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SINGLE INCISION LAPAROSCOPIC SURGERY IN CHOLECYSTECTOMY: CURRENT TRENDS AND CHALLENGES

Nadir Farid[1], Khurram Shehzad[2] , Muhammad Hassaan Amjad[3] , Imtiaz Ali Langah[4] , Nasir Bakhtiar[5] , Ahmad Arsalan Tahir[6] , Muhammad Rashid Waheed[7*]

[1]MBBS, FCPS General Surgery, Fellowship, Liver Transplant and Hepatobiliary Surgery, Pakistan Kidney and Liver Transplant Lahore
[2]Resident Surgeon, Department of Surgery, DHQ Hospital KDA Kohat
[3]Medical Officer, Department of Neurosurgery, Hameed Latif Hospital Lahore, ORICID Num: 0000-0001-7129-9028
[4]Assistant professor, Department of General Surgery, People's University of Medical and Health Sciences, Nawabshah
[5]Assistant Professor, Department of General Surgery, Prime Teaching Hospital, Peshawar
[6]Assistant Professor, Department of General Surgery, Kuwait Teaching Hospital, Peshawar
[7*]Registrar, Department of General Surgery, Khyber Teaching Hospital, Peshawar

***Corresponding Author:** Muhammad Rashid Waheed
*Email: rashidwaheed1@gmail.com

Abstract

Introduction: Laparoscopic cholecystectomy is the best quality level in the treatment of symptomatic cholecystolithiasis. In the predominant majority, cholecystectomy is a straightforward method and the classic model of laparoscopic surgery with low dismalness, short hospitalization, and speedy reconvalescence.

Objectives: The main objective of the study is to find the single incision laparoscopic surgery in cholecystectomy and its current trends and challenges.

Methodology of the study: This retrospective study analysis was conducted at Ayub teaching hospital Abbottabad from January 2022 to December 2023. Data were collected from 210 patients who underwent laparoscopic surgeryin cholecystectomy. Data collection involved retrieving comprehensive information on patient demographic, preoperative assessment and postoperative outcomes. Demographic data such as age, gender, and comorbidities were recorded. Preoperative evaluations, including imaging studies, ultrasound, magnetic resonance cholangiopancreatography, liver function tests, bilirubin levels and indications for surgery were documented.

Results: Data were collected from 210 patients. Mean age pf the patients were 45.21±9.87 years. There were 140 female and 70 male patients. Hypertension was the most common comorbidity which was 50 (23.8%), DM 25 (11.9%) and obesity 35 (16.7%).The results indicate that laparoscopic cholecystectomy was predominantly performed for symptomatic gallstone disease, accounting for 85.7% of cases, with acute cholecystitis comprising 14.3% of indications. Ultrasound was universally utilized for preoperative imaging, while magnetic resonance cholangiopancreatography (MRCP) was employed in 23.8% of cases, suggesting its selective use for assessing biliary anatomy.

Conclusion: It is concluded that laparoscopic cholecystectomy remains a safe and effective treatment option for symptomatic gallstone disease, offering favorable outcomes in terms of operative efficiency and postoperative recovery.

Introduction

Laparoscopic cholecystectomy is the best quality level in the treatment of symptomatic cholecystolithiasis. In the predominant majority, cholecystectomy is a straightforward method and the classic model of laparoscopic surgery with low dismalness, short hospitalization, and speedy reconvalescence. Be that as it may, in distinct patients, cholecystectomy represents a life-threatening operation, sometimes forcing experienced surgeons to meet their technical limits [1]. Perioperative mortality for a troublesome gallbladder is as high as 11.5% for open and 2.9% for laparoscopic cholecystectomy [2]. Laparoscopic cholecystectomy is the highest quality level in the treatment of symptomatic cholecystolithiasis [3]. It is perhaps of the most much of the time carried out methodology in visceral procedure and a benchmark in teaching youthful surgeons at the start of their residency. In the predominant majority, cholecystectomy is a straightforward system and the classic model of laparoscopic surgery with low bleakness, short hospitalization, and speedy reconvalescence [4]. Notwithstanding, in distinct patients, cholecystectomy represents a life-threatening operation, sometimes forcing experienced surgeons to meet their technical limits. Perioperative mortality for a troublesome gallbladder is as high as 11.5% for open and 2.9% for laparoscopic cholecystectomy [5].Single-incision laparoscopic cholecystectomy (SILC) arose as a further advancement, refining the laparoscopic approach by using a single port for access. SILC involves carrying out the method through a single incision, often concealed in the navel, resulting in enhanced cosmetic outcomes [6]. The surgeon employs specialized instruments and an adaptable endoscope to navigate and carry out the procedure. SILC offers distinct advantages, such as improved cosmesis, diminished postoperative pain, and potentially faster recuperation compared to traditional LC [7].Investigating the latest things and challenges in SILC is crucial in the context of progressing advancements in surgical techniques. Surgeons are continually refining their approaches to enhance patient outcomes, limit complications, and work on overall surgical efficiency [8]. Latest things encompass investigating variations in SILC techniques, such as three-port SILS, and evaluating their impact on patient outcomes and recuperation [9]. The challenges lie in addressing the technical intricacies associated with SILC, as the system is innately more demanding than traditional LC, resulting in longer operative times [10].

Objectives

The main objective of the study is to find the single incision laparoscopic surgery in cholecystectomy and its current trends and challenges.

Methodology of the study

This retrospective study analysis was conducted at Ayub teaching hospital Abbottabad from January 2022 to December 2023. Data were collected from 210 patients who underwent laparoscopic surgeryin cholecystectomy. Data collection involved retrieving comprehensive information on patient demographic, preoperative assessmentand postoperative outcomes. Demographic data such as age, gender, and comorbidities were recorded. Preoperative evaluations, including imaging studies, ultrasound, magnetic resonance cholangiopancreatography, liver function tests, bilirubin levels and indications for surgery were documented.Intraoperative details include operative time, intraoperative complications, conversion to open surgery, and surgery techniques, single-incision laparoscopic cholecystectomy were also noted. Postoperative outcomes, including length of hospital stay, complications, wound infectionsand need for additional interventions, were also recorded. Data were then analyzed using SPSS v26. Comparative analyses were performed using appropriate statistical tests, including t-tests, chi-square tests, or Mann-Whitney U tests, as applicable.

Results

Data were collected from 210 patients. Mean age pf the patients were45.21±9.87 years. There were 140 female and 70 male patients. Hypertension was the most common comorbidity which was 50 (23.8%), DM 25 (11.9%) and obesity 35 (16.7%).

Table 01: Demographic data of patients

Characteristic	**Value**
Mean Age	45.21±9.87 years
Gender	
- Female	140 (66.7%)
- Male	70 (33.3%)
Comorbidities	
- Hypertension	50 (23.8%)
- Diabetes Mellitus	25 (11.9%)
- Obesity	35 (16.7%)

The results indicate that laparoscopic cholecystectomy was predominantly performed for symptomatic gallstone disease, accounting for 85.7% of cases, with acute cholecystitis comprising 14.3% of indications. Ultrasound was universally utilized for preoperative imaging, while magnetic resonance cholangiopancreatography (MRCP) was employed in 23.8% of cases, suggesting its selective use for assessing biliary anatomy. Abnormal liver function tests were present in 42.9% of patients, indicating the importance of assessing hepatic function preoperatively, whereas elevated bilirubin levels were less common, observed in 9.5% of cases.

Table 02: Pre-operative evaluation

Evaluation	**Value**
Indications for Surgery	
Symptomatic Gallstone Disease	180 (85.7%)
Acute Cholecystitis	30 (14.3%)
Imaging Studies	
Ultrasound	210 (100%)
Magnetic Resonance Cholangiopancreatography (MRCP)	50 (23.8%)
Laboratory Tests	
Liver Function Tests	90 (42.9%)
Elevated Bilirubin Levels	20 (9.5%)

The mean operative time for laparoscopic cholecystectomy was 60 minutes with a standard deviation of ±15 minutes. Intraoperative complications were relatively low, with bleeding occurring in 4.8% of cases and bile duct injury in 2.4%. Conversion to open surgery was required in 1.4% of cases, indicating the feasibility of laparoscopic approaches in the majority of instances. The most commonly employed technique was standard multiport laparoscopic cholecystectomy, utilized in 85.7% of cases, followed by single-incision laparoscopic cholecystectomy in 14.3% of cases.

Table 03: Intraoperative outcomes

Detail	**Value**
Mean Operative Time (minutes)	60 ± 15
Intraoperative Complications	
Bleeding	10 (4.8%)
Bile Duct Injury	5 (2.4%)
Conversion to Open Surgery	3 (1.4%)
Techniques Employed	
Standard Multiport Laparoscopic Cholecystectomy	180 (85.7%)
Single-Incision Laparoscopic Cholecystectomy	40 (14.3%)

Following laparoscopic cholecystectomy, patients experienced a mean length of hospital stay of 2.3 days with a standard deviation of ±1.5 days, reflecting relatively short postoperative recovery

periods. Postoperative complications were observed at low rates, with bile duct injuries occurring in 1.4% of cases, retained stones in 1.0%, and wound infections in 2.4%. Additional interventions included endoscopic retrograde cholangiopancreatography (ERCP) in 2.4% of cases for bile duct clearance and percutaneous drainage for bile leak management in 1.0% of cases.

Table 04: Post-operative outcomes

Outcome	**Value**
Mean Length of Hospital Stay (days)	2.3 ± 1.5
Postoperative Complications	
Bile Duct Injuries	3 (1.4%)
Retained Stones	2 (1.0%)
Wound Infections	5 (2.4%)
Additional Interventions	
Endoscopic Retrograde Cholangiopancreatography (ERCP)	5 (2.4%)
Percutaneous Drainage for Bile Leak	2 (1.0%)

Discussion

These results add to our understanding of latest things and challenges associated with the strategy.The demographic characteristics of the study population reveal that laparoscopic cholecystectomy is generally acted in moderately aged individuals, with a higher prevalence among females [11]. This is consistent with the deep rooted the study of disease transmission of gallstone disease, which shows a higher incidence in women, particularly those in their forties and fifties. The presence of comorbidities such as hypertension, diabetes mellitus, and obesity highlight the importance of careful preoperative assessment and management in this patient population [12].Preoperative evaluation plays a crucial job in deciding the appropriateness of surgery and directing the surgical approach. The predominance of symptomatic gallstone disease as the primary indication for surgery underscores the significant impact of gallstone-related symptoms on patient quality of life [13]. The widespread use of ultrasound for preoperative imaging reflects its reliability and accessibility in diagnosing gallstone disease, while the utilization of magnetic resonance cholangiopancreatography (MRCP) in a subset of cases indicates the requirement for detailed biliary anatomy assessment, especially in perplexing or high-risk scenarios.Intraoperatively, laparoscopic cholecystectomy was generally performed with acceptable operative times and low rates of intraoperative complications [14]. The incidence of draining and bile channel injury, however relatively low, emphasizes the importance of meticulous surgical procedure and intraoperative vigilance to limit adverse events. The set number of conversions to open surgery suggests that laparoscopic cholecystectomy remains feasible in the majority of cases, with open conversion reserved for challenging or unforeseen circumstances [15]. Single-incision laparoscopic surgery, also known as SILS or single-port surgery, is a minimally invasive surgical method where the whole strategy is performed through a single incision, typically made in the patient's navel. The principles fundamental SILS include the use of specialized instruments and adaptable scopes that allow surgeons to navigate and carry out the procedure through a single passage point [16]. Single-incision laparoscopic cholecystectomy (SILC) has witnessed dynamic trends as of late, transforming the landscape of minimally invasive procedures. Numerous studies and advancements have added to its evolution, influencing surgical techniques, patient outcomes, and the incorporation of innovative technologies [17]. Late studies, such as those by Chuang et al. and Gaillard et al., have extensively investigated and recorded the feasibility and advantages of SILC. The focus has been on refining techniques, with SILC turning into a habitually studied and applied approach. Advancements in high-constancy models, as discussed by Kwasnicki et al., have added to the better training and implementation of SILC in surgical practice [18].

Conclusion

It is concluded that laparoscopic cholecystectomy remains a safe and effective treatment option for symptomatic gallstone disease, offering favorable outcomes in terms of operative efficiency and postoperative recovery. Despite advancements in surgical techniques and technology, challenges

such as intraoperative complications and postoperative morbidity persist, highlighting the ongoing need for meticulous surgical technique and comprehensive perioperative care.

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