

Patient's quality of life following open surgery and percutaneous nephrolithotomy for renal calculi: Short form-36 study

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ABSTRACT

Introduction: The aim of the study is to evaluate and compare the long-term quality of life in patients operated for kidney stones with either open stone surgery or percutaneous nephrolithotomy (PNL). **Materials and Methods:** Sixty patients (30 open surgery and 30 PNL) who have been operated were included in the study. Healthy group of 30 people was included as the control group. Quality of life evaluation was done using the short form-36. Linear regression analysis, Chi-square test, and ANOVA tests were used for the analysis of the data. **Results:** The mean age of patients was 48.9, 48.6, and 49.1 years consecutively in patients who underwent open renal stone surgery, PNL, and the control group ($P > 0.05$). Female to male ratio was 13/17 in both the open surgery group and PNL while this ratio was 12/18 in the control group ($P > 0.05$). Quality of life scores was statistically found to be similar in the open surgery group and PNL group ($P > 0.05$). A decrease in all scores except mental health with older ages was observed in patients who underwent either open or PNL surgery. The general health (GH) score was significantly less in the open surgery and PNL group when compared to the healthy control group. A significantly lower physical functioning, social role functioning, and role functioning score was observed in females. **Conclusion:** PNL and open stone surgery have similar long-term quality of life outcomes. Both of these surgical interventions cause a similar significant decrease in the GH perception in patients.

Key words: Kidney stone, percutaneous nephrolithotomy, quality of life, short form-36

INTRODUCTION

Current treatment options of renal stones are extracorporeal shock wave lithotripsy (SWL), percutaneous nephrolithotomy (PNL), retrograde internal surgery (RIRS), and open surgery. With the latest technological developments in SWL, PNL, and RIRS preference of open surgery as a treatment option has become less frequent (0.7–4%).^[1,2]

With the progress made in science during the past few decades, the quality of life issues has become a major concern in addition to effective treatment. Therefore, a growing interest and effort have been observed in developing effective tools to measure the well-being and quality of life of patients.^[3] The recent trend of effective quality of life evaluation is due to two major reasons. The first is the economic restrains and cost-effectiveness issues. The second is that there is no sensitive way to assess the thoughts of patients about the clinical efficacy of the treatment given.^[4]

The aim of this study is to evaluate and compare the quality of life outcomes of renal stone patients undergoing open or percutaneous stone surgery.

MATERIALS AND METHODS

Sixty patients who underwent open renal stone surgery ($n: 30$) or PNL ($n: 30$) and 30 control cases were included in the study.

Patients with a previous history of ipsilateral open renal surgery, SWL, and nephrostomy placement and diagnosis of acute pyelonephritis, solitary kidney, physical constraints, diabetes diagnosis of more than 5 years, hypertension (HT), chronic kidney disease, and renovascular HT were excluded from the study.

Pre-operative necessary blood work tests were conducted. Patients with an active urinary tract infection were treated for the infection with culture sensitive antibiotics before operation. Stone volume and localization were evaluated with either intravenous urography or computerized tomography.

Patients who accepted participation to the study were included. Within the post-operative 6th month 30 patients who underwent PNL and 30 patients who underwent open surgery were asked to fill in a quality of life form consisting of 36 questions. The same questionnaire was filled in by 30 healthy volunteers with similar age and gender ratio with the patients evaluated.

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Informed consent was retrieved from all patients and volunteers participating to the study. Forms were filled in during face-to-face interview.

Quality of life was evaluated with the short form-36 (SF-36) questionnaire developed by Ware *et al.* in 1987, which was validated to Turkish in 1999 by Kocyigit *et al.*^[5] The scoring system consists of eight scaled scores, which are the weighted sums of the questions in their section. Each scale is directly transformed into a 0–100 scale on the assumption that each question carries equal weight. Higher scores are indicative of a better health status.^[6] The eight sections are vitality, physical functioning (PF), bodily pain (BP), general health perceptions (GH), physical role functioning (RP), emotional role functioning (RE), social role functioning (SF), and mental health (MH).

Data were analyzed using the Chi-square test, ANOVA, and linear regression analysis. Results were analyzed according a 95% confidence interval and *P* values below 0.05 were defined as statistically significant.

RESULTS

The mean age of patients was 48.9, 48.6, and 49.1 years consecutively in patients who underwent open renal stone surgery, PNL, and the control group (*P* > 0.05). Female to male ratio was 13/17 in both the open surgery group and PNL while this ratio was 12/18 in the control group (*P* > 0.05).

Table 1: SF-36 form results of each group (quality of life index scores)

Groups	PF	VT	BP	GH	RP	RE	SF	MH
Open stone surgery group	85	67.6	84.9	59.9	80	78.9	83.7	75.7
PNL	87.8	67.7	87.5	61.8	82.5	78.9	84.6	75.7
Control group	89.3	70	89.6	69.1	84.2	85.6	83.3	78
Female	86.2	67.1	87	63	79.6	78.1	80.6	77.4
Male	88.2	88.3	87.6	64	84.1	83.4	86.3	75.8

PNL: Percutaneous nephrolithotomy, PF: Physical functioning, VT: Vitality, BP: Bodily pain, GH: General health, RP: Physical role functioning, RE: Emotional role functioning, SF: Social role functioning, MH: Mental health, SF-36: Short form-36

Table 2: Mean difference of scores between open surgery and PNL group

SF-36 questionnaire section	Mean difference of scores between two groups	P value
PF	-2.79	0.659
VT	-2.50	0.939
BP	-2.53	0.840
GH	-1.96	0.903
RP	0.00	1.000
RE	-0.83	0.994
SF	-0.02	1.000
MH	0.00	1.000

PNL: Percutaneous nephrolithotomy, PF: Physical functioning, VT: Vitality, BP: Bodily pain, GH: General health, RP: Physical role functioning, RE: Emotional role functioning, SF: Social role functioning, MH: Mental health, SF-36: Short form-36

Quality of life evaluations made with SF-36 health evaluation form results obtained in three groups is summarized in Table 1. In addition to the study groups, female and male scores have also been calculated and summarized in Table 1. Scores were compared between two surgical groups using the ANOVA and *post-hoc* Dunnett t-test. Mean scores of two groups were similar. In Table 2, the mean differences between open surgery and PNL groups have been listed. Mean scores of open surgery group and control group have been compared and the mean differences are summarized in Table 3. GH score was significantly lower in the open surgery group (mean difference: -9.2, *P* < 0.05). No difference was found in the remaining parameters (*P* > 0.05). Comparison of scores between PNL group and control group revealed a significant difference in GH score (mean difference: 7.26, *P* < 0.05). All remaining scores were similar in both groups (*P* > 0.05). Results have been summarized in Table 4.

Even though all average scores were found to be lower in females, significant differences were seen in only PF, SF, and RE scores. Linear regression analysis revealed that age and all scores except for MH were inversely associated (*P* < 0.05).

DISCUSSION

Our study has shown that open renal stone surgery and PNL have a similar effect on quality of life of patients.

Table 3: Mean difference of scores between open surgery and control group

SF-36 questionnaire section	Mean difference of scores between two groups	P value
PF	-4.33	0.226
VT	-4.16	0.748
BP	-4.73	0.327
GH	-9.23	0.014
RP	-2.33	0.609
RE	-0.41	0.999
SF	-6.63	0.329
MH	-2.26	0.555

PF: Physical functioning, VT: Vitality, BP: Bodily pain, GH: General health, RP: Physical role functioning, RE: Emotional role functioning, SF: Social role functioning, MH: Mental health, SF-36: Short form-36

Table 4: Mean difference of scores between PNL and control group

SF-36 questionnaire section	Mean difference of scores between two groups	P value
PF	-1.53	0.900
VT	-1.66	0.972
BP	-2.20	0.830
GH	-7.26	0.050
RP	-2.33	0.554
RE	-1.25	0.979
SF	-6.66	0.326
MH	-2.26	0.461

PNL: Percutaneous nephrolithotomy, PF: Physical functioning, VT: Vitality, BP: Bodily pain, GH: General health, RP: Physical role functioning, RE: Emotional role functioning, SF: Social role functioning, MH: Mental health, SF-36: Short form-36

Patient's perception of disease differs according to social status and environment they are in. Evaluation of quality of life with validated forms is an accepted approach. On the other hand, if the aim of the study is to evaluate the issue in detail, GH tests would be more helpful. These tests were developed to be used in clinical practice and population research studies. The SF-36 questionnaire consists of eight sections with 36 questions.^[5]

The SF-36 survey is a self-evaluation test and has been validated into Turkish. It is highly sensitive in evaluating the positive and negative aspects patients' health. A score for each section ranging from 0 to 100 is given.^[5] Previous studies have used the test to evaluate the quality of life in other urologic diseases. Hyperactive bladder,^[7] urinary incontinence,^[8] benign prostate hyperplasia,^[9] and prostate cancer^[10] are examples for these previous studies.

Limited literature has been published about the quality of life issues in patients with kidney stones.^[11-14] The first study to evaluate quality of life in kidney stone patients was published by Penniston and Nakada with a 189 patient series.^[11] According to the results of this study, BP and GH scores of kidney stone patients were significantly lower than the control group.^[11] In another study conducted by Bensalah *et al.*, a statistically significant difference was observed in five (PF, RP, GH, RE, and SF) parameters of patients with kidney stones when compared to healthy control patients.^[13] In a study conducted by Santios *et al.*, the RE and MH scores improve in long-term follow-ups.^[14] In our study, a lower GH score was observed in both surgical groups when compared to the healthy control group patients. However, no difference was observed in the remaining parameters. The common parameter that was significantly lower in long-term follow-ups in patients who underwent kidney surgery in the mentioned studies and our study is GH. It is evident that stone surgery decreases the long-term GH perception in patients.

In the study of Bensalah *et al.*, a decrease in the quality of life scores was observed in with an increase in age, however, this no such results were obtained in the study of Penniston and Nakada. Similar to the study results of Bensalah *et al.*, a negative correlation was observed between age and quality of health. In other studies conducted the quality of life scores were found to be higher in young population when compared to the old population (Fujisawa *et al.*, 2000; Balaska *et al.*, 2006). Contrary to our study and the mentioned study results no relationship with age and quality of life scores was reported in the studies of Humar *et al.* and Ponton *et al.* Quality of life and age relationship results in the literature are unclear. A higher incidence of diseases in the aged population and social factors such as being retired may be the reason why a lower quality of life score was seen in the aged group of patients in our study.

In our study, no difference in quality of life scores was identified between patients who underwent open surgery and PNL. However, in both of these groups, the GH scores were lower than the control group population. These results are representative of long-term scores and it is not possible to comment on the change occurring during time after surgery since the study did not evaluate the post-operative short-term results of patients.

Usually, the quality of life scores in the general population of males is higher than females.^[15-19] In our study, all parameters of quality of life scores were higher in males than they were in females. Statistical significance was observed in PF, SF, and RE

scores. Many studies have tried to elucidate the reasons of why females score less than males. Some of these studies concluded that a higher tendency of females developing depression and a low social support for females could be the reasons of the lower score observed in females (Ogutmen *et al.*, 2006; Pinar *et al.*, 2004; Akman *et al.*, 2004).

CONCLUSION

PNL and open stone surgery have similar quality of life outcomes. Both of these surgical interventions cause a similar significant decrease in the GH perception in patients. Further studies that would include a short-term evaluation in addition to long-term evaluations would be beneficial.

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