

The Quality of Life after Laparoscopic Pyeloplasty due to Ureteropelvic Junction Obstruction: Assessment After Long Term Observation.

Wojciech Panek

Uniwersytet Medyczny im Piastow Slaskich we Wroclawiu

Dawid Janczak

Uniwersytet Medyczny im Piastow Slaskich we Wroclawiu

Marta Panek

Uniwersytet Medyczny im Piastow Slaskich we Wroclawiu

Urszula Szydełko

Uniwersytet Medyczny im Piastow Slaskich we Wroclawiu

Rafał Chrzan

Uniwersytet Jagiellonski w Krakowie Collegium Medicum

Mariusz Chabowski (✉ mariusz.chabowski@gmail.com)

Wroclaw Medical University <https://orcid.org/0000-0002-9232-4525>

Tomasz Szydełko

Uniwersytet Medyczny im Piastow Slaskich we Wroclawiu

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Abstract

Background: A change in the assessment of treatment effectiveness is currently observed. More and more emphasis is being placed on assessing the impact of treatment on patients' quality of life (QoL). Data on postoperative quality of life in patients undergoing pyeloplasty is scarce.

The aim of the study was to assess the quality of life of patients who had undergone laparoscopic pyeloplasty due to ureteropelvic junction obstruction.

Methods: The study group consisted of 95 patients who had consecutively undergone laparoscopic pyeloplasty due to ureteropelvic junction obstruction in a single center, between 2002 and 2009, from whom 26 consented to participate in a study. We evaluated their quality of life using WHOQOL-BREF questionnaire and an additional form, created by one of the authors, prepared to assess specifically health related quality of life after pyeloplasty. In all the patients, postoperative, functional outcome was assessed using diuretic renography.

Results: Mean follow-up time was 89.8 months. Overall, 96% of study patients were satisfied with the procedure and all of them would consent to another pyeloplasty if needed. Dissatisfaction of one patient was caused by an insufficient decrease in pain level. All the patients reported that the postoperative pain intensity did not significantly affect their life and professional activity.

Conclusions: Laparoscopic pyeloplasty is associated with excellent functional outcomes and - most of all - the majority of patients are satisfied with the treatment results. There seems to be no correlation between functional outcome and postoperative satisfaction.

Background

In all surgical disciplines, minimally invasive surgical techniques are gradually replacing open techniques. One of such procedures is pyeloplasty. Since 1993, when the first laparoscopic pyeloplasty was performed by Schuessler et al¹, as well as by Kavoussi and Peters², the minimally invasive method has become the gold standard of treatment. Its clinical effectiveness is indisputable and has been proven in many studies³⁻⁶.

Currently, in medicine, we observe a change in the assessment of treatment effectiveness. In addition to the functional or survival results, more emphasis is being placed on assessing the impact of treatment on patients' quality of life. There are many recognized, widely used therapeutic methods, the consequences of which, despite a good effect on survival or improvement in laboratory parameters, can cause a drop in the patient quality of life. Though UPJO (ureteropelvic junction obstruction) is a common condition with well-established treatment methods, data on postoperative quality of life in patients undergoing minimally invasive pyeloplasty is scarce⁷⁻⁹.

The authors present a retrospective study assessing health related quality of life, using a specially designed questionnaire and WHOQOL-BREF questionnaire, after laparoscopic pyeloplasty with long term follow-up. To the best of the authors' knowledge, no similar study has ever been published.

The Aim Of The Study

The aim of the study was to assess the quality of life of patients who had undergone laparoscopic pyeloplasty due to ureteropelvic junction obstruction.

Methods

The study group consisted of 95 patients who had consecutively undergone transperitoneal, unilateral laparoscopic pyeloplasty performed by one surgeon (T.S.), in a single center, between 2002 and 2009. The patients data was obtained retrospectively from hospital records. Patients with a horseshoe kidney were excluded from the study (1 patient). All the remaining patients were invited for this study, 26 of whom consented to participate.

Procedure description

Prior to surgery, all patients had undergone preoperative examinations such as ultrasonography (US), diuretic renography (DR), excretory intravenous urography (IVU) or computed tomography (CT) to confirm the diagnosis of UPJO. The upper limit of the half time to tracer clearance on DR (T1/2) for nonobstructive systems, according to the F + 20 protocol, was 12 min. T1/2 for obstructive systems was over 20 min. Values between 12 min and 20 min were regarded as equivocal. Patients scheduled for surgery were symptomatic (23 patients) with hydronephrosis, or asymptomatic (3 patients) with hydronephrosis plus UPJO in IVU/CT or plus T1/2 > 20 min on DR.

All procedures were performed laparoscopically by one experienced surgeon (T.Sz.) using three techniques: Anderson-Hynes pyeloplasty in 19 patients (73%), Y-V pyeloplasty in 6 cases (23%) or laparoscopic Fenger pyeloplasty – 1 patient (4%). The decision regarding the pyeloplasty method has been made intraoperatively after visualization of the anatomy of the ureteropelvic junction area. All the procedures were performed in the manner described in previous publications^{10–13}.

The Foley catheter was removed on the second postoperative day. The closed suction drain was removed on the next day, if the drainage was less than 25 ml per day. The double-J stent was removed 4 to 6 weeks after pyeloplasty. All procedures were performed more than 5 years before follow-up visits for this study.

Control visits

Each patient participating in this study was invited for 2 follow-up visits. During the first visit we asked patients to estimate their intensity of pain in the VAS scale prior to surgery, evaluated a patient's medical

history - presence of arterial hypertension, collected data about pyeloplasty and perioperative period (with emphasis on postoperative complications classified according to the Clavien-Dindo criteria), assessed current pain intensity using the VAS scale, performed ultrasound examination of the affected kidney and asked patients to fill in two questionnaires – the WHOQOL-BREF questionnaire, ver. 1996 and an additional form prepared to assess specifically health related quality of life (HRQoL) after pyeloplasty^{14–16}. The additional questionnaire was created by one of the authors (W.P.) and consisted of five questions. Two patients did not agree to fill in the WHOQOL-BREF questionnaire.

The following cut-off points on the VAS score were used: no pain (0–4 mm), mild pain (5–44 mm), moderate pain (45–74 mm), and severe pain (75– 100 mm)¹⁵.

The WHOQOL-BREF questionnaire consists of 26 questions and is the shorter variant of WHOQOL-100 (World Health Organization Quality of Life – 100 questionnaire). Two questions concern general quality of life and health status. The remaining questions are divided into four domains: somatic, psychological, social and environmental. All questions refer to a patient's feelings during 4 past weeks. The numerical score of each domain is adequate for individual perception of quality of life in this domain. The higher numerical score represents the better quality of life. The questionnaire form was adapted for Polish cultural, linguistic and psychometric conditions by Wołowicka and Jaracz¹⁶.

After the first follow-up visit patients underwent laboratory tests – complete blood count, electrolytes, creatinine level and estimated glomerular filtration rate as well as diuretic renography in the same (F + 20) protocol as prior to pyeloplasty.

The study design was approved by the Bioethics Committee of Wrocław Medical University (permit nr KB-458/2012).

Results

Out of 26 patients who consented to participate in the study 10 (38.5%) were male and 16 (61.5%) were female. Mean age at operation was 32.2 yo (range 16–56 yo). In 12 (46.2%) cases the crossing vessels were identified. The Anderson-Hynes method was used in 19 (73%) patients, Y-V pyeloplasty - in 6 (23%) and Fenger type – in 1 (4%). Detailed perioperative characteristics of the study group are presented in Table 1.

Table 1
Perioperative parameters

Gender (N, %)	Male	10 (38.46%)
	Female	16 (61.54%)
Age during operation mean, (range)		32.2 (16–56 yo)
Method (N, %)	Anderson-Hynes	19 (73%)
	Y-V	6 (23%)
	Fenger	1 (4%)
Site (N, %)	Left	14 (53.8%)
	Right	12 (46.2%)
Crossing vessels (N, %)	Present	12 (46.2%)
	Absent	14 (53.8%)
Time of operation (min) (mean)	With crossing vessels	185
	Without crossing vessels	203.21
	Anderson-Hynes	207.63
	Y-V	166.7
	Fenger	120
	Average	194.8

Within 6 weeks after the procedure, one significant complication in the study group was observed. It was perioperative peritonitis due to urine leakage treated by laparotomy. Additionally, 4 patients required a change of a JJ-stent (Table 2).

Table 2

Postoperative complications after laparoscopic pyeloplasty according to the Clavien-Dindo classification.

Clavien-Dindo grade	N (%)	Description	Treatment
I	5 (19.23%)	3 patients (11,53%) - pyrexia	Antipyretics
		2 patients (7,7%) - spontaneous prolapse of double J catheter	No treatment
II	1 (3.85%)	Asymptomatic urinary infection	Antibiotics
IIIa	4 (15.38%)	Obstruction of double-J catheter with or without pyrexia	Change of double-J catheter
IIIb	0	-	-
IVa	0	-	-
IVb	1(3.85%)	Peritonitis due to urine leakage	Laparotomy
V	0	-	-

Mean follow-up time was 89.8 months. Time from surgery to study follow-up visit was at least 5 years. In 23 out of 26 study patients T1/2 was less than 12 min on follow-up diuretic renography (DR). According to the VAS scale surgery resulted in a decrease in mean pain intensity from average 65 prior to pyeloplasty to 14 after the procedure. Detailed follow up outcomes are presented in Table 3.

Table 3
Follow-up results

Follow up (mean)	89.8 months – 7.48 years	
Age during control (mean, range)	39.27 (21–64 yo)	
Half time to tracer clearance on DR (N [%], mean)	T $\frac{1}{2}$ < 12 min	23 (88.5%), 5.58 min
	T $\frac{1}{2}$ > 12 min, < 20 min	2 (7.7%), 12.75 min
	T $\frac{1}{2}$ => 20 min	1 (3.85%), Not estimable
Half time to tracer clearance on DR depending on presence of CV (N, [%], mean)	Crossing vessel present	12, [46.2%], 4.65 min
	Crossing vessel absent	14, [53.8%] 6 min
Hydronephrosis visible on US (N, %)	Absent	8 (29.63%)
	Grade 1–2	11 (42.31%)
	Grade 3–4	7 (26.92%)
	Mean / median pelvis AP diameter	20.66 mm / 16.35 mm
	Preoperative	6.48
Pain relief (N, %, average reduction)	Postoperative	1.44
	Severe to mild	18 (69.23%), (VAS 75.5 to 11.6)
	Moderate to mild	3 (11.54%), (VAS 73.3 to 30)
	Severe to moderate	2 (7.69%), (VAS 85 to 50)
	Asymptomatic patients	3 (11.54%) (VAS 0 to 0)
DR – diuretic renography		

Overall, 96% of study patients were satisfied with the procedure and all of them would consent to another pyeloplasty if needed, even though some of them had suffered from post-operative complications. Dissatisfaction of one patient was caused by an insufficient decrease in pain level. All the patients reported that the postoperative pain intensity did not significantly affect their life and professional activity. One patient underwent the treatment of renal stones on the operated side one year after the procedure (3 x ESWL) (Table 4).

Table 4
Results of the additional questionnaire designed by one of the authors

Are you satisfied with outcome of the procedure?	YES	25 (96.15%)
	NO	1 (3.85%)
Will you consent, if you would have to undergo laparoscopic pyeloplasty again?	YES	25 (96.15%)
	NO	1 (3.85%)
How do you estimate your present degree of pain using VAS scale?	1.44	
Does pain significantly affect your life and professional activity?	Significantly	0
	Insignificantly	4 (15.4%)
	Not at all	22 (84.6%)
How many additional procedures due to complications after laparoscopic pyeloplasty have you underwent?	Antibiotic or antipyretic administration	3 patients
	Change of dJ catheter	4 patients
	Laparotomy	1 patient
	ESWL	1 patient

Two patients did not agree to fill in the WHOQOL-BREF questionnaire. The remaining members of the study group evaluated their quality of life as good (average 4 in 1–5 scale) and health condition as moderate (average 3.5 in 1–5 scale). Three (12.5%) patients were discontented with their health status (Tables 5 and 6).

Table 5
General subjective Quality of Life based
on the WHOQOL-BREF questionnaire

Score	Number of patients	%
1	0	0
2	0	0
3	4	16.7%
4	16	66.7%
5	4	16.7%

Table 6
Health Status based on the WHOQOL-
BREF questionnaire

Score	Number of patients	%
1	0	0
2	3	12.5%
3	6	25%
4	14	58.3%
5	1	4.16%

Among the study group, the social domain score was reported the highest – mean 77.4 points, psychological domain – mean 68 points, environmental domain – mean 65.5 points, and the lowest score was reported in physical domain – mean 54.1 points. (Table 7)

Table 7
Domains based on the WHOQOL-BREF questionnaire

Domain	Score		Average	Standard deviation
	min	max		
Physical Health	38	69	54.125	9.38
Psychological	44	88	68.041	10.33
Social Relationship	69	100	77.417	9.35
Environment	44	81	65.458	9.37

Discussion

Minimally invasive pyeloplasty is the gold standard for treatment of uretero-pelvic junction obstruction. Clinical outcomes are excellent with the improvement observed in 85–100% of patients. Similar results have been shown for different surgical approaches as well as for modifications to the original techniques^{10,12,17}. Our study correlates with this data – 88.5% of cases presented the correct urine passage from the renal pelvis into the ureter, confirmed in diuretic renography with F + 20 protocol, and 80.8% of all patients, which is 91.3% patients in symptomatic patients group, reported reduction of pain intensity to the mild level.

In our study group 3 patients did not have furosemide half-clearance time reduced to < 12 min (2 patients - T½ between 12 and 20 min – 12.5 min and 13 min, 1 patient - cumulative curve -T½ - not estimable). Each of these 3 patients, despite not showing expected outcomes, was satisfied with the results, probably because of the reduction in pain intensity, and for this reason they refused to participate in further procedures, preferring to remain under observation. A similar was observed in 18 patients with postoperative hydronephrosis (69.2%). All of these patients were satisfied with the results. In this group every patient had a good outcome (T½ <12 min) in diuretic renography.

Surprisingly, one patient who had reported dissatisfaction after the procedure, because of an insufficient decrease in pain intensity – from 100 to 50 in the VAS scale, had furosemide half-clearance time < 12 min and no hydronephrosis in ultrasound examination of the kidney.

Also, perioperative complications did not seem to have an impact on patients' satisfaction. Ninety-six percent of patients, including patients who suffered from complications – Clavien-Dindo I-IVb, would agree to another LP on the other side, if the indications occurred.

Surprisingly, the health domain score assessed in the WHOQOL-BREF questionnaire was only moderate (average 3.5 in 1–5 scale), even though the global QoL score was good (average 4 in 1–5 scale). This result might have been caused by other illnesses that were not evaluated during our study, but the average age of the study group (39.3 yo) does not support this hypothesis.

Sahai et al. showed that there is no difference between preoperative and postoperative physical QoL among patients who had underwent laparoscopic upper urinary tract surgery for benign conditions. However, there was a significant improvement in mental QoL after the procedure, which is thought to be caused by relief from emotional stress associated with pending surgery⁸.

In a paper comparing open and laparoscopic nephrectomy it was shown that postoperative QoL return to baseline values after at least 1 year was faster in the laparoscopic group¹⁸. In our study postoperative QoL was assessed at least 5-years after surgery. We can safely assume that the effect of patient bias caused by perioperative stress and pain due to the operation is negligible.

The obvious **limitation of this study** is the size of the research group, which is too small to perform a valuable, multifactorial analysis of the factors affecting the quality of life. We cannot reliably conclude, for example, how the surgical technique and/or the presence of crossing vessels affects QoL.

Low study recruitment rate (26 out of 95) could be caused by a fact that all of the surgeries were done in one of the reference centers, performing the highest number of pyeloplasties in Poland. Therefore, our patients often come from distant locations. Their willingness to participate in the study could be weakened by the need of personal arrival. Also, majority of study patients are young people (average age 31 years). These patients are usually reluctant to undergo control tests in the absence of symptoms.

It cannot be excluded that the reason for the lack of response to the study was the poor treatment result, but it does not seem to be the only and most important reason. The poor outcome of the surgery as a reason for refusal in our study seems to be unlikely, taking into account a high success rate that was shown in previous papers published by the authors^{10,11,17}. However, it is possible that patients who were satisfied with the outcome were more willing to participate in the study conducted by the center where surgery was performed compared to the patients who were dissatisfied.

It should also be pointed out that the data regarding preoperative and early postoperative period were gathered retrospectively. Additionally, the test developed by one of the authors and used in the study was not validated. Another limitation of our study is lack of preoperative assessment of HRQoL. WHOQOL-BREF questionnaire and additional questionnaire were given to the patients only in the follow up period. That is why it is impossible to statistically analyze the relation between change in pain intensity and HRQoL.

However, our study seems to be the first one that evaluates postoperative HRQoL post minimally invasive pyeloplasty after long term follow-up. Lack of similar publications makes it difficult to compare our outcomes with the results of others.

Conclusions

Laparoscopic pyeloplasty is associated with excellent functional outcomes and - most of all - the majority of patients are satisfied with the treatment results. There seems to be no correlation between functional outcome and postoperative satisfaction.

In the case of UPJO treated with pyeloplasty, postoperative pain relief was most likely the main factor associated with patients' satisfaction. We hope that the results of our study can help other urologists make therapeutic decisions in patients with UPJO.

Further large and randomized studies are needed to evaluate our findings and to find factors associated with better HRQoL outcomes.

Abbreviations

QoL - quality of life

WHOQOL-BREF questionnaire

UPJO - ureteropelvic junction obstruction

US - ultrasonography,

DR - diuretic renography,

IVU - excretory intravenous urography

CT - computed tomography

HRQoL - health related quality of life

VAS scale – visual analogue scale

JJ-stent - ureteric stent

ESWL - extracorporeal shock-wave lithotripsy

Declarations

1. Ethics approval and consent to participate. The study was approved by the Bioethics Committee of Wrocław Medical University (no KB-458/2012)
2. Consent for publication. Written informed consent in Polish was obtained from each patient.
3. Availability of data and materials. The datasets used in the study can be obtained from the corresponding author on request.
4. Competing interests. The authors declare that they have no competing interests.
5. Funding. No funding was received from any commercial or government source.
6. Author contributions.

WP - The acquisition, analysis, or interpretation of data for the work.

DJ - Drafting the work or revising it critically for important intellectual content.

MP - The acquisition, analysis, or interpretation of data for the work.

US - Drafting the work or revising it critically for important intellectual content,

RS - The acquisition, analysis, or interpretation of data for the work.

MC - Final approval of the version to be published.

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