put into theses.

Aims

1. To work out the retroperitoneal nephrectomy, the least invasive method of removal of the impaired kidney.
2. Organ spearing renal procedures are to be performed laparoscopically.
3. Nephrectomy in the childhood are to be performed by laparoscopy.
4. Certain cases of pyeloureteral junction obstructions with renal pelvis dilation and complaints are to be solved by laparoscopic pyeloplasty.
5. Laparoscopic varicocelectomy means extraordinary teaching and learning opportunity. My aim was that in our clinic every urologist or resident can imbibe this method so that to perform it routinely. To work out the technique to make the intervention by one person.
6. Removal of renal cyst causing complaints or cysts of polycystic kidney are to be happen by laparoscope.
7. In cases of testicular cancer large abdominal exploration of retroperitoneal lymph nodes is to be replaced by laparoscopic retroperitoneal lymph node dissection.
8. Comparing laparoscopic ureterolithotomy with percutaneous ureterolithotomy, so that to give their advantages and drawbacks.
9. Combining laparoscopy with other endoscopic methods.

Patients and methods

In our department between 10th November, 2000 and 30th March, 2004 we performed 300 laparoscopic interventions.

Laparoscopic varicokelectomy

Because of left varicocele causing complaints and/or might has got role in infertility since 25th April, 2001 we have performed laparoscopic varicocelectomy in 159 patients. Youngest patient was 11, oldest was 64 years old at the time of the procedure, mean age 10 years. Patient lays in supine position, internal spermatic vein was approached transperitoneally. Peritoneum was incised in T shape above the spermatic vein which could be seen via the thin peritoneum, than vein was prepared, and clipped with two metallic clips. Last 8 operations were perform by only myself without assistance. Endocamera was kept with my left hand, with my right hand I prepared the vein and put the clips on.

Laparoscopic nephrectomy

Nephrectomy was performed in 53 patients. 35 women and 18 men were operated. In 30 cases right, in 23 patients left sided nephrectomy was made. Youngest patient was 4 the oldest was 77 years old at the time of the procedure mean age 50.8 years. Depending on the approach of the organ there were 3 groups of interventions: I. *transperitoneal,* II. *retroperitoneal (retroperitoneoscopic*), III. *transperitoneal, hand-assisted* nephrectomy.

First transperitoneal operation was performed was performed on 13th June, 2001. Procedures was performed because of afunctional right sided kidney affected by chronic pyelonephritis, renal hypoplasia and hydronephrosis. Ages of the 3 women were 25, 57, and 43 years.

With standard laparoscopic tools (forceps, scissors, hook, fan explorer), after incising laterocolicly of the posterior wall of peritoneum kidney was prepared round. Hylar vessels were prepared, first the renal artery then the the vein was ligated, then clipped. Kidney was removed after grate dissection of sceletal muscles via a skin incision not larger than 5 centimeters. After that non-tumorous kidneys were removed retroperitoneoscopically. Also retroperitoneoscopic nephrectomy was performed in renal tumors not larger than 6 centimeters in largest diameter and because of the size or place of the tumor there were no possibility for resection. Since 28th August we performed 28 interventions. Four and nine year-old children were also operated, the oldest patient was 77 years old, 16 right and 12 left sided kidneys were removed. In cases of ureteral tumors the upper and middle part of the ureter were also removed. Before the intervention patiend was laid in lumbotomic position. In the middle armpit line, 1.5 centimeter above the ileal crist, little skin incision was made, then subcutaneous and abdominal wall layers were pricked through with a Pean tool. Rubber glove finger was knotted on the end of 20F Nelathon catheter. Depending on the size of the patient one or two this kind of „balloon catheter" were put into the retroperitoneum, and each glove fingers were filled in 300-500 milliliters of lukewarm isotonic saline solution during 4-5 minutes. That way we created 400-900 milliliters of arteficial place. Retroperitoneal space was filled in carbone-dioxide gas till 15mmHg pressure. This pressure was reached by filling 500-800 milliliters of gas. After that laparoscopic ports, endocamera, and laparoscopic tools were put in place.

Nephrectomy, indicated by benign disease the preparation of the kidney happened step by step similarly to open procedures. We changed of using scissors, forceps, little ball towel, bleeding was stopped by electrocoagulator. Renal hylar vessels were prepared then dissected. To close vessels and ureter metallic, later plastic clips (Hemolock) were used, latter is similar to an umbilical snap. Incision of the middle armpit line was lenghtened, muscles were divided grately. Via this aperture kidney and dissected perirenal fatty tissue were removed. In cases of tumorous radical laparoscopic nephrectomy, Gerota fascia was not opened. Just right going on the psoas muscle we found then clipped the hylar vessels as we mentioned above. Kidney was put into plastic sac and was removed.

Tumorous kidney was most commonly removed by transperitoneal hand-assisted way. One of the surgeon hands palpating in the operative field pregnantly facilitates, in addition shorten the procedure. 22 interventions were performed, 11 right and also 11 left kidneys were removed. Largest tumor was 7 centimeters in largest diameter, which was located at the upper renal pole, average tumor size was 55 millimeters. During procedures adrenal glands were removed not in all cases. First intervention was performed on 11th November, 2000, led by E. Holman. The speciality of the operation is, that the urologist with his dominant hand works with laparoscopic tools, but his other hand is in the patient during all the procedure. Gas leakage from the abdomen can be prevented by two different methods. Using special, so-called handport or tighten the aperture of the access by sewing

round the joint of the hand. Patient is fixed in lumbotomic position described at retroperitoneoscopy. During the operation opening of posterior peritoneal wall, preparation of the kidney, klipping hylar vessels and ureter were done both with the hand inside and laparoscopic tools as described at retroperitoneoscopic nephrectomy. Kidney was removed at the hole of sewed hand.

Laparoscopic renal tumor resection, enucleation

In cases of peripherially located renal tumors approximately not larger than 4 centimeters there is possibility for performing laparoscopic organ spearing procedure. Since 11th September, 16 interventions have been performed. Youngest patient was 22 the oldest was 77 years old. We performed 7 right and 9 left sided procedure. Least tumor size was 12, the largest was 45 millimeters. During laparoscopy approach of the organ was retroperitoneal in 14, transperitoneal in 2 cases respectively. Kidney and hylar vessels were prepared, renal artery was isolated and compressed till a maximum time of 20 minutes by lifting a rubber band which was twisted tvice around the artery. Tumor was prepared around, resected with electrocoagulator or enucleated. Tumor was placed in steril glove finger and was removed through one of the laparoscopic ports.

Laparoscopic renal cyst resection

We have been performing 35 laparoscopic renal cyst resections because of recidive cysts causing complaints, locating at parapelvic region or medial part of the kidney since 26th September, 2002. Youngest patient was 16, the oldest was 76 years old, mean age was 51.9 years. 16 right and 18 left sided cysts were resected, one patient was operated bilaterally because of cysts in both kidneys. Four patient were operated because of polycystic kidneys so that to decompress renal parenchyma. In these latter patients there were several cysts resected. Size of the cysts altered between 50-200 millimeters and was 76 millimeters on average. Kidney was approached by retroperitoneoscopy in all cases. Cyst was prepared by scissors, and forceps, its fluid content was removed by suction then wall of the cyst was cut around electrically or with scissors near to renal parenchyma leaving a little collar from the wall of the cyst. Cystic wall was removed and was sent for hystopathologic examination.

Laparoscopic pyeloplasty

Laparoscopic pyeloplasty was performed in 6 patients because of reversible renal collecting system dilatation caused by congenital pyeloureteral junction stricture, causing complaints for the patient. First intervention was made on 3rd February, 2003. Procedures had also been performed in the childhood, our youngest patient was 10 years old.
Kidney was approached by retroperitoneoscopy. Renal pelvis and narrow pyeloureteral junction were prepared. When aberrant vessels were found, which were responsible for the stricture by compressing pyeloureteral junction, they were clipped and cut. Narrow pyeloureteral junction was incised longitudinally in dorsolateral direction and was sewed in oblique direction (laparoscopic Fenger pyeloplasty). For stenting and to heal the ureter a double-J catheter was left in place at the end of the procedure. Double-J ureteric catheter was removed 6 weeks later of the original procedure. One hour after the removal renal ultrasound examination was perform to establish the degree of renal collecting system dilation.

Laparoscopic lymph node dissection

Lymph node dissection was performed because of testicular, or prostate cancer. First intervention was performed because of testicular cancer on 21th October, 2002, and because of prostate cancer 3rd October, 2001 respectively. In 8 cases of testicular cancers modified, staging RPLND were performed, which is indicated in stage I. primary tumors. This means that in patients with left sided tumors from the renal hylum to the aortic bifurcation the paraaortic and to the level of the inferior mesenterial artery the praeaortic lymph node chains have to be removed. In cases of right sided primary tumors praeaortic lymph node chain has to be removed from the renal hylum to the inferior mesenteric artery and interaortocaval lymph nodes also have to be removed to the aortic bifurcation. Prae- and paracaval lymph nodes are also need to be removed, as well as lymph nodes locating beside the right common iliac artery and vein. The border of the dissection in both sides are the ureters. Patient's age was between 12 and 45 years old, mean age was 34 years. Four left and also 4 right sided interventions were performed. Position of patient, placement and location of ports were as similar as was described at transperitoneal nephrectomy. Retroperitoneum was opened paracolicly. Chains of lymph nodes were prepared step by step at the neighbourhoods of the large vessels. Dissected lymphoid and fatty tissues were removed. In 4 patients we performed hand assisted operation, similarly to nephrectomies. In cases of organ confined prostate cancer radical prostatectomy is performed through perineal approach in our department. From this exploration, sentinel obturatoriuos and pelviceal lymph nodes of the prostate are impossible to be reached. That is why before removing the prostate, above of 10 ng/ml serum prostate specific antigen (PSA) level, when possibility for pelviceal lymph node metastases is significantly increased, hystological examination of pelviceal lymph nodes is needed. The modernest method of sampling lymph nodes from the small pelvis is laparoscopic lymphadenectomy, when all the regional lymph nodes of the prostate are removed. Laparoscopic prostatectomy was performed in 12 patients, age of the patients was between 45 and 72 years, mean age was 60.7 years. In two patients intervention was unilateral, while the rest patients had bilateral lymphadenectomy.

Patients were in supine position with emerged flank. Going from the external iliac artery to medial direction, parailiac and obturatorious lymph nodes were dissected. During the procedures the obtoratorius nerve can be nakedly seen. After that the same intervention has to be done on the other side. Here, during the dissection, the obturatorious nerve became also naked. Dissected lymphoid and fatty tissue were removed. When the final histological examination had been negative, radical prostatectomy was performed 2-3 weeks later. In 5 cases, cardiorespiratoric statement of patients allowed longer narcosis, therefore, there were possibilities, after intraoperative frozen histological examination of the removed lymph nodes and if the result was negative, for removing the primer tumor in one session after lymphadenectomy.

Retroperitoneoscopic ureterolithotomy

In 4 patients laparoscopic ureterolihtotomy was performed because of middle part, impacted ureteral stones unsuccessully treated by ESWL before. First intervention was performed on 14th November, 2002. Two women and also 2 men were operated, years of age was between 50 and 71, there were one right and 3 left sided interventions. Size of stones altered between 8-24 millimeters. Ureter was approached during

retroperitoneoscopy. For easier identification of the ureter ureteral catheter was inserted at the affected side. After getting into the retroperitoneum middle, stone-bearing part of the ureter was prepared. Above the stone, a longitudinal incision was made on the ureter by a strait steel knife. After that stone was removed out of the ureter, then removed by a forceps from the body. Ureter was closed by simple stiches, ureteral catheter or double-J catheter was used for stenting.

Percutaneous nephroscopic ureterolithotomy

Eighty six percutaneous ureterolithotomies (PCUL) were performed in 85 patients because of ureteral stones impacted at the upper or middle part of the ureter. 56 men and 29 women were operated. 44 left and 42 right sided stones were removed. Stone size altered 5-29 millimeters and was 15 millimeteres on average. In 51 patients local, in 34 patients spinal anaesthesia was used during the interventions.

PCUL was performed in prone position. Before the intervention, 5-6F ureteral catheter was inserted up to the stone. The next step was direct puncture to the stone in the retroperitoneum under fluoroscopic control. After safe position of needle on the stone, special, steel, 0.038 inch wide guidewire was led via the needle till the stone. After one centimeter skin incision, pricked channel was widened with telescopic metal dilators and a 26F rigid nephroscope was inserted. Continuous streaming of isotonic saline solution was used for clear visualisation. Proper localisation of the stone was achieved both nephroscopically and fluoroscopically. Stone bearing part of the ureter was prepared by forceps, then cold, strait, steel knife was inserted into the working channel of the nephroscope. Sharp, longitudinal incision was made at the stone bearing part of the ureter. After that stone was removed by forceps. Ureteral wound was not closed after stone removal. For stenting the ureter, ureteral or double-J catheter was used.

Results

Between 11th November, 2000, and 31st March, 2004, 300 laparoscopic interventions were performed in our department.

Laparoscopic varicocelectomy

The first intervention lasted 80, the shortest lasted 6 minutes, mean operative time was 35 minutes. Average operative time of the latest 50 operations (concerning of all the operators) was 20 minutes. Time was affected beside the person of the operator that there was one or more veins to be found. If 2 or more veins were found, the operating time was longer with some minutes. During the operations, there was one intraoperative complication. The injured small intestine was emerged through the umbilical ring, than the wound was closed. There was no need for open exploration. Patients went home on the day after the operation. During regular control recidiva was seen in 10% of the patients at the beginning, this number was gradually decreasing. The most frequent cause was unclipped, significant draining vein. After 4-6 month of the intervention, if significant, recidive varicocele could be seen causing complaints for the patients, it was operated via inguinal or scrotal access. This happened in 13 patients (8.2%) till know.

Nephrectomy

The operating time of transperitoneal operations was 420, 375 and 415 minutes. In the first case we had a serious bleeding during the preparation of the kidney. It was caused by injury of the upper polar artery. Beacuse of the massive bleeding we performed conversion. Apart from this, we had not any other complication. Blood transfusion was not necessary. The patients could go home on the 4th postoperative day. Histology showed chronic pyelonephritis in all specimens.

The operating time of retroperitoneal operations ranged from 35 to 510 minutes. (average:175 min.). The average time of the last 10 operations was 135 minutes. In the case of the first patient conversion was made because of difficulty of preparation. Subcutaneous emphysema was noticed in 8 patients and it recovered spontaneously within 24 hours. The average blood loss was 100 milliliters. In the postoperative period we had not complication. Patients could go home in 3-7 days after surgery (average: 4 days). Histology showed chronic pyelonephritis (n:9), hypoplasia renis (n:1), multicystic kidney (n:1), hydronephrosis (n:5) and benign tumor (n:2). In the case of open surgical operation (after conversion) the histological examination revelaed pyelonephritis xanthogranulomatosa. In the group of patients with malignant diseases, histology proved carcinoma clarocellulare (n:8) or transitiocellulare (n:1) in pT1 stage. During the follow-up period local recurrence or distant metastasis was not detected.

The operating time of hand assisted transperitoneal laparoscopic operations ranged from 115 to 360 minutes (average: 185 min). The average operating time of the last 10 interventions was 132 minutes. We had not any perioperative complication. The average of blood loss was 225 milliliters. Conversion or blood transfusion was not adminestered. Patients went home in 5-8 days after surgery. Histology proved carcinoma clarocellulare in 15 cases (all cases had pT1 stage), carcinoma transitiocellulare in one patient and benign tumor in 5 occasions. In all patient the preoperative examinations showed suspicion of malignant tumor. In the follow-up period local recurrence or distant metastasis did not occured.

Laparoscopic renal tumor resection, enucleation

The time of the operation ranged from 125 to 360 minutes (average: 186 minutes). Perioperative complication did nor occurred, conversion was not performed. The average blood loss was 220 ml, however tansfusion was not necessary. Patients went home in 3-6 days after the operation. Histology described carcinoma clarocellure in 12 cases (pT1) with tumor-free magin of resection and benign disease in 4 patients. The patients had not local recurrence and distant metastasis during the follow-up period.

Laparoscopic renal cyst resection

The operating time ranged from 35 to 105 minutes (average:78 minutes). We had not any complication in the perioperative period. Patients went home on the 2nd or on the 3rd day after surgery. Histology did not show malignancy in the specimens.

Laparoscopic pyeloplasty

The operating time ranged from 200 to 420 minutes (average: 240 minutes). In case of the first patient conversion was performed because of breathing problem. In his cases open surgical pyeloplasty sec. Anderson-Hynes was carried out. Apart from this operation we had not any other complication. Average blood loss was below 100 ml and transfusion was not necessary. Patients went home in 5-7 days after operation. After the removal of duble-J stent the performed ultrasound showed decreased dilatation of pelvic system or did not depict pyelectasia. Controll intravenous urographies did not show stenosis and scintigraphies revealed improved renal function. After this operation the patients had not any complaints.

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Laparoscopic lymph node dissection

The operating time of this operation ranged from 145 to 310 minutes (average: 175 minutes) in patients with testical cancer. Complication did not occured. Average blood loss was 140 ml and transfusion was not given. Patients went home in 4-6 days after surgery. Histology did not revealed metastasis in 7 patients, while metastasis occurred in 1 case. At present the patients without complaints.

The operating time of this operation ranged from 110 to 250 minutes (average: 170 min) in patients with prostate cancer. There was no complication during operations and we had a minimal blood loss. In some patients we continued the operation with radical, perineal prostatectomy and in these cases there were not any complication. If frosen secton did not reveale metastasis, radical prostetectomy was performed. In two patients the final histological examination showed metastasis. The patients are under regular controll (based on prostate specific antigen), and they are without complaint.

Retroperitoneoscopic ureterolithotomy

The operating time ranged from 170 to 210 minutes (average:185 min). We could remove stones in all patients. Complication did not occurr and blood loss was minimal. Patients went home in 3 days after surgery. They are without any complaints and we did not realised any symptom concerning to ureter stenosis.

Pecutaneous nephroscopic ureterolithotomy

The operating time ranged from 12 to 40 minutes (average: 20 minutes). In one case conversion was performed because of the difficulty of the preparation of the ureter. Apart from this we had not other complication. The stone was removed from all patient. Patients went home in 3-8 days (average: 4 days) after the operation. Stenosis of the ureter did not occured.

Discussion

The previously mentioned laparoscopic operations are widely used as a routine procedure in the different Western European countries and in America. These laparoscopic operations have become safety interventions due to the development of laparocopic instruments and experience. At present the urologists can perform laparoscopic radical cystectomy, laparoscopic radical prostatectomy, laparoscopic retroperitoneal lymph node dissection in large series. The results of the laparoscopic operations are comparable with results of open surgical interventions.

The first laparoscopic varicolectomy was performed in 1992. In the same year Holman and Toth described the technique of this operation in Hungary. On the second day after laparoscopic varicocelectomy the patient has not any pain and can move free. This operation can be performed for out-patients or can be performed such an „one day surgery". We worked out a special technique for this intervention which allows for the urologist to perform alone this operation. By our experience and by our results, laparoscopic varicocelectomy is a minimally invasive technique and it is more convenient for patients than open surgical varicocelectomy. Results of both procedures are similar.

First laparoscopic nephrectomy was descibed Clayman in 1991. Firts laparoscopic nephrectomy (transperitoneal) was made by Holman in Hungary. We performed the first retroperitoneoscopic (laparoscopic) nephrectomy. In the past ten years the results of laparoscopic nephrectomy proved a lot of of advantages of this method and this operation is used worldwide. Laparoscopic nephrectomy is also can be used for removal of tumorous kidneys. Both the laparoscopic and the open surgical nephrectomy are performed under general anaesthesia. Time of the hospitalization is much shorter in case of laparoscopic nephrectomy. The cosmetical apperiance is also better in case of laparoscopic operation. The patient has only a small incision which does not cause weakness of abdominal muscles. Acquiring more experience we could reduce the operating time.

Using hand assisted laparoscopic nephrectomy we could remove a relatively large renal tumors in T1 stage, laparoscopically. It was reported by sevaral authors, that open surgical nephrectomy is indicated only in advanced cases, when the tumor infiltrates the surrounding tissues or we cannot perform laparoscopic operation by anaeshesiological reason. Because relatively high rate of renal tumor is diagnosed incidentally by a routine ultrasound or CT examination in early stage, we can cure the patient with laparoscopic nephrectomy.
In case of early renal cancer we can perform oncologically radical laparoscopic nephrectomy. In our patients we did not diagnosed any recurrence in the follow-up period. We strongly recommend retroperitonescopic nephrectomy in childhood.

In case of experienced surgeon, nephron sparing laparoscopic surgery can be performed. In this case we remove only the tumorous part of the kidney. In the past decade the meaning of the radicality in renal cancer has been changed. Previously during the radical nephrectomy we should have to remove the kidney with the fatty capsula and we had to remove the regional lymph nodes. Nowdays we think that we perform radical operation if we remove only the small tumor. Of course in this question is controversal at peresent. However, results of previous studies proved that 5 or 10 years survival is similar in case of nephron sparing surgery and nephrectomy when the diameter of the tumor is less than 4 cm. By the results of large series, intraoperative bleeding is less during laparoscopic operations than in open surgery. Retrospective studies showed that 5 mm safety zone is enough around the tumor. Operating time of this laparoscopic intervention is comparable with open surgical procedures in experienced hands. The postoperative period is more convenient for the patient (less wound pain, better cosmetical result, less hospitalization time). I have to mention that we

performed the first nephron sparing laparoscopic operation in Hungary. Our results are with a good correlation with other international results.

Renal cysts can be removed by ultrasound guided pecutaneous punction, percutaneous fenestration of the cyst wall or by removing the total wall of the cyst by laparoscopic way.

Indications of the renal cysts are the followings: large cyst which causes complaints, due to compression of renal pelvis or retroperitoneal specimen. Specific indication of this operation is punction of polycystic kidney. Advantage of the laparoscopic resection of renal cyst is that we can remove the total wall, so after this operation cyst recurrence cannot occurrs. At present four urologists perform this intervention in our clinic. Postoperative period is short and the patient can go home in 1-2 days after operation. We did not detect cyst recurrence in the follow-up period.

Previously the congenital pyeloureteral stricture was treated traditionally by open surgical way with Anderson-Hynes pyeloplasty. In the past decades the endoscopic pyelotomy has used worldwide for the treatment of pyeloureteral stricture. Endopyelotomy is a good minimally inasive method with 75-95 % success rate. However, pyeloplasty can be performed by laparoscopy also. Success rate of laparoscopic pyeloplastica is similar to open surgery (100 %).

During the laparoscopic pyeloplasy we have a good possibility to see and to ligate aberrant renal vessels. The first laparoscipic pyelonplastica was performed by us in Hungary. By the opinion of most authors, the laparoscopic procedure can change the open surgery in the treatment of paeloureteral stricture, because the results are similar, but the laparoscopic method is less invasive and give better cosmetical result. However, the role of endopyelotomy is will be important, because it is also a minimal invasive operation with relatively good results.

The retroperitoneal lymph node dissection (RPLND) in patient with testicular cancer - performed by open surgical intervention – is one the highest invasive operation in the urology. During this operation we make a long skin incision from processus xyphoideus to symphysis. At present some urologists perform RPLND in stage I and IIA. We can get exact histological diagnosis after this minimal invasive operation, and we can decide about the further treatment after this. In case of those patients, who has not lymph node metastasis (stage I) further treament treatment not necessary. So, using the laparoscopic operation we can avoid the overtreatment. The correct name of this laparoscopic intervention is staging laparoscopic retroperitoneal lymphadenectomy. Laparoscopic staging RPLND is a minimal expense to the young patient. Operating time is comparable in both type operations in experienced hands. The laparoscopic RPLND is curative treatment in stage IIA cases. The first hand assisted RPLND in patient with testicularl cancer was performed by Holman and the first laparoscopic (not hand assisted) RPLND was performed by us in Hungary.

Radical prostatectomy is usually performed by perineal approach at our clinic. In that cases when serum PSA level is above 10 ng/ml, removing the regional lymph nodes from obturator fossa is indicated. The preoperative local staging examinations (CT, MRI, tansrectal ultrasound) have a low rate of sensitivity. During the radical prostatectomy we cannot reach the regional lymph nodes from the perineal approach. The laparoscopic technique is a very good, minimal invasive method to remove the regional lymph nodes. The first laparoscopic lymphadenectomy from the pelvic minor was described by Haas at al. in Hungary in 1995. However, we performed the first laparoscopic lymphadenectomy combined with laparoscopic radical prostatectomy in one step in Hungary.

Professor Toth has been worked out a new minimally invasive technique – called percutaneous endoscopic ureteral stone extraction - to remove the stones from the upper or middle part of the ureter. This technique is very usefull to remove the ureteral stones. This operation can be performed under local or spinal anaesthesia within 30 minutes. and patients

can go home in some day after operation. This method did not cause stricture of the ureter. However laparoscopy can also be usefull in the treament for ureteral stones. Holman performed the first retroperitoneoscopic ureteral stone extraction in Hungary.
By our experience the laparoscopic ureteral stone extraction a safety method with good results. Laparoscopic operation is more beneficial compared to open surgery, because the result is the same, however the pain is minimal in the postoperatve period and the hospitalisation period shorter. Based our experience we can say that result is similar in case of percutaneous endoscopic and in case of laparoscopic ureteral stone extraction. However, the percutaneous endoscopic operation is more adventageous, because it less invasive method. Instead of open surgical procedures for ureteral stone extraction we suggest the laparoscopic operation.

Summary

1. I worked out and performed the first retroperitoneoscopic nephrectomy in tumorous cases in Hungary. By my experience this operation is useful in benign and malignant kidney diseases also. This technique is less invasive method compared to open surgery and transperitoneal laparoscopic operation. The results are similar in the mentioned types of surgery.

2. I performed the first nephron sparing retroperitoneoscopic operation in the early stage renal cancer in Hungary. My results proved that this procedure is safety, minimal invasive method. It can be performed without complications. The result is similar than in case open surgery.

3. I performed the first retroperitoneoscopic nephrectomy in childhood. By my experience the retroperitoneoscopic approach the kidney is the less invasive method with very good results in childhood.

4. I worked out and performed the first retroperitoneoscopic pyeloplasty in adults and in childhood in Hungary. By my experience and by my results, I suggest this operation when the endopyelotomy was unsuccesfull or endopyelotomy cannot be performed (mainly in presence of aberrant renal artery), instead of open surgical intervention.
   The result of laparoscopic pyeloplasty is equal with result of open surgical pyeloplasty, however the laparoscopic method is less invasive.

5. I performed the first laproscopic varicocelectomy at our clinic. After this operation I performed several types of laparoscopic interventions, while I tried to teach this technique my colleagues. At present all my colleague can make laparoscopic varicocelectomy routinely. I worked out such technique for this intervention which allows for the urologist to perform safety alone this operation without any assistance.

6. I worked out and performed the first retroperitoneoscopic cyst wall resection in cases of large renal cysts and in polycystic kidney disease. This method is the least invasive technique to cure the cysts and it is the most safety method to avoid the cyst recurrence. My aim is to pass my laparoscopic experience and knowledge to my

colleagues. At present, due to my action the laparoscopic renal cyst wall resection is can be performed successfully by my three colleagues.

7. I performed the first laparoscopic lymph node dissection (not hand assisted) in patient with testicular cancer in Hungary. My results are a good correlation with results of newest international publications. By these results the efficiency of the laparoscopic lymph node dissection is similar with results of open surgery in the early stage tumors. However laparocopic intervention is less invasive, the hospitalization time is decreased and it has much better cosmetical result. Laparoscopic staging lumph node dissection is a minimal expense to the young patient which give exact histological diagnosis. Using the laparoscopic operation we can avoid the overtreatment.

8. I conclude that laparoscopic extraction of ureteral stones is so successful as open surgical operation, however, the laparoscopic method is less invasive. I suggest this laparoscopic intervention instead of open surgery. The percutaneous endoscopic ureteral stone extraction is used only in our clinic, and this is fast, effective and minimal invasive intervention for patients.

9. I performed several laparoscopic operations with combination of endoscopic intervention. This proves that laparoscopic procedures did not extrude endoscopic surgery, and in some occasion we cure patients with combination of these interventions. However, laparoscopic operations can change the open surgical interventions in the most of diseases.