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Quality of life in patients early after surgery

Kvalitet života bolesnika u ranom postoperativnom toku

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Abstract

Background/Aim. Quality of life in patients early after elective surgery is related to postoperative pain and recovery rate. The aim of this study was to compare immediate preoperative and early postoperative quality of life after three common elective surgical interventions in hospital settings. **Methods.** Population of this prospective cohort study included patients who underwent one of the three surgical interventions: elective laparoscopic cholecystectomy (n = 40), open inguinal hernia repair (n = 40) or excision of pilonidal sinus (n = 40). Primary outcome of the study was quality of life measured once-daily, starting from the day before surgery, and then each postoperative day. It was measured by visual analogue scale (VAS) and by Serbian translation of short questionnaire on quality of life developed by World Health Organization. **Results.** Postoperative quality of life dropped to the lowest level on the first postoperative day, regardless of the type of surgery. The drop was the most pronounced in physical and psychological aspects of quality of life (e.g. after cholecystectomy from 15.4 ± 2.5 to 12.5 ± 2.0, and from 15.9 ± 2.0 to 14.9 ± 2.1, respectively) while social and environmental aspects were the least affected by the surgery (e.g., after excision of pilonidal sinus from 16.3 ± 2.6 to 15.7 ± 2.1, and from 14.3 ± 2.6 to 14.1 ± 2.2, respectively). Quality of life was rapidly restored on the second postoperative day, and on the last day before discharge of the patient from hospital it surpasses preoperative level (e.g., after open inguinal hernia repair from 14.6 ± 3.6 to 15.2 ± 3.0. **Conclusions.** Minor elective surgical interventions are associated with only moderate (less than 25%) and short (one day) immediate postoperative decrease in quality of life, which is followed by increase on discharge from hospital to the levels, higher than preoperative one.

Key words:
surgical procedures, operative; quality of life; pain, postoperative; postoperative period; surveys and questionnaires.

Apstrakt

Uvod/Cilj. Kvalitet života bolesnika u ranom postoperativnom toku posle elektivnih operacija povezan je sa postoperativnim bolom i brzinom oporavka. Cilj ove studije bio je da uporedi kvalitet života bolesnika u neposrednom postoperativnom periodu posle tri česte elektivne hirurške intevencije u bolničkim uslovima. **Metod.** Populaciju ove prospektivne kohortne studije činili su bolesnici podvrgnuti jednoj od sledećih hirurških intervencija: elektivna laparoskopska holecistektomija (n = 40), otvorena operacija preponske kile (n = 40) ili ekscizija pilonidalnog sinusa (n = 40). Primarni ishod studije bio je kvalitet života meren svakodnevno, počev od dana koji prethodi operaciji, a zatim svakog postoperativnog dana. Kvalitet života bio je meren vizuelnom analognom skalom (VAS) i prevodom na srpski Kratke forme upitnika za kvalitet života Svetske zdravstvene organizacije. **Rezultati.** Postoperativni kvalitet života opao je na najniži nivo prvog postoperativnog dana, bez obzira na vrstu hirurške intervencije. Pad je bio najizraženiji u fizičkom i psihološkom domenu upitnika (npr. posle holecistektomije sa 15,4 ± 2,5 na 12,5 ± 2,0 i sa 15,9 ± 2,0 na 14,9 ± 2,1, po redosledu), dok su socijalni i domen okruženja bili najmanje pogođeni operacijom (npr. posle ekscizije pilonidalnog sinusa sa 16,3 ± 2,6 na 15,7 ± 2,1, i sa 14,3 ± 2,6 na 14,1 ± 2,2, po redosledu). Kvalitet života se brzo vratio na početni nivo drugog postoperativnog dana, da bi poslednjeg dana pred otpust iz bolnice postigao viši nivo od preoperativnog (npr. posle otvorene operacije preponske kile sa 14,6 ± 3,6 na 15,2 ± 3,0). **Zaključak.** Manje elektivne hirurške intervencije su praćene umerenim (ispod 25%) i kratkim (jedan dan) neposrednim postoperativnim smanjenjem kvaliteta života, za kojim sledi porast sve do nivoa višeg od preoperativnog, na otpustu iz bolnice.

Ključne reči:
hirurgija, operativne procedure; kvalitet života; bol, postoperativni; postoperativni period; upitnici.

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Introduction

Quality of life is one of the most important outcomes of surgery which is increasingly used for comparing efficacy and safety of alternative treatment strategies. Quality of life has five key dimensions which reflect capability of patients to conduct certain functions: moving, self-care, performing usual activities, presence of pain and other complaints, and presence of anxiety or depression [1]. Although there are several generic instruments which could be used for measuring quality of life after surgery, like Short Form Health Survey (SF-36), Euro QoL Five Dimensions Questionnaire (EQ 5D) and the World Health Organization Quality of Life (WHO-QOL-BREF) [2–4], the last one is more comprehensive than EQ 5D and could be used without cost (unlike SF-36). Reliability and validity of the WHOQOL-BREF have been recently tested in Serbian population [5].

Quality of life in patients early after surgery is related to postoperative complications, pain and recovery rate [6]. Several other factors were also shown to be associated with quality of life early after surgery such as: type of surgery, type of anesthesia, age and sex of the patients, mechanical ventilation, duration of surgery, co-morbidities, methods of postoperative pain management, etc. [7–9].

Although it was shown that quality of life early after surgery gradually increases throughout the postoperative period, rate of increase is still unknown for majority of surgical techniques [10, 11]. Besides, relation of immediate preoperative and early postoperative quality of life is also unknown, as well as the factors associated with [12].

The aim of this study was to compare immediate preoperative and early postoperative quality of life after three common elective surgical interventions in hospital settings: laparoscopic cholecystectomy, open inguinal hernia repair and excision of pilonidal sinus.

Methods

The study design

The study design was of prospective cohort type, with three parallel cohorts: the patients undergoing elective laparoscopic cholecystectomy, open inguinal hernia repair or excision of pilonidal sinus. It was conducted at the single center (Surgery Clinic, Military Medical Academy, Belgrade, Serbia) from January to June 2016. The study obtained approval prior to commencement from the Ethics Committee of Military Medical Academy, Belgrade.

Population and the sample

The study population included patients who were admitted to Surgery Clinic and then underwent one of the three surgical interventions during the study period, if the following inclusion criteria were met: age over 18 years, signed informed consent for participation in the study, elective nature of surgery and full consciousness and accountability throughout the study. The exclusion criteria were: refusal to sign informed consent, pregnancy, history of major mental diseases, dementia, mental retardation and pre- or postoperative delirium. The study sample was consecutive and the cohorts were locked once the pre-defined number of participants was reached.

The study outcome and variables

Primary outcome of the study was quality of life measured once-daily, starting from the day before surgery, and then each postoperative day. Quality of life was measured by visual analogue scale (VAS) and by Serbian translation of short form of quality of life questionnaire (with 26 questions) developed by World Health Organization (WHOQOL-BREF). The questionnaire has 4 domains (physical health, psychological, social relationships and environment) and the first two questions are integrated in general estimate of quality of life. The responses are transformed to the scale with minimum (zero) and maximum (20 points) quality of life. Previously validated Serbian translation of the questionnaire was obtained from the World Health Organization with permission to use it in this study. The questionnaire was administered by the investigators. The VAS scale was presented to the patients as a line 100 mm long drawn on the paper, marked at the beginning with 0 and at the end with 100 and patients were asked to show with a pencil the point on the line which reflected their overall quality of life at that moment. Secondary outcomes of the study were duration of hospitalization and rate of postoperative complications.

The following independent and potentially confounding variables were collected from the patient files: age, sex, level of education, marital status, diagnosis, type of surgical intervention, duration of surgery, type of anesthesia (general inhalational or local infiltrative), utilization of postoperative analgesia [either ketorolac (i.m., i.v.), diclofenac (i.m., i.v.) or paracetamol (i.v.)], postoperative headache and postoperative day when a patient started oral intake.

Sample size calculation

Sample size was calculated using G-Power software, version 3.1 [13]. In the study of Acar et al. [14] significant difference was noted in quality of life of patients operated on with two different surgical techniques (58.78 ± 15.85% in one and 70.31 ± 19.38% in another group). Based on the effect size calculated from the study [14], and using two-sided Student's *t*-test, with expected power of the study of 80% and probability of type I error of 0.05, minimal size of each of the study cohorts was 38 patients.

Statistics

Descriptive statistics of the study data included measures of central tendency (mean and median), measures of variability (standard deviation) and percentages. Normality of data distribution for each of the variables was tested by Shapiro-Wilk's test. When normality was confirmed, differences among the cohorts were tested by one-way ANOVA,

and for the opposite nonparametric Kruskal-Wallis analysis of variance was used. Also, when normality of the data distribution was confirmed, differences in the same variable among the days of follow-up were tested by one-way repeated measures ANOVA, and for the opposite Friedman's test was used. Tamhane *post-hoc* test was used to make pairwise comparison among the groups with nomal distrubution of data, and for the opposite Wilcoxon matched pair sign test was used. A multiple linear regressions were calculated for each cohort to predict general estimate of quality of life on the last day of follow-up (before the patients were discharged from hospital). The results were considered significant if probability of null hypothesis was less than 0.05. All calculations were made by the SPSS software, version 18.

Results

The three study cohorts included 40 patients each. Characteristics of the patients within the study cohorts are shown in the Table 1.

The quality of life in all three cohorts, as measured by VAS, general estimate and by the four domains dropped on the first postoperative day relative to preoperative estimate, and then increased above the preoperative level on postoperative days two and three (Table 2). While the quality of life preoperatively was the highest in patients awaiting inguinal hernia repair, it reached the highest values in patients who underwent excision of pilonidal sinus postoperatively (Table 2).

A multiple linear regressions were calculated for each cohort to predict general estimate of quality of life on the last day of follow-up (before the patients were discharged from hospital) by the first two questions of WHOQOL-BREF, based on sex, age, duration of surgery, postoperative headache and onset of oral intake after the surgery. The regression for cholecystectomy cohort was not significant ($F = 1.274$; $p = 0.301$) and explained only 14.1% of variability ($R^2 = 0.141$) in quality of life based on the following predictors: sex ($B = -0.048$; $p = 0.953$) age ($B = -0.043$; $p = 0.092$), duration of surgery ($B = -0.060$; $p = 0.194$) and postoperative headache ($B = 1.119$; $p = 0.188$). The regression for hernia repair cohort was not significant ($F = 1.979$; $p = 0.120$) and explained 30.1% of variability ($R^2 = 0.301$) in quality of life based on the following predictors: sex ($B = -0.576$; $p = 0.674$) age ($B = -0.104$; $p = 0.071$), duration of surgery ($B = 0.136$; $p = 0.152$), postoperative headache ($B = 1.083$; $p = 0.538$) and onset of oral intake after the surgery ($B = -2.333$; $p = 0.279$). Finally, the regression for pilonidal sinus cohort was not significant ($F = 0.852$; $p = 0.508$) and explained 14.0% of variability ($R^2 = 0.140$) in quality of life based on the following predictors: sex ($B = 0.688$; $p = 0.572$) age ($B = 0.130$; $p = 0.173$), duration of surgery ($B = 0.056$; $p = 0.411$) and postoperative headache ($B = -1.027$; $p = 0.366$).

Discussion

Our study showed that postoperative quality of life drops to the lowest level on the first postoperative day, regardless of the type of surgery. The drop is the most pronounced in physical and psychological aspects of quality of life, while social and environmental aspects are the least affected by the surgery. Although statistically significant, the decrease of quality of life on the first postoperative day is moderate, and never overcomes 25% of the preoperative level. Quality of life also is rapidly restored on the second postoperative day, and on the last day before discharge of the patient from hospital it surpasses preoperative level. No predictors of postoperative quality of life were found in our study.

Table 1

Characteristics of the patients within the study cohorts

Characteristics	Laparoscopic cholecystectomy (n = 40)	Open inguinal hernia repair (n = 40)	Excision of pilonidal sinus (n = 40)
Sex: male/female, n	18/22	30/10	31/9
Age (years), mean ± SD	55.3 ± 16.1	56.7 ± 14.1	27.3 ± 6.9
Duration of surgery (minutes), mean ± SD	62.5 ± 8.2	52.2 ± 6.1	34.8 ± 7.1
Education level, n elementary/high school/higher education	11/16/13	12/12/16	5/17/18
Marital status, n married/unmarried	31/9	27/13	12/28
Type of anesthesia, n general inhalatory/local infiltrative	40/0	40/0	0/40
Use of postoperative analgesia, n yes/no	40/0	40/0	40/0
Complications of surgery, n yes/no	0/40	1/39	3/37
Length of hospitalization, n 2 days/3 days/4 days/5 or more days	4/25/10/1	0/11/18/11	14/23/1/2
Postoperative headache, n yes/no	21/19	26/14	19/21
Onset of oral intake, n 1st day/2nd day	0/40	7/33	5/35

n – number of patients; SD – standard deviaton.

Table 2

Quality of life estimates by day and surgical intervention (mean ± standard deviation)

Type of intervention and outcome measure	Preoperative day	First postoperative day	Second postoperative day	Third postoperative day	Significance of difference
Laparoscopic holecystectomy (n = 40)					
VAS (0 – 100)	63.0 ± 17.3	51.5 ± 19.2	63.6 ± 14.8	69.1 ± 18.1	p = 0.000* $Wilcoxon_{p,1}$: p = 0.002 $Wilcoxon_{1,2}$: p = 0.000 $Wilcoxon_{1,3}$: p = 0.003 $Wilcoxon_{2,3}$: p = 0.034
General estimate (0 – 20)	14.1 ± 2.3	12.6 ± 2.9	13.8 ± 2.3	13.6 ± 3.1	p = 0.001* $Wilcoxon_{p,1}$: p = 0.005 $Wilcoxon_{1,2}$: p = 0.002
Physical health (0 – 20)	15.4 ± 2.5	12.5 ± 2.0	14.4 ± 1.9	14.1 ± 2.3	p = 0.003* $Wilcoxon_{p,1}$: p = 0.000 $Wilcoxon_{p,2}$: p = 0.010 $Wilcoxon_{1,2}$: p = 0.000 $Wilcoxon_{1,3}$: p = 0.038
Psychological (0 – 20)	15.9 ± 2.0	14.9 ± 2.1	15.7 ± 1.8	15.2 ± 2.3	p = 0.018* $Wilcoxon_{p,1}$: p = 0.003 $Wilcoxon_{1,2}$: p = 0.006
Social relationships (0 – 20)	15.4 ± 2.2	14.9 ± 2.3	14.9 ± 2.3	14.2 ± 1.9	p = 0.197
Environmental (0 – 20)	14.4 ± 1.9	13.8 ± 1.7	14.3 ± 1.4	13.7 ± 1.6	p = 0.001* $Wilcoxon_{p,1}$: p = 0.011 $Wilcoxon_{p,3}$: p = 0.035 $Wilcoxon_{1,2}$: p = 0.005
Excision of pilonidal sinus (n = 40)					
VAS (0 – 100)	61.8 ± 24.7	62.3 ± 21.8	78.1 ± 17.4	-	p = 0.007* $Tamhane_{p,2}$: p = 0.006 $Tamhane_{1,2}$: p = 0.006
General estimate (0 – 20)	13.9 ± 3.7	13.6 ± 3.0	15.8 ± 2.5	-	p = 0.018* $Tamhane_{p,2}$: p = 0.047 $Tamhane_{1,2}$: p = 0.005
Physical health (0 – 20)	15.2 ± 3.2	13.5 ± 2.3	14.9 ± 2.0	-	p = 0.029* $Tamhane_{1,2}$: p = 0.047
Psychological (0 – 20)	16.7 ± 2.0	16.5 ± 2.0	17.3 ± 2.0	-	p = 0.260
Social relationships (0 – 20)	16.3 ± 2.6	15.7 ± 2.1	16.5 ± 2.3	-	p = 0.472
Environmental (0 – 20)	14.3 ± 2.6	14.1 ± 2.2	15.4 ± 2.0	-	p = 0.078
Open inguinal hernia repair (n = 40)					
VAS (0 – 100)	70.5 ± 20.0	53.1 ± 20.8	65.9 ± 20.2	73.3 ± 22.0	p = 0.000* $Tamhane_{p,1}$: p = 0.002 $Tamhane_{1,2}$: p = 0.043 $Tamhane_{1,3}$: p = 0.002
General estimate (0 – 20)	14.6 ± 3.6	12.4 ± 2.6	14.0 ± 2.7	15.2 ± 3.0	p = 0.000* $Wilcoxon_{p,1}$: p = 0.001 $Wilcoxon_{1,2}$: p = 0.000 $Wilcoxon_{1,3}$: p = 0.000 $Wilcoxon_{2,3}$: p = 0.001
Physical health (0 – 20)	16.1 ± 2.8	13.5 ± 2.5	14.8 ± 2.1	15.4 ± 2.8	p = 0.000* $Tamhane_{p,1}$: p = 0.000 $Tamhane_{1,3}$: p = 0.039
Psychological (0 – 20)	16.5 ± 2.3	15.4 ± 2.1	16.1 ± 2.5	17.1 ± 2.5	p = 0.020* $Tamhane_{1,3}$: p = 0.020
Social relationships (0 – 20)	15.9 ± 2.5	14.5 ± 2.1	14.8 ± 2.1	15.7 ± 2.1	p = 0.019* $Tamhane_{p,1}$: p = 0.070
Environmental (0 – 20)	14.6 ± 2.1	13.6 ± 2.2	13.8 ± 2.0	14.3 ± 2.2	p = 0.139

*** significant difference among the days of measurement; VAS – Visual Analogue Scale.**

Since postoperative pain is one of the most important determinants of early postoperative quality of life, it is not surprising that we found sudden drop of quality of life on the first postoperative day, and then restoration on as early as the next postoperative day. In the study of Saadati et al. [15] postoperative pain after laparoscopic cholecystectomy was about 2.5 (on VAS scale from 0 to 10) on the first postoperative day, only to drop to 1.7–1.3 on the second postoperative day and to less than 0.2 on the third postoperative day. Ciftci et al. [16] showed similar experience with open inguinal hernia repair: the patients reported significant pain on the first postoperative day (about 5.7 on VAS scale from 0 to 10), only to leave the hospital on the second day without significant complaints on pain. Patients who underwent excision of pilonidal sinus in the study of Tavassoli et al. [17] scored postoperative pain in the first day 4.7 ± 1.6, and only 1.9 ± 1.2 on the fourth postoperative day.

With minor elective operations which do not alter physiological functions of the patients significantly, postoperative pain is the most pronounced on the first postoperative day and then rapidly dissipates in the next few days; quality of life tightly follows these changes, as we noted in our study.

Only moderate drop in quality of life on the first postoperative day and rapid restoration on the second one observed in our study could also be explained by early gain of mobility, independence of medical aid and early return to everyday activities achieved with laparoscopic cholecystectomy and other two investigated operations. In the study of Lezana-Perez et al. [18], the patients were discharged from hospital as early as on average 1.49 days after laparoscopic cholecystectomy returning immediately to their normal life activities.

It is not surprising either that quality of life on the day of discharge from hospital is higher than preoperatively. The patients are cured with these elective operations, and old complaints are no longer present, as given in the study of Pierides et al. [19], who showed increase in quality of life after open inguinal hernia repair in elderly patients. Similar was demonstrated in the study of Ertan et al. [20] with quality of life in patients after excision of pilonidal sinus.

The main limitation of our study is its uni-centeredness, so the results are dependent on the skills of operating teams within the institution where the study was done. Cognitive status was assessed by the investigators on clinical grounds, instead of conducting Mini Mental test, so certain degree of subjectivity could not be ruled out. Besides, follow-up of the patients was limited to their hospital stay, since we lacked resources to follow the patients at their homes or in outpatient facilities.

Conclusion

Our study showed that minor elective surgical interventions (elective laparoscopic cholecystectomy, open inguinal hernia repair or excision of pilonidal sinus) are associated with only moderate (less than 25%) and short (one day) immediate postoperative decrease in quality of life, which is followed by increase in quality of life on discharge from hospital to the levels higher than preoperative.

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