

Research Article
Open Access

Quality of Life, Support before and after Surgery which Cholelithiasis by Laparoscopic and Traditional Methods

 E Laska^{1*} and E Musz²
¹Collegium Medicum, Faculty of Health Sciences, Andrzej Frycz Modrzewski University, Krakow, Poland

²University Hospital, Krakow, Poland

***Corresponding author**

Edyta Laska, Collegium Medicum, Faculty of Health Sciences, Andrzej Frycz Modrzewski University, Krakow, Poland.

Received: February 15, 2025; **Accepted:** February 18, 2025; **Published:** February 28, 2025

ABSTRACT

Introduction: Laparoscopic cholelithiasis is a common surgical procedure worldwide and remains the golden standard for the treatment of mild diseases of the gallbladder and bile ducts. The aim of this study was to assess the quality of life, social support of patients before and after surgery with gallstones treated laparoscopically and traditionally.

Methods: The study was conducted in 96 patients with gallbladder stones treated surgically with laparoscopic and traditional methods at the Department of General, Oncological and Minimally Invasive Surgery of the Stefan Zoromski Specialist Hospital in Kraków from March to December 2024. Approval was obtained from the bioethics committee to conduct the study.

The study was conducted using a diagnostic survey method with standardized research tools: The World Health Organization Quality of Life and Multidimensional Scale of Perceived So-cial Support.

Statistical analysis was done using IBM SPSS software. Differences between the two groups were compared using the Mann-Whitney test. Differences between pre- and post-treatment post-measures on the same scales were tested using Wilcoxon tests for dependent samples. A $p < 0.05$ was used as the limit of the significance level.

Results: Statistically significant differences were found between laparoscopic and traditional surgery types for the somatic domain before surgery and all domains after surgery assessing quality of life. All domains had higher values in the laparoscopically operated group. Statistically significant differences were found between pre- and post-operative measurements for social support, where higher values were found after surgery. No significant differences in quality of life were shown when analyzing all domains between pre- and post-operative measurements.

Conclusions: Laparoscopically operated patients showed higher values for the somatic domain before surgery, as well as for all domains after surgery, compared to traditionally operated patients. Patients after surgery for gallbladder stones were shown more support from relatives, family and friends, compared to patients before surgery.

Keywords: Cholelithiasis, Laparoscopic Surgery, Traditional Surgery, Quality of Life, Social Support

QOL: Quality of Life

PGWB: The Psychological General Well – Being Index

GIQLI: Gastrointestinal Quality of Life Index

Abbreviations

MIS: Minimally Invasive Surgery

CVS: Critical View of Safety

ICG: Indocyanine Green

DLC: Difficult Laparoscopic Cholecystectomy

3D: Three-Dimensional

2D: Two-Dimensional

SAGES: Society of American Gastrointestinal and Endoscopic Surgeons

IBM SPSS: IBM Statistical Package for the Social Sciences

WHOQOL: The World Health Organization Quality of Life

MSPSS: Multidimensional Scale of Perceived Social Support

Introduction

Cholecystectomy is the definitive treatment for patients with symptomatic cholelithiasis. Since the introduction of laparoscopic cholecystectomy in the 1990s, the rate of cholecystectomy in Australia has increased to 24% compared with the pre-laparoscopic era. Minimally invasive surgery (MIS) has been shown to have significant co-benefits in terms of aesthetic outcomes, reduced post-operative morbidity and mortality, shortened hospital stay, significantly reduced rates of wound infection and pneumonia, and early return to normal activity [1].

Laparoscopic cholecystectomy is the predominant treatment for patients with gallstones in the United States, with approximately 700 000 such operations performed each year. While complicated cholelithiasis (i.e. cholecystitis, biliary pancreatitis) is an indication for cholecystectomy by the traditional method, there is no consensus for patients with uncomplicated symptomatic cholelithiasis as to the benefit of laparoscopic surgery [2].

Cholecystectomy is one of the most commonly performed abdominal surgical procedures to-day. More than 80% of them are performed laparoscopically in Europe and the United States of America. Various studies have shown that conversion to open surgery during laparoscopic surgery was influenced by many aspects, such as patient factors, gallbladder pathology and surgeon factors. Various measures have been implemented to prevent conversion to open procedures. One systematic review recommends focusing on appropriate dissection techniques along with basic principles of biliary surgery to achieve a critical view of safety (CVS). Similarly, a meta-analysis showed that intraoperative use of near-infrared fluorescence cholangiography with indocyanine green (ICG) significantly reduced bile duct injury [3].

Laparoscopic cholecystectomy may be considered difficult if the operation takes longer than sixty minutes or if the cystic artery is damaged before ligation or clipping. Anticipating a difficult laparoscopic cholecystectomy can help the surgeon prepare for intraoperative challenges, such as adhesions in the Calot's triangle, damage to the cystic artery or bile stone spillage. Difficult laparoscopic cholecystectomy (DLC) occurs in approximately 2-7% of laparoscopic cholecystectomy procedures. Previous studies have identified prognostic factors for difficult laparoscopic cholecystectomy, which are male sex, advanced age, acute and chronic cholecystitis, obesity, liver cirrhosis and surgical experience. There are some scales that assess the risk of conversion from laparoscopic to open surgery, but few scales that predict difficult laparoscopic cholecystectomy [4].

Over the past 20 years, there have been significant technological developments in minimally invasive instrumentation and video capture devices, with the general consensus being that this has improved patient outcomes.

One of the advances in minimally invasive surgery has been the development of three-dimensional (3D) visualisation systems that provide stereopsis.

Traditionally, laparoscopic surgery has used two-dimensional (2D) visualisation systems, which do not provide depth perception. Therefore, 3D cameras have been designed to improve the visual experience during surgery, and although many surgeons claim that these advantages lead to better surgical images and better patient outcomes, the objective of confirming this hypothesis is difficult [1].

According to the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) 'Guidelines for the Clinical Use of Laparoscopic Biliary Surgery', the use of a gallbladder extraction bag is entirely at the surgeon's discretion. In general, plastic bags should be used when gallbladder cancer is suspected, to minimise the spread of cancer cells, or in cases of acute cholecystitis, to avoid spillage of gallbladder contents, including possible infected bile, stones or pus. Although one study found that when cholecystectomy is performed for gallstones, surgeons opt for a

plastic bag only in cases of large gallstones, severe inflammation or gallbladder swelling [5].

The aim of this study was to assess the quality of life and social support of patients before and after surgery for gallstones treated by laparoscopic and traditional surgery.

Materials and Methods

The study was conducted in 96 patients with gallbladder stones treated surgically using laparoscopic and traditional methods at the Department of General, Oncological and Minimally Invasive Surgery of the Stefan Żeromski Specialist Hospital in Kraków from March to December 2024. The consent of the bioethics committee (KBKA 33/0/2024) was obtained prior to the study. Patients gave written informed consent to participate in the study, which targeted patients before surgery and after surgery (immediately before the patient was discharged home).

The method of patient recruitment was that every patient who was admitted to the ward with a diagnosis of cholelithiasis and was qualified for laparoscopic or traditional surgery and gave written informed consent for the study and the processing of personal data was recruited into the study.

Inclusion criteria for the study group included patients who gave written informed consent to participate in the study preoperatively, postoperatively and completed post-legal questionnaires. On the other hand, the criteria for exclusion from the study included patients who refused to participate in the further part of the study during the study, and when the questionnaires were not completely or correctly completed.

Calculations were performed using IBM SPSS software. Results of quantitative variables were presented using descriptive statistics. Due to the non-parametric nature of the distributions (deviating from a normal distribution), non-parametric methods were used for the analyses. Mann-Whitney tests were used to assess the presence of differences between the two groups. Differences between pre- and post-treatment measurements on the same scales were tested using Wilcoxon tests for dependent samples. The cut-off for the level of significance was $p < 0.05$.

Schedule of Study Material Collection

- Before surgery, a diagnostic survey using a self-administered questionnaire on past illnesses and treatment and the standardised research tools outlined below.
- After surgery in the hospital ward, a diagnostic survey was conducted using the standardised research tools presented below.

The study was carried out using a diagnostic survey method with a self-administered questionnaire on past illnesses and treatment and the following standardised research tools:

- Abbreviated version of the quality-of-life assessment questionnaire - The World Health Organization Quality of Life (WHOQOL) -BREF - Zimet Multidimensional Scale of Perceived Social Support - MSPSS original version.

Results

The Relationship between Quality of Life in Patients Treated Surgically for Gallstones and the Method of Surgery: Laparoscopic or Traditional is Shown in Table 1.

Descriptive Statistics

	Type of treatment	Somatic domain (0 - 100) - before	Psychological domain (0 - 100) - before	Social domain (0 - 100) - before	Environmental domain (0 - 100) - before	Somatic domain (0 - 100) - after treatment	Psychological domain (0 - 100) - after treatment	Social domain (0 - 100) - after treatment	Environmental domain (0 - 100) - after treatment
Laparoscopic	Mean	79,17	46,35	72,22	92,14	96,67	56,35	95,14	109,37
	Me	75,00	50,00	75,00	92,19	100,00	57,69	100,00	109,38
	Sd	25,281	10,199	18,895	13,754	13,305	4,794	10,326	7,413
	N	60	60	60	60	60	60	60	60
traditional	Mean	60,65	42,74	71,06	85,50	46,30	22,12	37,50	53,56
	Me	70,83	38,46	75,00	90,63	45,83	19,23	33,33	51,56
	Sd	35,780	12,015	18,201	14,488	30,825	10,458	13,729	15,601
	N	36	36	36	36	36	36	36	36

Mann-Whitney Test Results

	Somatic domain (0 - 100) - before	Psychological domain (0 - 100) - before	Social domain (0 - 100) - before	Environmental domain (0 - 100) - before	Somatic domain (0 - 100) - after treatment	Psychological domain (0 - 100) - after treatment	Social domain (0 - 100) - after treatment	Environmental domain (0 - 100) - after treatment
Mann-Whitney	795,500	857,000	1041,500	875,500	150,500	18,000	6,500	6,500
Wilcoxon	1461,500	1523,000	1707,500	1541,500	816,500	684,000	672,500	672,500
Z	-2,175	-1,712	-,295	-1,559	-7,261	-8,129	-8,563	-8,198
P	0,030	0,087	0,768	0,119	<0,001	<0,001	<0,001	<0,001

Statistically significant differences were found between laparoscopic and traditional surgery types for the somatic domain before surgery and all domains after surgery. All domains had higher values in the laparoscopic-operated group.

Comparisons are Provided in the Figures 1-4.

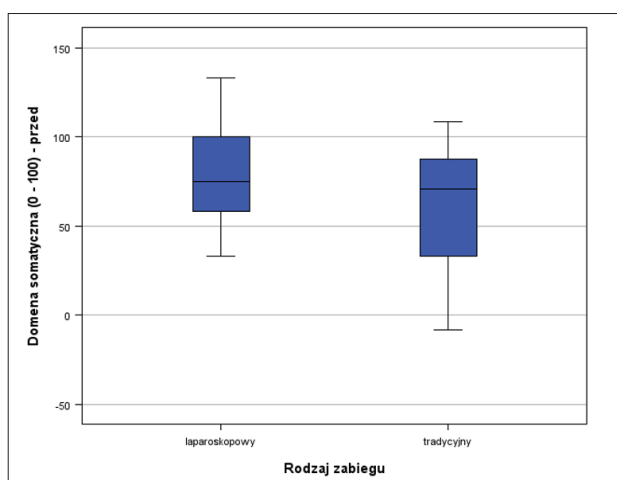


Figure 1: Relationship between Laparoscopic and Traditional Surgery as Exemplified by the Somatic Domain Assessing Quality of life before Surgery.

The Legend

- X-axis – Type of treatment (Laparoscopic, Traditional)
- Y-axis – Somatic Domain (0-100) Before

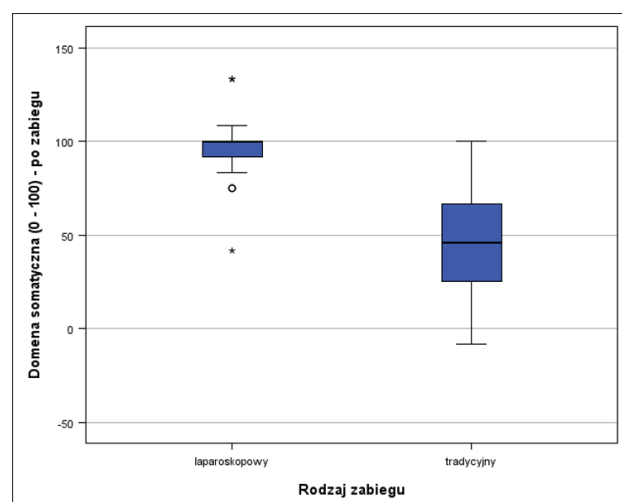


Figure 2: Relationship between Laparoscopic and Traditional Surgery Using the Example of the Somatic Domain Assessing Quality of Life after Surgery.

The Legend

- X-axis – Type of treatment (Laparoscopic, Traditional)
- Y-axis – Somatic Domain (0-100) After Treatment

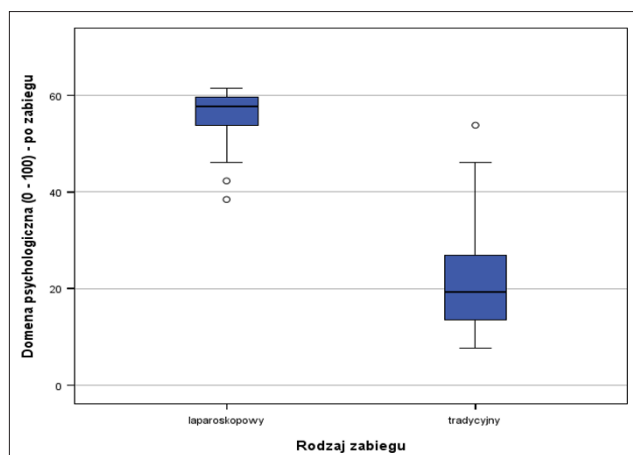


Figure 3: Relationship between Laparoscopic and Traditional Surgery Exemplified by the Psychological Domain Assessing Quality of Life After Surgery.

The Legend

- X-axis – Type of treatment (Laparoscopic, Traditional)
- Y-axis – Psychological Domain (0-100) After Treatment

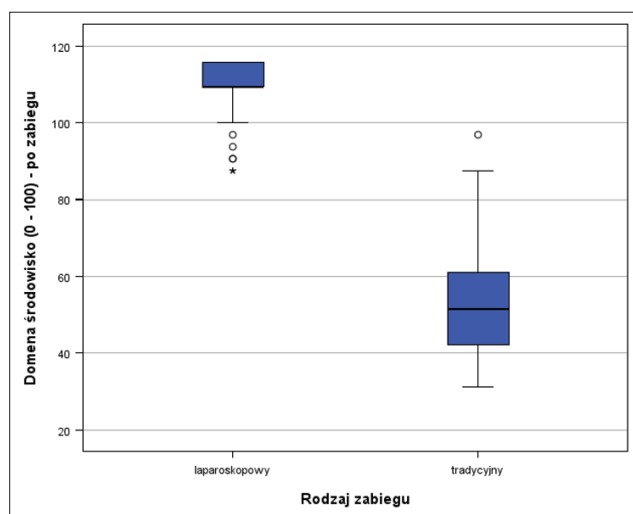


Figure 4: Relationship between Laparoscopic and Traditional Surgery as Exemplified by the Environmental Domain Assessing Quality of Life After Surgery.

The legend:

- X-axis – Type of treatment (Laparoscopic, Traditional)
- Y-axis – Environmental Domain (0-100) After Treatment.

Social Support before and after Surgery for Gallstones is Presented in Table 2.

	MSPSS - before	MSPSS - after	MSPSS Friend - before	MSPSS Friend - after	MSPSS Family - before	MSPSS Family - after	MSPSS Significant person before	MSPSS Significant Person - after
Mean	72,7579	77,6250	23,1684	25,3125	23,8125	26,0521	25,8021	26,2604
Median	74,0000	78,5000	24,0000	25,5000	24,5000	27,0000	27,0000	28,0000
Standard deviation	7,24601	5,02677	3,91846	2,28640	5,03736	2,33675	2,91501	2,40720
N	96	96	96	96	96	96	96	96

Wilcoxon Test Results

	MSPSS - before - MSPSS - after	MSPSS Friend - after - MSPSS Friend - before	MSPSS Family - after - MSPSS Family - before	MSPSS Signifi-cant Person - af-ter - MSPSS Sig-nificant Person - before
Z	-7,389	-5,399	-6,125	-4,070
p	<0,001	<0,001	<0,001	<0,001

The legend

- MSPSS - Multidimensional Scale of Perceived Social Support

A Comparison is Provided in the Figures 5-6.

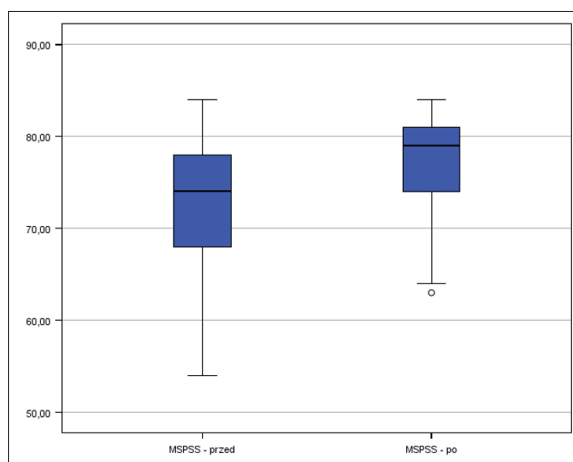


Figure 5: Comparison of Social Support before and after Surgery.

The Legend

- X-axis – MSPSS-Before
- MSPSS – After MSPSS - Multidimensional Scale of Perceived Social Support

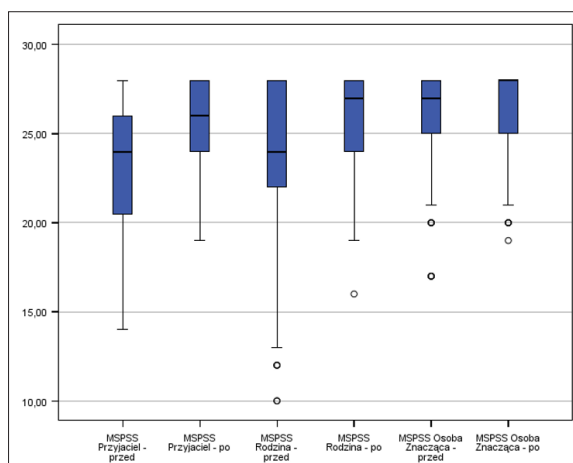


Figure 6: Comparison of Social Support before and after Surgery Considering Family, Friend or Significant Person

The Legend

- X-axis-MSPSS Friend-Before
- MSPSS Friend-After
- MSPSS Family-Before
- MSPSS Family-After
- MSPSS Significant Person -Before
- MSPSS Significant Person-After (looking from the left)
- MSPSS - Multidimensional Scale of Perceived Social Support

Statistically significant differences were found between pre- and post-treatment measurements on the Multidimensional Perceived Social Support Scale. The scale had higher values after treatment.

Social support in patients before and after laparoscopic and traditional surgery is shown in Table 3.

Descriptive Statistics by Group

Type of treatment		MSPSS - before	MSPSS - after	MSPSS Friend - before	MSPSS Friend - after	MSPSS Family - before	MSPSS Family - after	MSPSS Significant person before	MSPSS Significant Person - after
Laparoscopic	Mean	72,47	77,70	23,37	25,53	23,48	26,00	25,67	26,17
		72,00	78,00	24,00	25,50	23,00	26,00	26,00	27,00
		7,130	4,770	3,498	1,961	5,014	2,217	2,990	2,337
		59	60	59	60	60	60	60	60
traditional		73,22	77,50	22,83	24,94	24,36	26,14	26,03	26,42
		75,00	79,00	23,50	25,50	27,00	27,00	28,00	28,00
		7,510	5,495	4,558	2,735	5,100	2,554	2,813	2,545
		36	36	36	36	36	36	36	36
Total		72,76	77,63	23,17	25,31	23,81	26,05	25,80	26,26
		74,00	78,50	24,00	25,50	24,50	27,00	27,00	28,00
		7,246	5,027	3,918	2,286	5,037	2,337	2,915	2,407
		95	96	95	96	96	96	96	96

Mann-Whitney Test Results

	MSPSS - before	MSPSS - after	MSPSS Friend - before	MSPSS Friend - after	MSPSS Family - before	MSPSS Family - after	MSPSS Significant person before	MSPSS Significant Person - after
Z	-,562	-,194	-,403	-,608	-,903	-,813	-,900	-,978
p	0,574	0,846	0,687	0,543	0,366	0,416	0,368	0,328

The Legend

- MSPSS - Multidimensional Scale of Perceived Social Support

There were no statistically significant differences between the groups in any of the variables.

Quality of life in patients treated surgically for gallbladder stones before and after surgery is presented in Table 4.

Descriptive Statistics

	N	Mean	Median	Sd	Minimum	Maximum
Somatic domain (0 - 100) - before	96	72,22	75,00	30,819	-8	133
Somatic domain (0 - 100) - after treatment	96	77,78	91,67	32,572	-8	133
Psychological domain (0 - 100) - before	96	44,99	46,15	10,994	15	62
Psychological domain (0 - 100) - after treatment	96	43,51	53,85	18,223	8	62
Social domain (0 - 100) - before	96	71,79	75,00	18,550	33	100
Social domain (0 - 100) - after treatment	96	73,52	91,67	30,373	17	100
Environmental domain (0 - 100) - before	96	89,65	90,63	14,326	53	116
Environmental domain (0 - 100) - after treatment	96	88,44	106,25	29,354	31	116

Wilcoxon Test Results

Somatic Domain (0 - 100) - II / Somatic Domain (0 - 100) - I	Psychological Domain (0 - 100) - II / Psychological Domain (0 - 100) I	Social Domain (0 - 100) - II / Social Domain (0 - 100) I	Environmental Domain (0 - 100) - II / Environmental Domain (0 - 100) I
Z -1,740	-,329	-,529	-,208
p 0,082	0,742	0,597	0,835

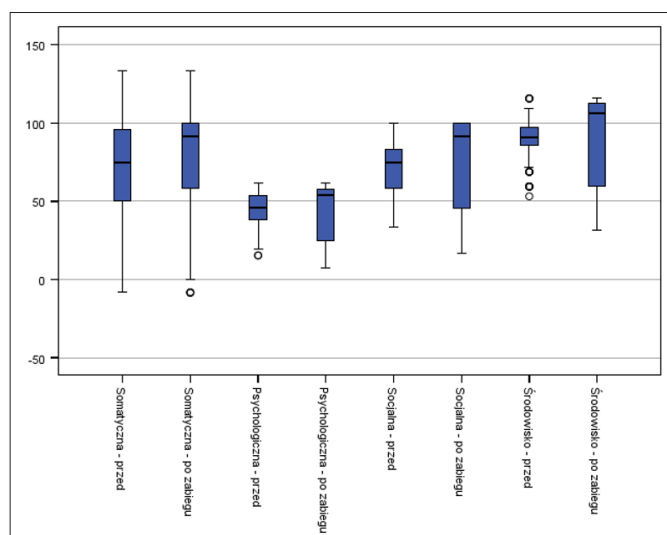


Figure 7: Comparison of Quality of Life before and after Surgery Considering All Domains: Somatic, Psychological, Social and Environmental.

The Legend

- X-axis-Somatic-Before
- Somatic-After Treatment
- Psychological-Before
- Psychological-After Treatment
- Social-Before
- Social-After Treatment
- Environmental-Before
- Environmental-After Treatment (looking from the left)

There were no significant differences in quality of life when analysing all domains between the pre- and post-treatment measurements.

Discussion

In cases of symptomatic lithiasis, laparoscopic cholecystectomy is the treatment of first choice, whose advantages over traditional open cholecystectomy include reduced hospitalisation and recovery time. Laparoscopic cholecystectomy is one of the most commonly performed surgical procedures worldwide, especially in Western countries. However, laparoscopic cholecystectomy has been shown to lead to some complications that are extremely rare. One of these is gallbladder perforation with resultant spillage of gallstones in the abdominal cavity, and this complication is reported in 6-40% of cases.

Disseminated gallstones are a complication of laparoscopic cholecystectomy that can result in conditions even after a considerable period of time. These conditions can present diagnostic difficulties. There is a need to increase awareness of the adverse consequences of gallstone proliferation so that, in the case of gallbladder perforation during cholecystectomy, such stones can be proactively identified and removed [6].

Laparoscopic cholecystectomy is currently the gold standard for the treatment of gallstones. The significantly less invasive nature of the surgery contributes to a reduction in post-operative pain. It also has a huge impact on the quality of postoperative recovery, which is significantly faster and more effective than in patients undergoing conventional surgery. The method also has the advantages of a shorter hospital stay, a faster return to physical and occupational activity and cosmetic considerations [7].

With the laparoscopic cholecystectomy performed by Phillippe Mouret, there has been rapid progress in the field of minimally invasive abdominal surgery. An additional aspect in favour of laparoscopy is the possibility of performing several surgeries at the same time (depending on the indication), e.g. gallbladder, appendix, abdominal hernia, as well as performing diagnostics of the entire abdominal cavity [8].

There has been a steady upward trend in the number of laparoscopic procedures performed due to availability, reduction in post-operative pain and shorter hospital stays. However, approximately one third of patients undergoing this treatment report postoperative pain and dyspeptic disorders. The assessment of the quality of life of patients undergoing laparoscopic cholecystectomy, based on standardised questionnaires, should be one of the elements to evaluate the impact of the treatment on patients' lives [9].

This huge number of procedures performed is not without an impact on quality of life (QOL). The majority of patients benefit from this procedure, but the complaints of six patients related to: complications, concomitant diseases, physiological and metabolic disorders require appropriate management in the postoperative period [9].

Controversy has been encountered in the literature as to whether single-incision laparoscopic cholecystectomy, with a slightly larger incision at the umbilicus, may lead to poorer postoperative quality of life and more pain compared with the more classic 4-port laparoscopic cholecystectomy [10].

The results of a study by Eitaro Ito et al. showed that postoperative quality of life was not significantly different between single-incision laparoscopic cholecystectomy and 4-port laparoscopic cholecystectomy. Similarly, time to postoperative pain relief did not differ significantly between groups [10].

The assessment of quality of life after surgical treatment, depending on the organ operated on, is based on different questionnaires, completed in the perioperative period and up to one year after surgery. According to the 2004 recommendations of the European Association for Endoscopic Surgery, the quality of life of patients after cholecystectomies should be assessed using questionnaires: PGWB (The Psychological General Well-Being Index) combined with GIQLI (Gastrointestinal Quality of Life Index).

In case of organisational constraints, only the GIQLI questionnaire can be used, as it is more precise in assessing quality of life in patients with cholelithiasis [9-13].

Our study showed statistically significant differences between laparoscopic and traditional surgery types for the somatic domain before surgery and all domains after surgery assessing quality of life, where all domains had higher values in the laparoscopic surgery group.

In a study by Hen-Hui Lien et al, results showed that laparoscopic cholecystectomy significantly improves patients' quality of life [14].

In-house studies showed statistically significant differences between pre- and post-operative measures for the Multidimensional Perceived Social Support Scale, where the scale had higher values after surgery. The in-house study showed no significant differences in quality of life when analysing all domains between pre- and post-surgery measurements.

In a study by Gach et al, patients with preoperative biliary colic episodes following laparoscopic cholecystectomy rated their well-being better compared to a group of patients without acute biliary episodes; however, more than 6 months after surgical treatment, the overall quality of life score did not depend on the presence of symptoms in the preoperative period [9].

Conclusions

Laparoscopically operated patients show higher values for the somatic domain before surgery, as well as for all domains after surgery assessing quality of life, compared to patients operated with the traditional method. This means that patients before laparoscopic surgery are better prepared for surgery in the somatic domain and feel better after surgery in both somatic, psychological, environmental and social aspects.

Patients after surgery for gallstones were shown more support from relatives, family and friends, compared to patients before surgery.

There was no difference between laparoscopic and traditional gallbladder stone surgery in terms of support from relatives, family and friends before and after surgery.

There is no difference in terms of patients' quality of life before and after surgery for gallbladder stones.

The assessment of quality of life before and after laparoscopic and conventional surgery, as presented in the article, should be one of the important elements assessed in patients in surgical wards and the results should influence the choice of treatment. The use of standardised and matched to cholelithiasis treated surgically is crucial to be able to adequately interpret the results and to compare studies conducted in different centres. The article highlights the very important assessment of quality of life and social support for patients before and after surgery for gallstones treated by laparoscopic and traditional methods.

Conflicts of Interest: None

Sources of Funding: None

References

1. Patel M, Hugh TA (2023) Comparison of Three-Dimensional Visualization Systems and Two-Dimensional Visualization Systems During Laparoscopic Cholecystectomy: A Narrative Review. *Journal of laparoendoscopic & advanced surgical techniques* 33: 957-962.
2. Daan J Comes, Sarah Z Wennmacker, Carmen SS Latenstein, Jarmila van der Bilt, Otmar Buysse, et al. (2024) Restrictive Strategy vs Usual Care for Cholecystectomy in Patients with Abdominal Pain and Gallstones: 5-Year Follow-Up of the SECURE Randomized Clinical Trial. *JAMA Surgery* 159: 1235-1243.
3. Gaurav Katwal, Yeshika Thapa, Aisha Shrestha, Abhishek Bhattarai, Kishor Kumar Tamrakar, et al. (2022) Open Cholecystectomy among Patients undergoing Laparoscopic. Cholecystectomy in a Tertiary Care Centre: A Descriptive Cross-Sectional Study. *J Nepal Med Assoc* 60: 444-447.
4. Khadija Anees, Muhammad Faizan, Sarush Ahmed Siddiqui, Ayesha Anees, Komal Faheem, et al. (2024) Role of C-Reactive Protein as a Predictor of Difficult Laparoscopic Cholecystectomy. *Surgical Innovation* 31: 26-32.
5. Natalia Petryshyn, Teodora Dražić, Piotr Hogendorf, Janusz Strzelczyk, Alicja Strzałka, et al. (2021) Site metastases a year

- after initial laparoscopic cholecystectomy. Should the use of retrieval bags during laparoscopic cholecystectomy be the new gold standard?. *Polski Przegląd Chirurgiczny* 93: 61-65.
6. Sajad Ahmad Salati, Mohammed Alfehaid, Saleh Alsuwaydani, Lamees AlSulaim (2023) gallstones after laparoscopic cholecystectomy: a systematic review. *Polski Przegląd Chirurgiczny* 95: 56-79.
 7. Długolecka R, Kania E, Biegus I (2022) Opieka pielęgniarska nad pacjentem po cholelitytomii klasycznej i laparoskopowej. *Pielęgniarstwo chirurgiczne i angiologiczne* 16: 85-90.
 8. Murawa D, Bąk M (2019) Współczesne techniki laparoskopowe - korzyści dla pacjenta. *Ogólnopolski Przegląd Medyczny* 2: 37-43.
 9. Tomasz Gach, Paweł Bogacki, Beata Markowska, Joanna Bonior, Małgorzata Paplacyk, et al. (2021) Quality of life of patients after laparoscopic cholecystectomy for cholelithiasis - assessment of long-term postoperative results. *Polish Surgical Review* 93: 19-24.
 10. Eitaro Ito, Akihiro Takai, Yoshinori Imai, Hiromi Otani, Yoshihiro Onishi, et al. (2019) Quality of life after single-incision laparoscopic cholecystectomy: A randomized, clinical trial. *Journal Homepage Surgery* 165: 353-359.
 11. Korolija D, Sauerland S, Wood-Dauphinée S, Abbou CC, Eypasch E, et al. (2004) Evaluation of quality of life after laparoscopic surgery. *Evidence-based guidelines of the European Association for Endoscopic Surgery. Surg Endosc* 18: 879-897.
 12. Hon-Yi Shi, Hao-Hsien Lee, Chong-Chi Chiu, Heng-Chia Chiu, Yih-Huei Uen, et al. (2008) Responsiveness and Minimal Clinically Important Differences after Cholecystectomy: GIQLI Versus SF-36. *J Gastrointest Surg* 12: 1275-1282.
 13. Eypasch E, Williams JI, Wood-Dauphinée S, Ure BM, Schmülling C, et al. (1995) Gastrointestinal Quality of Life Index: development, validation and application of a new instrument. *Br J Surg* 82: 216-222.
 14. Hen-Hui Lien, Chi-Cheng Huang, Pa-Chun Wang, Ching-Shui Huang, Ya-Hui Chen, et al. (2010) Changes in Quality-of-Life Following Laparoscopic Cholecystectomy in Adult Patients with Cholelithiasis. *J Gastrointest Surg* 14: 126-130.

Copyright: ©2025 Edyta Laska. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.