The Efficacy and Safety of Laparoscopic Surgery and Lichtenstein Herniorrhaphy in the Treatment of Inguinal Hernia in Elderly: A Meta-analysis

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Abstract

Objective:To evaluate the safety and efficacy of laparoscopic surgery and Lichtenstein herniorrhaphy for inguinal hernia in the elderly. Methods: CNKI, Wanfang, VIP, Web ofScience, PubMed EMbase, the Cochrane Library and other domestic and foreign databases were searched by computer until May 28, 2020. The language searched was Chinese and English. Randomized controlled trials comparing laparoscopic surgery and Lichtenstein herniorrhaphy for inguinal hernia in the elderly were included, risk bias assessment of the included studies was performed according to the Cochrane Handbook 5.0.2, and meta-analysis was performed using Review Manager 5.3. Result: Twelve trials with a total of 1317 were finally included. Meta-analysis showed that laparoscopic surgery was compared with Lichtenstein herniorrhaphy in terms of intraoperative blood loss [MD=−7.15, 95% CI (−11.05~−3.25), P<0.05], postoperative day 1 VAS pain score [MD=−1.39, 95% CI (−2.07~−0.70), P<0.05], length of hospital stay [MD=−1.42, 95% CI (−2.22~−0.62), P=0.0005], incidence of scrotal swelling [RR=0.41, 95% CI (0.17~0.95), P=0.04], incidence of incisional pain [RR=0.21, 95% CI (0.06~0.72), P=0.01], incidence of groin discomfort [RR=0.35, 95% CI (0.17~0.72), P=0.004], recurrence rate [RR=0.38, 95% CI(0.17~0.87), P=0.02] Laparoscopic herniorrhaphy was superior to Lichtenstein herniorrhaphy, but it was higher than Lichtenstein herniorrhaphy in terms of surgical costs [MD=4798.61, 95% CI (3012.94~6584.28), P<0.05]. There was no significant difference in operation time, postoperative recovery time, incidence of urinary retention, incidence of hematoma or seroma, incidence of incision infection and incidence of chronic pain. Conclusion: Laparoscopic herniorrhaphy is safe and effective in the treatment of inguinal hernia in the elderly, with the characteristics of less operative bleeding, shorter hospital stay, fewer complications, and low recurrence rate, but it is costly.

Keywords

Laparoscopic Hernia Repair; Lichtenstein Hernia Repair; Elderly; Meta-analysis.

1. Introduction

Inguinal hernia is a common disease in general surgery with the elderly as the main affected group, and a multicenter study in Shanghai showed that the prevalence of inguinal hernia in the elderly > 60 years of age was as high as 1.13% [1]. Since the introduction of the concept of "tension-free hernia repair" by Lichtenstein et al in 1989 [2], Lichtenstein has been used as the gold standard for inguinal hernia repair[3]. However, with the promotion of laparoscopic minimally invasive techniques and the deepening of the understanding of the anatomy of the inguinal region, laparoscopic tension-free inguinal hernia repair including transperitoneal preperitoneal space herniorrhaphy (TAPP) and total extraperitoneal herniorrhaphy (TEP) has emerged, and has been gradually widely used by surgeons and even become the primary option. The defining criteria for the elderly in China are 60 years old[4]. Most elderly patients with inguinal hernia are accompanied by cardiovascular diseases, pulmonary diseases and other diseases that lead to increased intra-abdominal pressure. There are problems such as high risk of surgery and anesthesia, more postoperative complications and high recurrence rate. Therefore, it is of great clinical value to select a surgical method with high safety, rapid postoperative recovery, fewer complications and low recurrence rate for elderly patients with inguinal hernia. After

searching the literature, it was found that there was no systematic review article comparing laparoscopic surgery with Lichtenstein for inguinal hernia in the elderly. In this paper, we compared the efficacy and safety of laparoscopic surgery and Lichtenstein herniorrhaphy in the treatment of inguinal hernia in the elderly by searching the domestic and foreign literatures and using meta-analysis. The results of this study can provide evidence-based basis for clinical treatment.

2. Materials and Methods

2.1 Literature search strategy

Domestic and foreign databases such as CNKI, Wanfang, VIP, WebofScience, PubMed, EMbase, and the CochraneLibrary were searched by computer. The reference lists of included articles were also manually searched for literature supplement. The search time was from database establishment to May 28, 2020. They were searched with Chinese and English search terms, respectively.

2.2 Inclusion and exclusion criteria of literatures

2.2.1 Inclusion criteria

(1) The type of study design is a randomized controlled trial; (2) The study subjects are the elderly (> 60 years old); (3) The diagnosis of inguinal hernia is clear; (4) The intervention measures are TAPP, TEP and Li Jinstein tension-free herniorrhaphy; (5) The outcome measures include at least one of the operation time, intraoperative blood loss, postoperative recovery time, postoperative day 1 VAS pain score, hospital stay, hospitalization costs, urinary retention, scrotal swelling, hematoma or seroma, incision infection, incision pain, inguinal discomfort (paresthesia, foreign body sensation, referred sensation, etc.), chronic pain, recurrence rate, and total incidence of complications; (6) The full text of the published literature can be retrieved, and the publication language is limited to Chinese and English. (7), the results of multiple published studies, take the most recent data.

2.2.2 Exclusion criteria

(1) non-randomized controlled trials; (2) incomplete data or logic errors; (3) reviews, case reports, clinical guidelines, conference abstracts.

2.3 Data Extraction

The original data extraction contents include: (1) General data: title, author, publication time; (2) Study characteristics: study subjects, age, gender, number of cases, intervention measures; (3) Outcome measures: operation time (min), intraoperative blood loss (ml), postoperative recovery time to the ground (h), VAS pain score on postoperative d1, hospital stay (d), hospitalization costs (yuan), urinary retention, scrotal swelling, hematoma or seroma, incision infection, incision pain, groin discomfort (paresthesia, foreign body sensation, referred sensation, etc.), chronic pain, recurrence rate, total incidence rate of complications. This process was independently performed by two reviewers according to the established inclusion and exclusion criteria, and cross-checking was performed after finalizing the controlled trials to be included, and discrepancies or inconsistencies were resolved by discussion or with the assistance of a third researcher.

2.4 Data Analysis

Statistical analysis of the data was performed using ReviewManager 5.3 software provided by the Cochrane Collaboration. Enumeration data were expressed as relative risk (RR) and 95% confidence interval (CI); measurement data were expressed as mean difference (MD) or standardized mean difference (SMD) and their 95% CI. The heterogeneity of finally included literatures was tested by I2 test. When $I2 \leq 50\%$, it indicated that there was homogeneity, and the fixed-effect model was used; when $I2 > 50\%$, it indicated that there was heterogeneity, and the random-effect model was used. Relevant analysis can be appropriately performed for the results with large heterogeneity. And the test level $\alpha = 0.05$, $P \leq 0.05$ was set as statistically significant.

2.5 Risk of bias evaluation of included studies

According to the literature quality evaluation criteria established in the Cochrane Handbook for Systematic Reviewers Version 5.0.2, two reviewers independently evaluated the literature data and

decided whether they met the inclusion requirements. When two reviewers had different opinions, they resolved them through discussion or solicited the opinions of a third party.

3. Results

3.1 Literature screening process and results

From the initial search, a total of 652 articles were identified and screened, which were screened layer by layer in strict accordance with the inclusion and exclusion criteria of the articles, and finally 12 articles met the requirements for final combined inclusion. STUDY SELECTION PROCESS 1. Literature screening flow chart and results see figure 1.

3.2 General characteristics of the included literatures and bias risk assessment results

3.2.1 General characteristics of the included literature1

Table 1. General characteristics of included literatures

Author	Year	Group	Surgery	Case	Age(year)	Gender male/female	Outcome
Yu Huajie [5]	2019	T	TAPP	40	71.09±5.71	33/7	①⑤⑥⑦⑨⑫⑬⑭⑮
		C	Li	40	70.59±6.02	32/8	
Sun Defeng [6]	2020	T	TEP	100	72.01±1.21	50/50	①②⑤⑨⑩⑪⑮
		C	Li	100	72.12±1.25	51/49	
Zhang Shijie [7]	2019	T	TEP	60	70.55±6.00	60/0	①②④⑤⑥⑧⑩⑫⑬⑭⑮
		C	Li	60	72.22±7.88	59/1	
Zhang Jiaoyang [8]	2017	T	TAPP	29	—	26/3	①②④⑤
		C	Li	29	—	25/4	
Li Qiuyang [9]	2020	T	TAPP	35	67.8±6.1	25/10	①②③⑤⑥⑦⑨⑩⑫⑬⑮
		C	Li	35	68.7±6.7	26/9	
Liang Guodong [10]	2019	T	TAPP	48	75.26±7.78	39/9	①②③④⑤⑦⑧⑫⑭⑮
		C	Li	48	73.48±8.26	40/8	
Liang Yongsheng [11]	2011	T	TEP	25	72.5±13.4	—	①③⑤⑦⑪⑭⑮
		C	Li	25	69.3±14.1	—	
Wang Jichang [12]	2019	T	TEP	103	65.36±4.36	—	①②③⑤⑦⑨⑩⑮
		C	Li	202		—	
Wang Lei [13]	2019	T	TAPP	66	68.1±4.2	54/14	①②③⑤⑦⑩⑫⑮
		C	Li	66	68.3±4.7	53/13	
Zhao Yong [14]	2020	T	TAPP	40	63.8±9.3	40/0	①③⑤⑥⑦⑧⑩⑮
		C	Li	36	65.7±7.8	36/0	
Guo Guomin [15]	2018	T	TAPP	25	70.04±3.07	19/6	①②④⑤⑦⑧⑫⑮
		C	Li	25	68.92±3.17	18/7	
Huang Lizhe [16]	2018	T	TEP	40	74.1±1.3	37/3	①③⑤⑧⑨⑪⑭⑮
		C	Li	40	74.0±1.3	36/4	

T: experimental group (laparoscopic surgery group); C: control group (Lichtenstein operation group); —: not reported; Li: Lichtenstein. Outcome measures: ① operation time (min); ② intraoperative blood loss (mL); ③ postoperative recovery time to the ground (h); ④ VAS pain score on the first day after operation; ⑤ hospital stay (d); ③ hospitalization costs (yuan); ② urinary retention; ② scrotal swelling; ③ hematoma or seroma; ④ incision infection; ④ incision pain; groin discomfort (paresthesia, foreign body sensation, referred sensation, etc.); chronic pain; recurrence rate; total incidence rate of complications.

3.2.2 Results of risk of bias assessment of included literatures

The evaluation was performed according to the Cochrane Handbook quality evaluation criteria, including: random generation of allocation scheme, whether allocation scheme was hidden, implementation of blind method, whether the result data were complete, whether the results were non-selectively reported, and whether there were other sources of bias. " Lowrisk "(green) indicates low risk of bias," unclearrisk "(yellow) indicates that the literature does not provide sufficient information for assessment, and" highrisk "(red) indicates high risk of bias. See Figure 2A, Figure 2B.

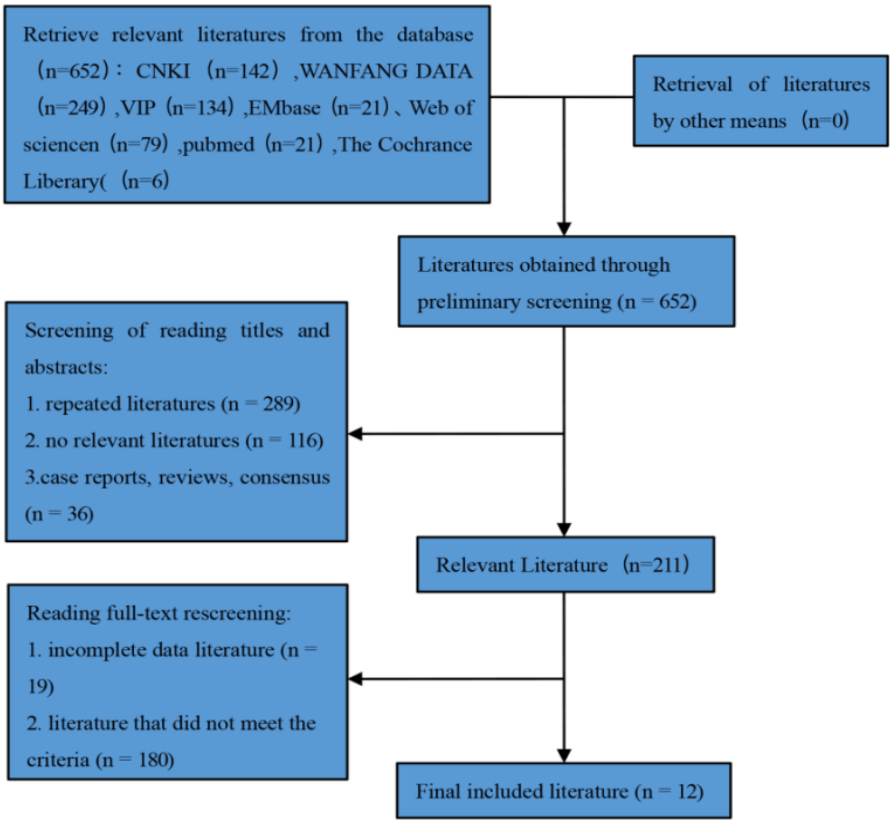

Figure 1. Literature screening flow chart and results

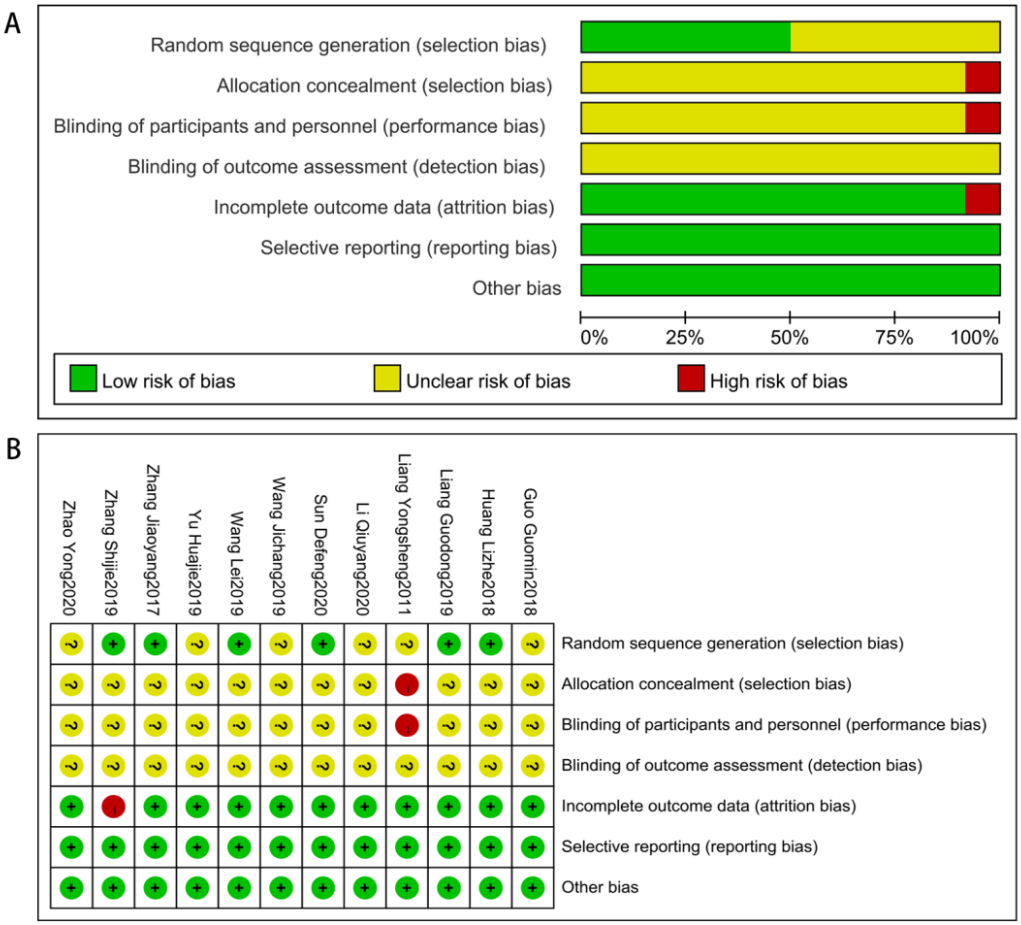

Figure 2. Results of risk of bias assessment

3.3 Meta analysis results

3.3.1 Operation time

12 literatures [5-16] reported the operation duration. The heterogeneity test results of each study (P < 0.00001, I2 = 99%). Therefore, the random-effects model was used for meta-analysis. The results showed that there was no significant difference in the operation time between laparoscopic surgery and Lichtenstein surgery [MD = -3.40, 95% CI (-8.12 ~ 1.32), P = 0.16]. Figure 3.

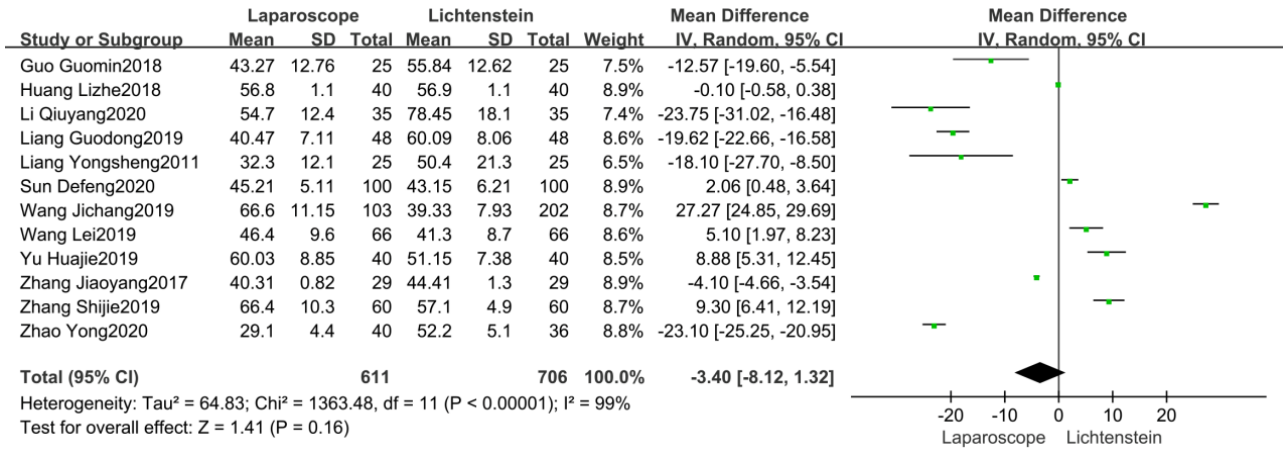

Figure 3. Comparison of operation time between laparoscopic surgery group and Lichtenstein operation group

3.3.2 Intraoperative blood loss

There were 9 literatures [6-10, 12, 13, 15, 16] that described the intraoperative blood loss. The heterogeneity test results of each study (P < 0.00001, I2 = 98%) were used. Therefore, the random-effects model was used for meta-analysis. The results showed that the laparoscopic intraoperative blood loss was significantly less than that of Lichtenstein operation, and the difference had statistical significance [MD = -7.15, 95% CI (-11.05 ~ -3.25), P < 0.05]. Figure 4.

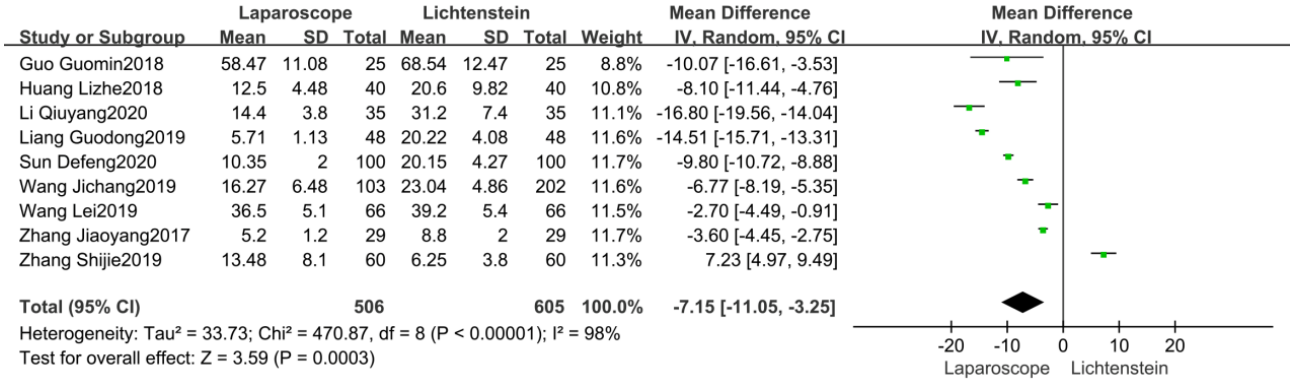

Figure 4. Comparison of intraoperative blood loss in laparoscopic surgery group

3.3.3 Postoperative recovery time

There were 7 literatures [9-14, 16] that compared the postoperative recovery time of patients undergoing laparoscopic and Lichtenstein surgery. The heterogeneity test results of each study (P < 0.00001, I2 = 99%) were used. Therefore, the random-effects model was used for meta-analysis. The results showed that there was no significant difference in the postoperative recovery time between laparoscopic surgery and Lichtenstein surgery [MD = -2.43, 95% CI (-5.13 ~ 0.26), P = 0.08]. Figure 5.

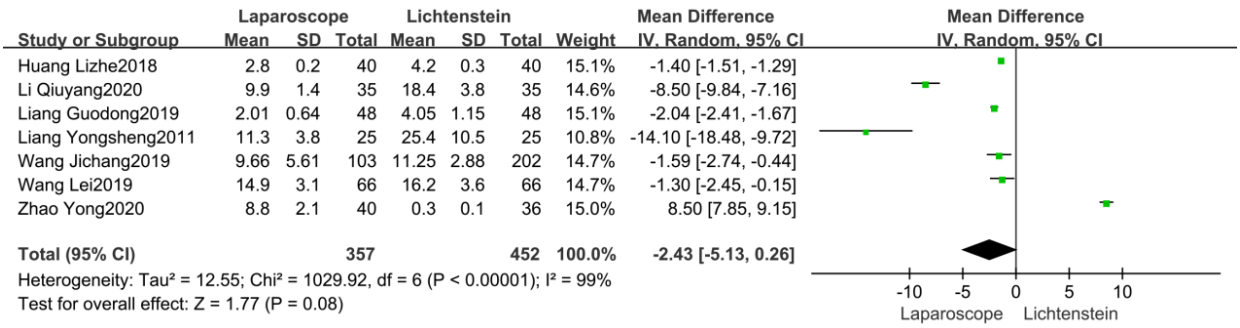

Figure 5. Comparison of postoperative recovery time in Lichtenstein operation group

3.3.4 VAS pain score on the first day after operation

4 literatures [7, 8, 10, 15] reported VAS pain score on the first day after operation in patients undergoing laparoscopic and Lichtenstein surgery, and the heterogeneity test results of each study (P < 0.00001, I2 = 88%) so a meta-analysis was performed using a random-effects model. The results showed that the VAS pain score on the first day after laparoscopic surgery was significantly lower than that of Lichtenstein surgery, and the difference had statistical significance [MD = -1.39, 95% CI (-2.07 ~ -0.70), P < 0.05]. Figure 6.

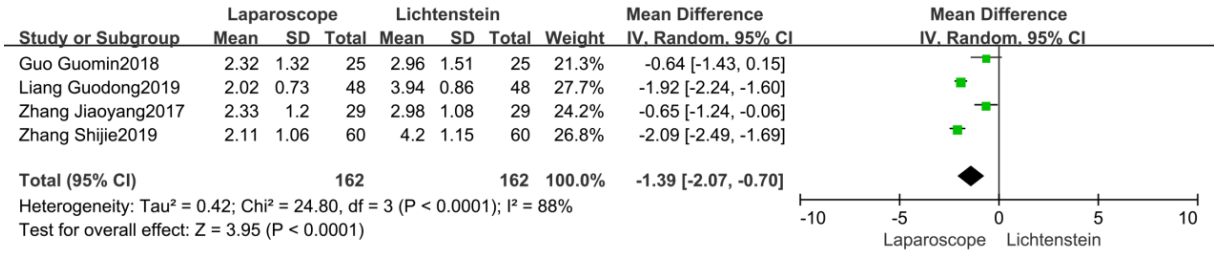

Figure 6. Comparison of VAS Pain Scores on Postoperative Day 1 in the Laparoscopic Surgery Group

3.3.5 Hospital stay

A total of 12 literatures [5-16] were studied in terms of hospital stay. The heterogeneity test results of each study (P < 0.00001, I2 = 98%) were used. Therefore, the random-effects model was used for meta-analysis. The results showed that the hospital stay of laparoscopic surgery was significantly less than that of Lichtenstein surgery, and the difference had statistical significance [MD = -1.42, 95% CI (-2.22 ~ -0.62), P < 0.05]. Figure 7.

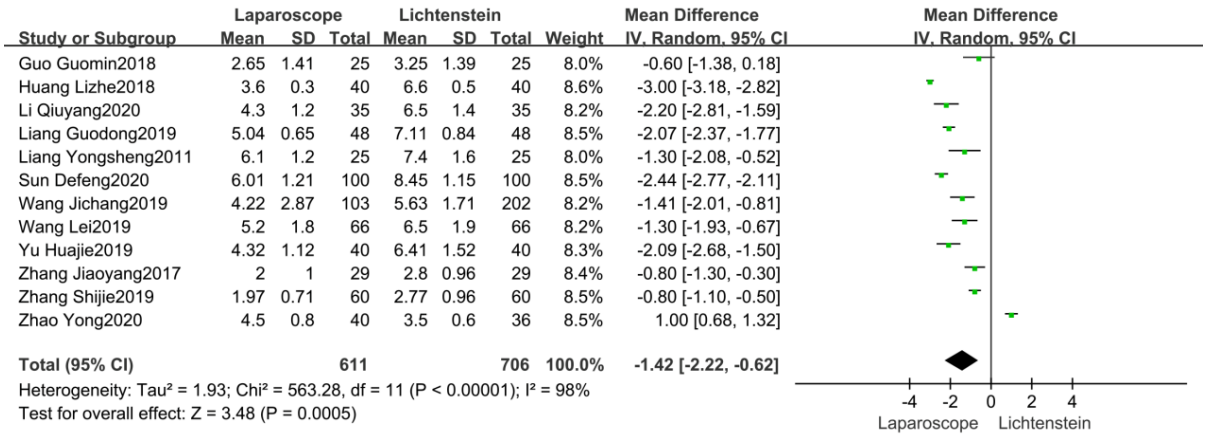

Figure 7. Comparison of hospital stay in the laparoscopic surgery group

3.3.6 Hospitalization costs

Four literatures [6-10, 12, 13, 15, 16] reported the hospitalization costs of the two surgical methods. The heterogeneity test results of each study (P < 0.00001, I2 = 100%) were used for meta-analysis. The results showed that the hospitalization costs of laparoscopic surgery were significantly higher than those of Lichtenstein surgery, and the difference had statistical significance [MD = 4798.61, 95% CI (3012.94 ~ 6584.28), P < 0.05]. Figure 8.

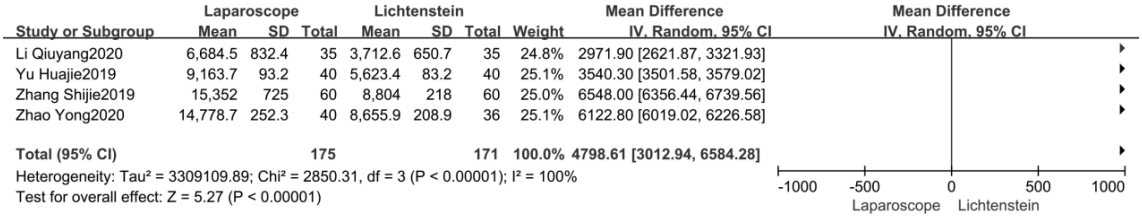

Figure 8. Comparison of hospitalization costs in laparoscopic surgery group

3.3.7 Incidence of urinary retention

A total of 8 literatures [5, 9-15]compared the incidence of postoperative urinary retention in patients undergoing laparoscopic surgery and Lichtenstein surgery. The results of heterogeneity test in each study (P = 0.60, I2 = 0%) were analyzed by fixed effect model. The results showed that there was no significant difference in postoperative urinary retention between patients undergoing laparoscopic surgery and Lichtenstein surgery [RR = 0.80, 95% CI (0.39 ~ 1.62), P = 0.53]. Figure 9.

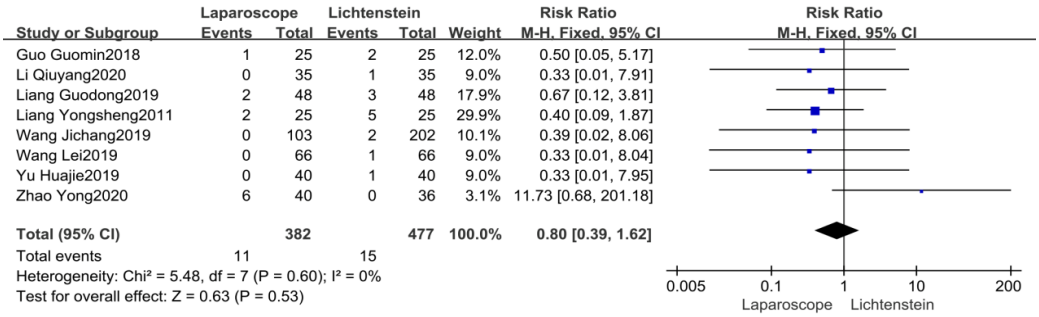

Figure 9. Comparison of incidence of postoperative urinary retention in laparoscopic surgery group after Lichtenstein operation

3.3.8 Incidence of scrotal swelling

There were 5 articles [7, 10, 14-16] reporting postoperative scrotal swelling in patients undergoing laparoscopic and Lichtenstein surgery, and the results of heterogeneity test in each study (P = 0.65, I2 = 0%) so a fixed-effect model was used for meta-analysis, and the results showed that the incidence of postoperative scrotal swelling in the laparoscopic surgery group was lower than that in the Lichtenstein surgery group, and the difference in postoperative scrotal swelling was statistically significant [RR = 0.41, 95% CI (0.17 to 0.95), P < 0.05].Figure 10.

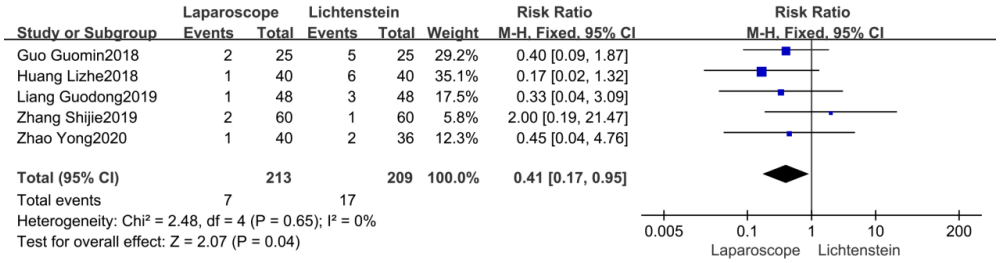

Figure 10. Comparison of the incidence of postoperative scrotal swelling in the laparoscopic surgery group

3.3.9 Hematoma or serum incidence

There were 5 literatures [5, 6, 9, 12, 16]that compared the postoperative hematoma or seroma between patients who underwent laparoscopic surgery and those who underwent Lichtenstein operation. The heterogeneity test results of each study (P = 0.32, I2 = 15%) were used. Therefore, the fixed-effect model was used for meta-analysis. The results showed that there was no significant difference in the postoperative hematoma or seroma between patients who underwent laparoscopic surgery and those who underwent Lichtenstein operation [RR = 1.13, 95% CI (0.44 ~ 2.89), P = 0.80]. Fig.11.

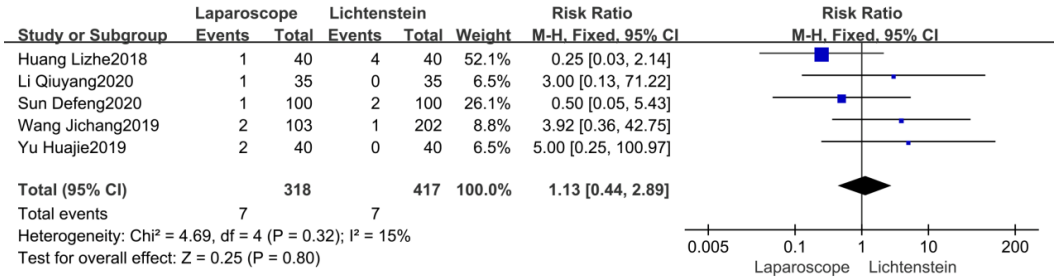

Figure 11. Comparison of the incidence of postoperative hematoma or seroma in the laparoscopic surgery group

3.3.10 Incidence of incision infection

Six literatures [6, 7, 9, 12-14]reported postoperative incision infection in laparoscopic surgery group. The heterogeneity test results of each study (P = 0.77, I2 = 0%) were analyzed by fixed-effect model. The results showed that there was no significant difference in postoperative incision infection between laparoscopic surgery group and Lichtenstein operation group [RR = 0.42, 95% CI (0.15 ~ 1.14), P = 0.09].Figure 12.

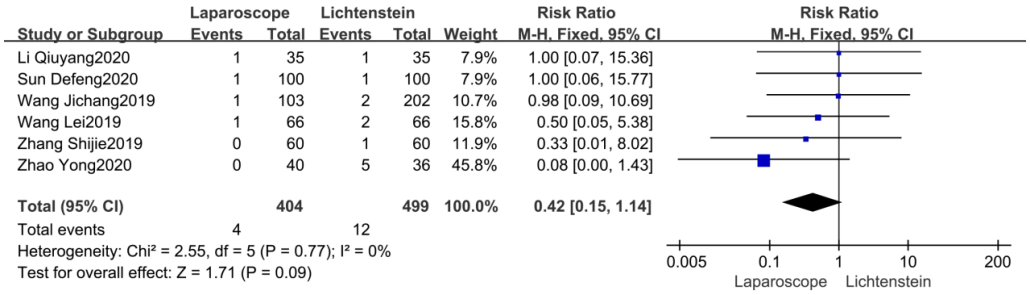

Figure 12. Comparison of incidence rate of postoperative incision infection in laparoscopic surgery group treated with Lichtenstein operation

3.3.11 Incidence of incision pain

Three literatures [6, 11, 16] reported the situation of incision pain. The heterogeneity test results of each study (P = 0.72, I2 = 0%) were analyzed by fixed effect model. The results showed that the incidence rate of postoperative incision pain in laparoscopic surgery group was lower than that in Lichtenstein operation group, and the difference in the postoperative incision pain had statistical significance [RR = 0.21, 95% CI (0.06 ~ 0.72), P < 0.05]. Figure 13.

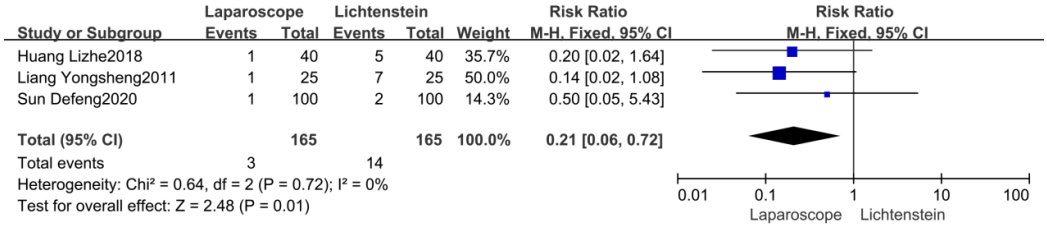

Figure 13. Comparison of incidence rate of postoperative incision pain in laparoscopic surgery group treated with Lichtenstein operation

3.3.12 Incidence of discomfort in the inguinal region

There were 5 articles [5, 7, 10, 13, 15] that reported about postoperative discomfort in the femoral groove region, and the results of heterogeneity test in each study (P = 0.27, I2 = 23%) so a meta-analysis was performed using a fixed-effect model, and the results showed that the incidence of postoperative discomfort in the inguinal region in the laparoscopic surgery group was lower than that in the Lichtenstein surgery group, and the difference in postoperative discomfort in the inguinal region was statistically significant [RR = 0.35, 95% CI (0.17 to 0.72), P < 0.05]. Figure 14.

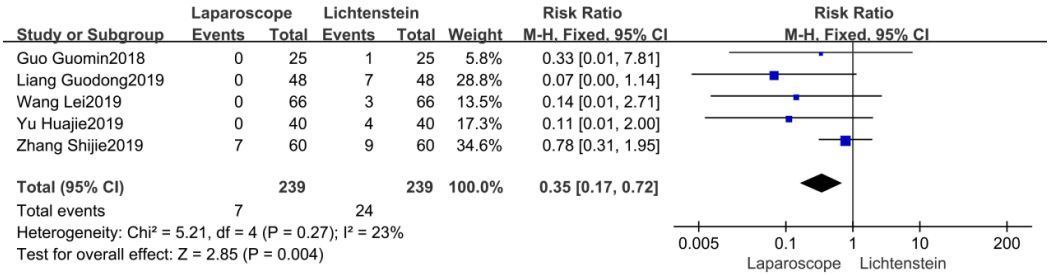

Figure 14. Comparison of incidence of postoperative groin discomfort in laparoscopic surgery group

3.3.13 Incidence of chronic pain

Three literatures [5, 7, 9] reported the occurrence of postoperative chronic pain in the laparoscopic surgery group. The heterogeneity test results of each study (P = 0.35, I2 = 4%) were analyzed by the fixed-effect model. The results showed that there was no significant difference in the occurrence of postoperative chronic pain between the laparoscopic surgery group and the Lichtenstein surgery group [RR = 0.56, 95% CI (0.19 ~ 1.62), P = 0.28]. Figure 15.

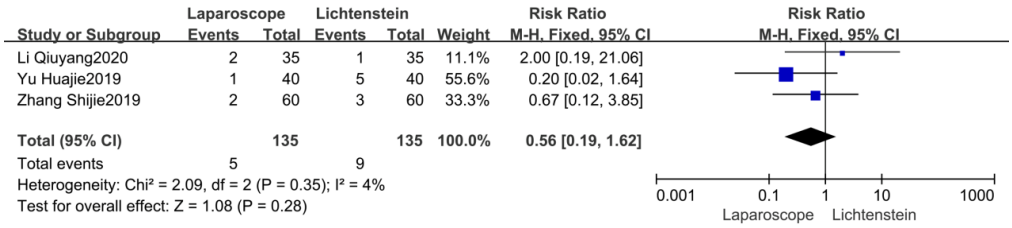

Figure 15. Comparison of the incidence of postoperative chronic pain in the laparoscopic surgery group

3.3.14 Recurrence rate

5 literatures [9-11, 13, 16] reported the recurrence. The heterogeneity test results of each study (P = 0.69, I2 = 0%). Therefore, the fixed-effect model was used for meta-analysis. The results showed that the recurrence rate in the laparoscopic surgery group was lower than that in the Lichtenstein surgery group, and the difference in the postoperative recurrence rate was statistically significant [RR = 0.38, 95% CI (0.17 ~ 0.87), P < 0.05]. Figure 16.

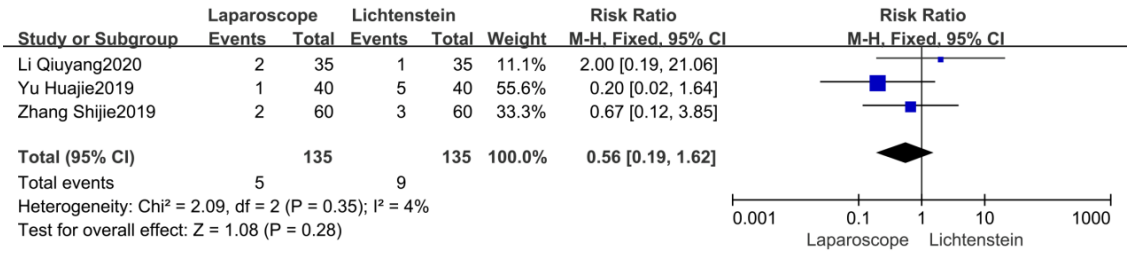

Figure 16. Comparison of postoperative recurrence rate in laparoscopic surgery group treated with Lichtenstein operation

3.3.15 Total incidence rate of complications

11 literatures [5-7, 9-16, 17-26] reported the total incidence rate of complications in laparoscopic surgery group. The heterogeneity test results of each study (P = 0.11, I2 = 37%) were used for meta-analysis. The results showed that the total incidence rate of complications in laparoscopic surgery group was lower than that in Lichtenstein surgery group, and the difference in the total incidence rate of complications had statistical significance [RR = 0.47, 95% CI (0.34 ~ 0.63), P < 0.05]. Figure 17.

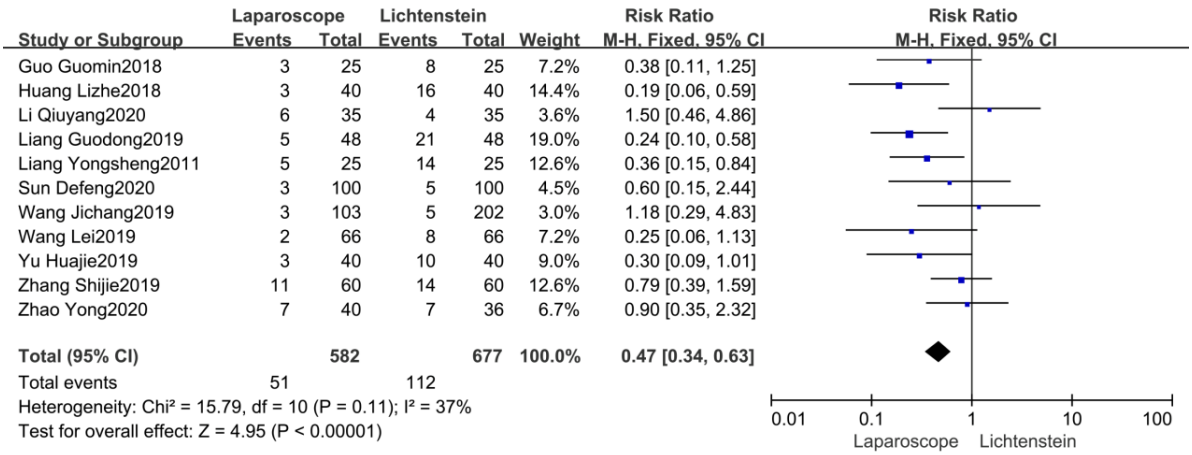

Figure 17. Comparison of Overall Complication Rate in Lichtenstein Procedure Group

4. Discussion

The incidence of inguinal hernia increases with age, and as the aging of Chinese society progresses, the number of elderly patients with inguinal hernia will increase. Elderly patients, as a special group, are often accompanied by a variety of chronic diseases, poor physical base level and compensatory ability, and need to be more cautious about their clinical treatment, and errors in the determination of any link will increase the risk of surgical complications.Lichtenstein's space is simple, only the subaponeurotic space of the external oblique is freed, avoiding the operation in the preperitoneal space, reducing the risk of trauma and potential bleeding; the vast majority of patients can complete the operation under local anesthesia, reducing the surgical risk caused by anesthesia, with a definite effect and a recurrence rate as low as 0.12%, however, this incision is large, not conducive to early ambulation, slow recovery, and the incidence of postoperative chronic pain is high, which can reach 15% to 40%. Both TAPP and TEP in laparoscopic surgery are preperitoneal enhanced repair of pubic foramen, with the advantages of low recurrence rate and rapid recovery time, and also have advantages in the treatment of hernia and abdominal exploration. Some literatures pointed out that for elderly patients with transverse abdominal fascia relaxation and increased intra-abdominal pressure, preperitoneal repair should be the most appropriate choice; the disadvantages are that the operation is relatively complex, it requires operation under general anesthesia and pneumoperitoneum, and it requires a longer learning curve.Some scholars believe that for elderly patients, laparoscopic surgery is a supplement rather than a substitute for open surgery, and there is still some controversy about the choice of open or laparoscopic surgery for inguinal hernia in the elderly.

Twelve trials were finally included in this meta-analysis, including 611 cases in the laparoscopic group, including 258 cases of TAPP surgery and 353 cases of TEP surgery; 706 cases in the Lichtenstein group.The results showed that laparoscopic herniorrhaphy was superior to Lichtenstein herniorrhaphy in terms of intraoperative blood loss, VAS pain score on postoperative day 1, length of hospital stay, incidence of scrotal swelling, incidence of incisional pain, incidence of groin discomfort, recurrence rate, and total incidence of complications.The reasons may be: (1) advantages of laparoscopic surgery equipment: the high-definition imaging system has a clear and magnified view field to facilitate the identification of tissue structure. In addition, the harmonic scalpel has a

good hemostatic and cutting effect, making the operation more precise and avoiding the collateral injury of nerves, blood vessels, lymphatic vessels and other tissues; (2) characteristics of TAPP and TEP surgery: both of them are preperitoneal enhanced repair of pubic foramen, which is more physiological from the mechanical principle, the repair is exact, and it can protect the inguinal canal anatomy and cremaster muscle without damaging the vas deferens and spermatic vessels and nerves.It should be noted that in the analysis of intraoperative blood loss, VAS pain score on the first day after operation and hospital stay, the heterogeneity was large, considering that the possible reasons were: different surgeons did the same surgical effect was not consistent, in addition, elderly patients had more underlying diseases, which could also affect the therapeutic effect. There was no significant difference between the two surgical methods in terms of operation time, postoperative recovery time, incidence of urinary retention, incidence of hematoma or seroma, incidence of incision infection, and incidence of chronic pain. It was considered that there was a relationship between the main surgical methods and the technical differences of the operator as well as the age of elderly patients, combined underlying diseases and other personal differences. In addition, the incidence of urinary retention was greatly related to the anesthesia method, but also related to the fluid intake and the use of analgesic pump; the relationship between the occurrence of chronic pain after inguinal hernia repair and the surgical technique was not clear, and it is generally accepted that it is related to the injury of iliohypogastric nerve, genitofemoral nerve, patch rejection or improper patch placement. The results of this study showed that the cost of laparoscopic surgery was higher than that of Lichtenstein herniorrhaphy, which provided a reference for the patient's family to choose the surgical approach to some extent.

This study is a randomized controlled trial with comprehensive observation indicators. The results of Meta analysis are scientific and representative. However, it may also have the following limitations: (1) studies come from different centers and may have differences in regions, investigators, etc.; (2) the quality of the included literatures in this study is uneven, which may also bring potential bias; (4) some of the included studies have large heterogeneity, which may be related to the age, underlying diseases, ease of surgery, etc.; (3) some outcome measures included too few literatures; (4) this study did not consider the specific way of laparoscopic surgery and the age stratification of the elderly; (5) this study included sample size is not very sufficient.

In summary, based on the current evidence, laparoscopic surgery is superior to Lichtenstein herniorrhaphy in the surgical treatment of inguinal hernia in the elderly in terms of operative blood loss, postoperative day 1 VAS pain score, length of hospital stay, incidence of scrotal swelling, incidence of incisional pain, incidence of groin discomfort, recurrence rate, and total incidence of complications, but with relatively high hospital costs. In addition, differences in operation time, time to postoperative recovery, incidence of urinary retention, incidence of hematoma or seroma, incidence of incision infection, and incidence of chronic pain require confirmation by further studies. It is therefore concluded that laparoscopic herniorrhaphy is safe and effective in the treatment of inguinal hernia in the elderly and can be a priority in the case of a comprehensive assessment of the patient's good physical condition.

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