

# Is Laparoscopic Nephropexy Improving the Quality of Life

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## ABSTRACT

*Short- and long-term effectiveness of laparoscopic nephropexy was evaluated in patients with symptomatic nephrop-tosis especially quality of life of the patients and repositioning of the ptotic kidney. In 87 patients with symptomatic nephrop-tosis laparoscopic nephropexy was performed from 1994 to 2003. In 86 patients trans-abdominal approach was used and retroperitoneal in one patient. Visual pain scale was used for pain evaluation before surgery and six month af-ter surgery. At the same period creatinine serum concentration, urine examination, i.v. urography and ultrasound in su-pine and erect position was made. There was statistical significant decrease of pain from  $6.5 \pm 1.055$  (SD) to  $2.4 \pm 1.577$  (SD) ( $p=0.000$ ), according to visual scale, and decrease of urinary tract infections ( $p=0.000$ ) in patients after laparo-scopic nephropexy. Average operative time was  $45.9 \pm 8$  (SD) min., and hospital stay  $3.4 \pm 0.7$  (SD) days. Reposition of the kidney was successful in 70 of 80 patients. Laparoscopic nephropexy importantly improved the quality of life in patients with symptomatic nephrop-tosis. Surgical procedure was safe and successful in most of the patients.*

**Key words:** nephrop-tosis, nephropexy, laparoscopic surgery, quality of life, pain, urinary tract infection

## Introduction

At the beginning of the 20<sup>th</sup> Century nephrop-tosis, of-ten referred also as floating kidney or movable kidney, was familiar and frequent diagnosis among urologists, general practitioners, other specialist and also patients<sup>1</sup>. Nephropexy was commonly performed operation in wo-men. Nearly 200 different surgical procedures were de-scribed<sup>2,3</sup>. Association between nephrop-tosis and »neuras-thenia« clouded objectivity of the data prior to 1920. Floated kidney was assumed as imaginary disease<sup>4-6</sup>.

In last 20 to 30 years the disease practically eclipsed in the United States and the physicians became unfamil-iar with nephrop-tosis<sup>7</sup>.

Recently, in last 12 years, laparoscopic surgical tech-niques have been applied to the treatment of symptom-atic nephrop-tosis and new interest arise for the study of the condition and the results of contemporary surgical therapy<sup>8,9</sup>.

Only symptomatic nephrop-tosis is relevant for the pa-tient and the physician. Displacement of the kidney has to be more than 5 cm down-ward in erect position as defi-nition of nephrop-tosis<sup>10</sup>. Flank or back pain in the erect position is most frequent manifestation of the condition,

urinary tract infections, proteinuria, erythrocyturia, even hypertension, nephrosclerosis, and Fraley's syndrome may be present and may be a consequence of nephrop-tosis<sup>11-14</sup>. Nephrosclerosis, nephrolithiasis and renal hy-pertension are not proven consequences of nephrop-tosis. The most severe manifestation of the condition is Dietl's crisis (severe colicky, flank pain, nausea, chills, tachycar-dia, oliguria, and transient hematuria or proteinuria)<sup>15</sup>.

First laparoscopic nephropexy was reported by Urban et al.<sup>16</sup>.

Quality of life was only marginally studied, especially in quantitative fashion, in the reported series of patients with symptomatic nephrop-tosis after nephropexy.

In Department of Urology, General Hospital Slovenj Gradec, Slovenia the first laparoscopic nephropexy was performed in March 1994.

Hypothesis of our study was that laparoscopic ne-phropexy is improving the quality of life of the patients, especially pain and even decreasing urinary tract infec-tions.

From March 1994 till December 2003 all patients undergoing laparoscopic trans-abdominal nephropexy due to symptomatic nephroptosis were prospectively followed looking operation, recovery after surgery, complications of the procedure, mobility of the kidney after surgery, patients' well being, pain scale and frequency of urinary tract infections.

## Patients and Methods

### Patients

From March 1994 till the end of December 2003 a laparoscopic trans-abdominal nephropexy was performed in 87 patients with symptomatic nephroptosis in General Hospital Slovenj Gradec, Slovenia. All the 87 patients were females. Average age was  $48 \pm 7.3$  (SD) years (range: 35–70). Average body weight was  $59.1 \pm 8.5$  (SD) kg (range: 46–85). In 10 patients there was left side nephroptosis and in 79 right side. Two patients have nephroptosis on both, right and left side.

Average duration of clinical symptoms of nephroptosis was  $3.1 \pm 1.4$  (SD) years (range: 1–13). There were 7 patients without urinary tract infection, 35 with 1 urinary tract infection per year and 45 patients with more than 1 urinary tract infection per year. 17 patients had arterial hypertension. According to the classification of hydronephrosis from Peters<sup>17</sup> there were 10 patients in class 0, 63 patients in class 1, and 14 patients in class 2. Orthostatic proteinuria was observed in 48 patients, and orthostatic erythrocyturia in 35 patients.

37 from 87 female patients had other urological conditions, 13 cystitis, 8 nephrolithiasis, 1 pyelonephritis, and 15 urinary stress-incontinence.

### Surgery

Indication for operating procedure was symptomatic nephroptosis for at least one year with descent of the kidney for 5 cm or more during posture changes from supine to erect position for 15 cm or more.

Laparoscopic trans-abdominal nephropexy was accomplished in 86 patients and retroperitoneal one in 1 patient.

Laparoscopic nephropexy was made in all the patients. Standard equipment for laparoscopic procedure was used<sup>7</sup>.

General endotracheal anaesthesia has been induced in all the patients.

Retroperitoneal approach was used according to the description of Rassweiler<sup>18</sup> in one case. In 86 patients trans-abdominal approach was used.

The patients were placed in a lateral decubitus position (45 degrees angle) with the operative side elevated. Three laparoscopic ports were placed: 10 mm along the umbilicus for telescope, 10 mm trocar paramedially below the costal margin, 5 mm trocar in the anterior axillary line at the level of iliac spine anterior superior.

When it was necessary, an additional 5 mm trocar was placed in a medial axillary line below the costal margin. We changed the ports' positions in case of adhesion in the part of cecum and ascendent colon. The peritoneum was incised in the line of Toldt approximately 10–15 cm down from the lower edge. The colon was mobilized medially, the operative preparation of the retroperitoneal musculature was done. Gerota's fascia was incised and the surgical preparation of the only lower pole of the kidney was performed. The kidney was fixed in its normal anatomic position using subcapsular suture with two 0 Vicryl (Ethicon) thread on the retroperitoneal muscles below the costal margin. We did not place drain after procedure. The peritoneum was closed by using the running suture with 4-0 Monocryl on cutting needle (Ethicon).

### Outcome measures

Ultrasound with measuring of resistance index was performed preoperatively in supine and erect position. Intravenous urography was made preoperatively and postoperatively. Mobility of the kidney was measured quantitatively.

Serum creatinine concentration was lower than 120  $\mu\text{mol/L}$  in all the patients.

Routine postoperative control was performed 4 weeks, 3 months and 6 months after surgery, ultrasound and i.v. urography was performed during the last control.

Pain was classified according to visual pain scale from 0 to 10 before surgery and six months after surgery<sup>19,20</sup>.

Urinary tract infections were diagnosed according to the criteria of Stamm and Hooton<sup>21</sup>, and Brumfitt and Hamilton-Miller<sup>22</sup>.

### Statistics

In the statistical analysis the following descriptive statistics were calculated: minimum, maximum, mean, standard deviation, and the following statistical methods were used: paired t-test to estimate the difference between two means, and the sign test of paired data.

Microsoft Excel 2000 was used for computational part of the analysis. This report was written by use Microsoft Word 2000.

## Results

In evaluating the possible changes of quality of life of patients with laparoscopic nephropexy 87 female patients with symptomatic nephroptosis were included in the study. Before surgical procedure average pain according to visual pain scale was  $6.5 \pm 1.055$  (SD). Most of the patients had at least 1 urinary tract infection per year (80 from 87), even 45 of them had more than one, and only 7 didn't have urinary tract infection before laparoscopic nephropexy. Average blood pressure before surgery was  $133 \pm 13/86 \pm 11$  mmHg (SD).

Average operative time of laparoscopic nephropexy was  $45.9 \pm 8$  (SD) min. Patients have been hospitalized for average  $3.4 \pm 0.7$  (SD) days. In 12 patients small

**TABLE 1**  
AVERAGE TIME OF LAPAROSCOPIC NEPHROPEXY, TIME TO RESUME NORMAL ACTIVITIES AND SUBJECTIVE AND OBJECTIVE EVALUATION OF OPERATIVE PROCEDURE

Operative time	45.9±8 (SD)	(31–67) min
Hospital stay	3.4±0.7 (SD)	(2–5) days
Time to resume every day activities	4–6 weeks	
Evaluation of success of surgery	Improvement	No changes
Subjective	68 patients	19 patients
Objective	79 patients	8 patients

**TABLE 2**  
PAIN, ACCORDING TO VISUAL PAIN SCALE (0–10) AND URINARY TRACT INFECTIONS PER YEAR BEFORE AND AFTER SURGICAL PROCEDURE

Pain	Before surgery	After surgery
	6.5±1.055	2.4±1.577*
Urinary tract infections per year:		
0	7	55**
1	35	30
>1	45	2

\*p=0.000; \*\*p=0.000, compared year before surgery with the year after surgery

haematomas have been found in the surrounding of trocar placement. 9 patients experienced moderate pain along right costal margin during first 2 days after surgery. It was possible to evaluate difference between the position of the kidney before and after laparoscopic nephropexy in 80 patients. Kidney was moved upwards on average 4.1±1.5 cm, maximally 6 cm. After the procedure we were classifying of the operated kidneys as non-mobile in 72 (83%), lightly mobile in 12 (14%), and moderately mobile in 3 (3%) patients. Patients needed 4–6 weeks to resume normal professional and domestic activities. Patient's subjective evaluation, based upon the pain showed improvement in 68 and no changes in 19 of them. Objective evaluation based on kidney position showed improvement in 79 and no changes in 8 patients (Table 1). After laparoscopic nephropexy average pain was reduced according to visual pain scale from 6.5±1.055 (SD) to 2.4±1.577 (SD) after surgery. The difference is highly statistically significant (p=0.000).

After laparoscopic nephropexy there were no urinary tract infections in 55 patients, 1 urinary tract infection in 30 patients, and more than one in 2 patients (Table 2). There was significant reduction of urinary tract infections after surgery (p=0.000).

## Discussion

Quality of life of our patients with symptomatic nephropexy improved significantly after laparoscopic nephropexy if compared with pre-surgical period. There was

improvement of general health-related quality of life (subjective evaluation), especially decrease of pain and also significant decrease of urinary tract infections.

Our results are in accordance with results of Matsui et al.<sup>23</sup> and Wyler et al.<sup>24</sup>. McDougall et al.<sup>8</sup> reported average 80 % improvement in the pain among 14 patients. Among 23 patients of Fornara et al.<sup>25</sup> pain intensity had improved in 21 patients 13 months after laparoscopic nephropexy.

Urinary tract infections are not generally followed in the biggest reported series of patients with nephropexy and also after laparoscopic nephropexy. We have observed important decrease of thus infections when we have compared one year period before and after surgery. Urinary tract infections do importantly affect quality of life of female patients.

Fornara et al. 1997 observed the urinary tract infections only in one of 9 patients<sup>25</sup>. Rassweiler et al. 2001 didn't find pyelonephritis among 11 patients after surgery<sup>26</sup>. McDougall et al. 2000 were treated recurrent urinary tract infection only in one of 14 patients<sup>8</sup>. Plas et al. 2001 didn't observe post-operative urinary tract infection among 17 patients<sup>11</sup>.

Surgical reposition of the ptotic kidney was completely successful in 70 from 80 patients. Results are in accordance with the data of McDougall et al. and others, generally reporting about 80 % success rate<sup>7,8,18</sup>.

In most articles describing the laparoscopic nephropexy in symptomatic nephropexy a similar technique was used, namely trans-abdominal approach<sup>27,28</sup>. Because of modification of the technique, using preparation only the lower pole of the kidney, time of surgery is shorter (mean 45.9 min.) than in most of the published series (range: 60–167 min.)<sup>25,29,30</sup>. Some authors are using foreign material and others fascial flap or muscle bands for fixation of the kidney<sup>31,32</sup>. Retroperitoneal approach seems to be much more difficult technique because of limited space during the surgery. The average operating time is at least 103 minutes<sup>25</sup>.

With the exception of some small haematomas and pain we didn't experience considerable complications among our patients. Although we did not use drainage, we didn't observe clinically manifested retroperitoneal haematomas, pneumothorax and surgical site infection. These results are comparable to the bigger series of similar operations<sup>7, 8</sup>.

All our patients had normal kidney function already before surgery if we had serum creatinine concentration as a marker. There was no hypertension among our patients.

Decrease of urinary tract infections among our patients was a consequence of surgery, but probably also of better medical care and prevention.

24-hour proteinuria and erythrocyturia, average blood pressure in standing position, possibly improved kidney histology and renal blood flow, and psychological indices of well-being are topics which were not adequately studied after laparoscopic nephropexy.

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## DA LI LAPARASKOPSKA NEFROPEKSIJA POBOLJŠAVA KVALITETU ŽIVOTA?

### SAŽETAK

U istraživanjima su proučavani kratkoročni i dugoročni efekti laparoskopске nefropeksije, na pacijentima oboljelim od nefroptoze. Uzorak je sadržavao 87 pacijenata, koji su tretirani laparoskopskom nefropeksijom u razdoblju od 1994. do 2003. godine. Kod 86 pacijenata je korišten trans abdominalan pristup, a kod jednog retroperitonealan. Vizualna ljestvica boli korištena je prije operacije i šest mjeseci nakon. U istom periodu je praćen serumski kreatinin, rađene su pretrage urina, urografija te ultrazvuk sprijeda i straga. Kod pacijenata nakon laparoskopске nefropeksije pronađene su statistički značajne razlike u boli prema vizualnoj ljestvici  $6.5 \pm 1.055$  (SD) do  $2.4 \pm 1.577$  (SD) ( $p=0.000$ ) i razlike u trans urinarnim infekcijama ( $p=0.000$ ). Svakodnevno operativno vrijeme bilo je  $45.9 \pm 8$  (SD) min., a ostanak u bolnici  $3.4 \pm 0.7$  (SD) dana. Transplatacija bubrega bila je uspješna u 70 do 80 pacijenata. Laroskopска nefropeksija potvrdila se kao bitna u osiguranju kvalitete života kod pacijenata sa simptomatičnom nefroptozom. Kirurške metode bile su sigurne i uspješne kod većine pacijenata.