



Clinical Efficacy and Safety of Transumbilical Single-Port Laparoscopic Cholecystectomy: Insights from a Large-Scale Analysis of 10,285 Cases

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INTRODUCTION

Laparoscopic cholecystectomy is the standard surgical treatment of clinically benign gallbladder diseases. The present study aims to evaluate the safety, efficacy, and clinical outcomes of transumbilical single-port laparoscopic cholecystectomy (TSLC) for the treatment of chronic cholecystitis and gallstones, based on a comprehensive analysis of 10,285 cases performed at our institution.

METHODS AND PROCEDURES

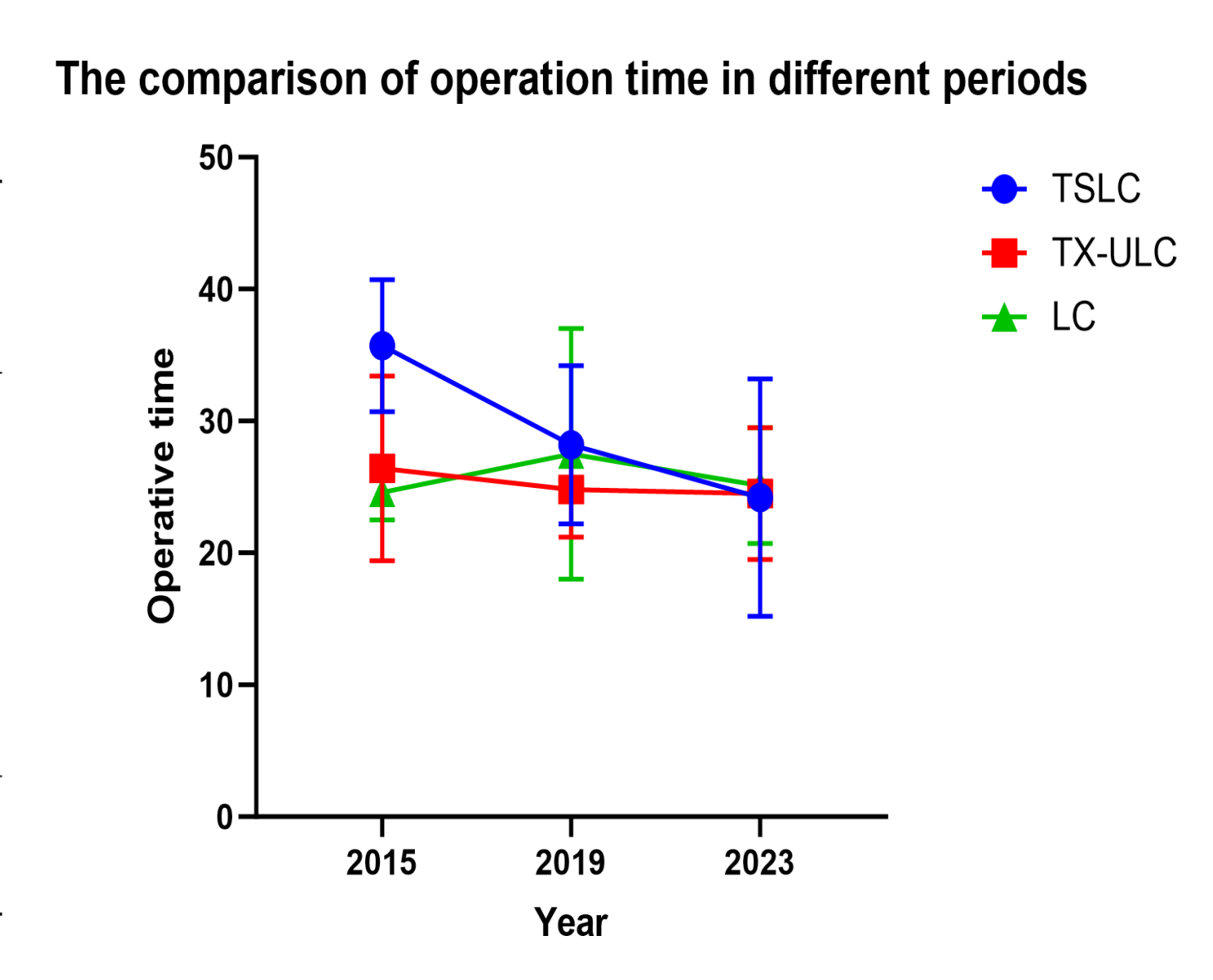
This retrospective study analyzed data from 10,285 patients who underwent TSLC at the Shanghai East Hospital, Tongji University School of Medicine between January 2007 and December 2023. The cohort included 4,603 males and 5,682 females, with an average age of 56.8 ± 7.5 years. The control groups comprised patients who underwent traditional three-port laparoscopic cholecystectomy (LC) and Trans Xiphoid-Umbilical two-port laparoscopic cholecystectomy (TX-ULC). Perioperative indicators, postoperative complications, and patient satisfaction were assessed.

RESULTS

The success rate of TSLC was 93.5%, with 715 patients being converted to TX-ULC or LC intraoperatively. Postoperative mortality was not observed. The TSLC group exhibited significantly longer operation times than the TX-ULC and LC groups ($P<0.001$). However, there were no significant differences in intraoperative blood loss, postoperative recovery time for bowel function, or hospital stay duration across the three groups. The TSLC group demonstrated significantly lower postoperative pain scores ($P<0.001$) and higher patient satisfaction with cosmetic outcomes ($P<0.001$). Postoperative complications in the TSLC group included 6 cases of hemorrhage and 4 cases of bile leakage, with no significant differences in the incidence of major complications among the three groups.



Table 2: Surgical data of the patient in three groups (TSLC, TX-ULC and LC)							
Group	Postoperative Complications (n, %)	Operative time (min, $\bar{x}\pm sd$)	Amount of bleeding (ml, $\bar{x}\pm sd$)	Postoperative exhaust Time (min, $\bar{x}\pm sd$)	Postoperative pain score ($\bar{x}\pm sd$)	Satisfaction Score ($\bar{x}\pm sd$)	Hospital Stay (day, $\bar{x}\pm sd$)
TSLC (n=10285)	10(0.972)	31.5 $\pm$ 6.4	21.7 $\pm$ 7.5	18.2 $\pm$ 8.8	4.2 $\pm$ 1.1	9.2 $\pm$ 0.4	3.3 $\pm$ 0.2
TX-ULC (n=7094)	6(0.846)	29.2 $\pm$ 9*	22.0 $\pm$ 8.5	18.3 $\pm$ 5.4	4.9 $\pm$ 1.6*	8.1 $\pm$ 1.2*	3.3 $\pm$ 1.5
LC (n=9503)	12(1.263)	24.8 $\pm$ 7.6#	21.9 $\pm$ 9.5	18.4 $\pm$ 4.6	4.8 $\pm$ 2.8#	8.1 $\pm$ 0.8#	3.3 $\pm$ 0.8
χ^2 /F-value	$\chi^2=0.756$	F=1967	F=2.861	F=2.206	F=340.7	F=5756	F=1
P-value	>0.05	<0.001	0.0572	0.1102	<0.001	<0.001	0.3679
*TSLC vs TX-ULC; #TSLC vs LC							



CONCLUSION

TSLC is a viable and safe alternative to conventional laparoscopic cholecystectomy, particularly by experienced surgeons. It offers notable advantages in terms of postoperative pain reduction and superior cosmetic outcomes. However, this technique requires rigorous adherence to surgical indications and an adequate learning curve for surgeons. Further large-scale, multi-center studies with extended follow-up periods are necessary to confirm the long-term benefits and establish TSLC as a standard surgical procedure for gallbladder diseases.

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