

Efficacy and prognosis of mastoscopic axillary lymph node dissection for breast cancer: a systematic evaluation and meta-analysis

Hong-Yi Lan, Yi-Hua Fan, Yang Chen, Wan-Ting Cui, Wen-Han Li, Hao-Fang Guan, and Xin-Ju Li

Abstract—Objective: To systematically evaluate the efficacy and prognosis of breast lumpectomy axillary lymphatic dissection for the treatment of breast cancer. **Methods:** We use computer to search PubMed, The Cochrane Library, EMBASE, Web of Science, China Knowledge Network, Wanfang database, VIP database and CBM for randomized controlled trials (RCTs) of breast lumpectomy in axillary lymphatic dissection for breast cancer. The search time frame was from the database establishment to July 2021. Meta-analysis was performed using Revman 5.4.1 software after 2 investigators independently screened the literature, extracted information, and evaluated the risk of bias of the included studies. **Results:** A total of 20 RCTs including 2672 patients were included. Mastoscopic axillary lymph node dissection (MALND) was used in the trial group and conventional axillary lymph node dissection (CALND) was used in the control group. The results showed that the trial group was more effective in controlling bleeding volume [MD = -54.72, 95% CI (-79.73, -29.71), $P < 0.00001$], postoperative drainage [MD = -98.99, 95% CI (-128.83, -69.15), $P < 0.00001$], length of hospital stay [MD = -2.75, 95% CI (-4.67, -0.83), $P = 0.005$], and incidence rate of adverse reaction [RR = 0.30, 95% CI (0.19, 0.45), $P < 0.00001$] were superior to the control group, and the differences were statistically significant. **Conclusions:** Current evidence suggests that MALND can achieve better outcomes compared with CALND. It is more advantageous in controlling the bleeding volume, postoperative drainage, length of hospital stays, and incidence rate of adverse events.

Key words—Axillary lymph node dissection, Breast lumpectomy, Breast cancer, Randomized controlled trial, Meta-analysis

INTRODUCTION

Breast cancer is a highly prevalent malignancy of the breast, accounting for approximately 25.1% of all cancers in women worldwide. According to the global cancer statistics in 2020, the incidence of breast cancer is as high as 11.7%, which is the most prevalent cancer in the world, and the mortality rate reaches 6.9%, and the trend is increasing year by year [1]. The current treatment for breast cancer is mainly surgery, which can achieve good efficacy, high cure rate and low recurrence rate of patients

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after surgery [2]. Surgical procedures have evolved in recent years. From the initial simple radical tumor resection, to the emergence of breast-conserving surgery with higher aesthetics and survival quality, to the current widespread use of sentinel lymphatic biopsy and breast lumpectomy [3]. Minimally invasive surgery causes less damage to the normal tissues of breast cancer patients, preserves some normal physiological functions of patients, significantly improves the prognosis of patients and improves survival quality [4].

As an emerging minimally invasive technique in breast surgery, breast lumpectomy was initially used in breast plastic surgery, and gradually applied to minimally invasive treatment of surgical excision of breast cancer in continuous development [5]. Clinical studies have shown that [6-8], compared with conventional open surgery, endoscopic breast surgery can significantly reduce postoperative complications, and has the advantages of breast function preservation and beautiful appearance. It plays an important role in the mental and psychological rehabilitation of patients with mammary gland disease after surgery, and can significantly improve the quality of life of patients [9]. There is still a lack of systematic and objective clinical analysis and evaluation, and the efficacy and prognosis of lumpectomy treatment are still controversial [10]. Therefore, this article will conduct a meta-analysis of all studies on the treatment of breast cancer with mastoscopic axillary lymph node dissection to make an objective evaluation of the efficacy and prognosis of this therapy, improve the quality of clinical evidence, and promote endoscopic adjuvant therapy.

METHODS

Criteria used to consider studies for this review

Type of studies Only clinical randomized controlled trials that provided specific data were included, and there were no language restrictions on the included studies.

Patients included Patients with a diagnosis of breast cancer confirmed by pathology and imaging, with no restrictions on nationality, race or disease duration for inclusion in the study.

Type of intervention Breast-conserving surgery or radical surgery was performed in both the test and control groups. MALND was used in the trial group and CALND was used in the control group.

Evaluation indexes Duration of surgery, bleeding volume, number of lymph nodes dissected, postoperative

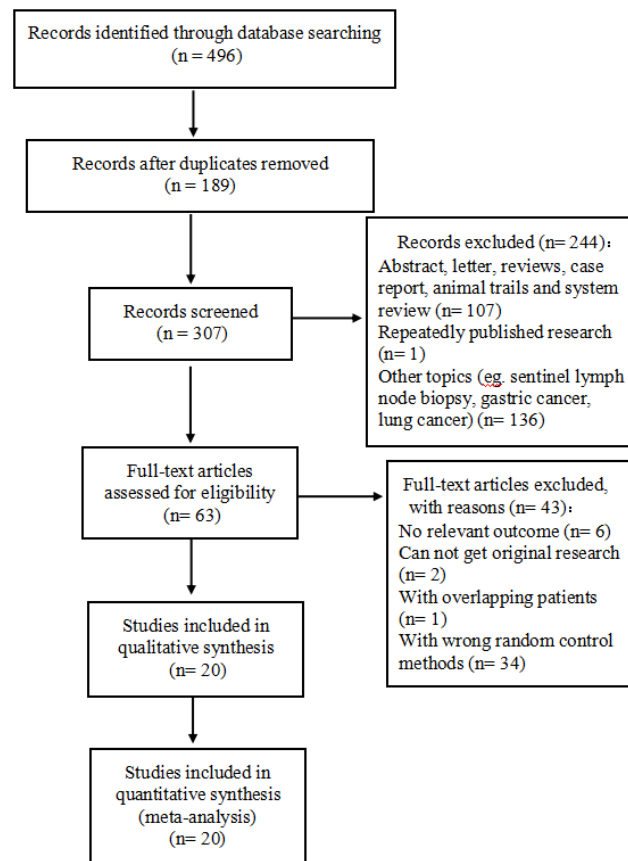


Fig. 1 Document selection process and results

drainage, length of hospital stays, incidence rate of adverse reaction, recurrence rate.

Exclusion criteria

(1) Non-randomized controlled studies such as reviews, abstracts, letters, and case reports. (2) Repeatedly published studies. (3) Studies with incorrect randomized control methods (e.g. studies based on patients' wishes, grouping according to different surgical methods, or studies that did not mention randomized methods). (4) Studies combining other treatment modalities.

Search methods for study identification

Using "breast cancer", "axillary lymphatic dissection", "breast lumpectomy", etc. as search words. And used the combination of subject words and free words (e.g. search by "Lymph Node Excision" as the subject words, search by "Lymph Node Dissection", "Lymphadenectomy", etc. as free words, and use "or" to connect the search terms to obtain as much studies as possible). The following databases were searched by computer: PubMed, The Cochrane Library, EMBASE, Web of Science, China Knowledge Network, Wanfang database, VIP database and CBM. The clinical studies on MALND for breast cancer published in domestic and foreign biomedical journals were searched from database establishment to July 2021, and all references were imported into Endnote X9.

Data extraction, selection and coding

Literature screening as well as data extraction was done by two researchers. Firstly, removing duplicate studies, browsing the titles and abstracts of the studies for initial

screening and excluding literature with inconsistent themes. Secondly, the researchers read the full text carefully and removed ineligible studies based on the exclusion criteria. Finally, an Excel spreadsheet was used to extract the following: 1) Baseline information: first author's name, year of publication, basic patient information, and disease typology. 2) Interventions in the test and control groups. 3) Outcome indicators and corresponding values. 4) Adverse effects, number of recurrence cases, and follow-up time. 5) Characterization of the risk of bias in evaluating the quality of the literature.

The results were checked and compared with each other by two researchers, and if disagreements arose, they were first discussed. If a common conclusion cannot be reached, it will be resolved with the assistance of a third party.

Risk of bias (quality) assessment

The literature will be assessed using the risk of bias assessment tool recommended in the Cochrane Handbook. Risk of bias assessment will be carried out by two researchers based on the quality characteristics of the literature provided by the article and based on the following six aspects. These include: randomised method, blinding, allocation scheme, selective reporting, data completeness and other bias. The final assessment was "unclear", "high risk" and "low risk".

Strategy for data synthesis

We will use Revman 5.4.1 statistical software for meta-analysis. Risk ratio (RR) statistics will be used to analyze dichotomous variables. For continuous variables, weighted mean difference (WMD) will be used if the measurement

Table 1 Basic characteristics of included studies

Author name	Year	N (T/C)	Age		Intervention		Type	Outcome	Follow-up time
			T	C	T	C			
Salvat J. [11]	1996	40 (20/20)	63 ± 9	59.4 ± 12.25	MALND	CALND	I/II/III	1, 2, 5, 6, 7	6 months
C. G. S. Hüscher [12]	2002	22 (10/12)	56.9 ± 8.5	62.7 ± 9.75	MALND	CALND	I/II	1, 2, 4, 6	70 months
R. L. de Wilde [13]	2003	80 (40/40)	58.4 ± 11	64.9 ± 7.75	MALND	CALND	I/II	1, 6	3 months
Guo M.Q. [14]	2006	79 (45/34)	46.2 ± 8.25	46.9 ± 8	MALND	CALND	I/II/III	1, 2, 3, 4	\
Chaoyou Huang [15]	2012	30 (15/15)	43.5 ± 5.75		MALND	CALND	\	1, 2, 3, 4	\
Luo, C [16]	2012	996 (496/500)	52.2	47.9	MALND	CALND	I/II/III	1, 2, 3, 4, 6	63 months
Yu Gong [17]	2013	100 (50/50)	48.13 ± 6.43	49.07 ± 4.19	MALND	CALND	I/II/III	1, 2, 3, 5, 6	\
Jian Zhang [18]	2013	267 (134/133)	50.0 ± 10.8	50.1 ± 10.7	MALND	CALND	I/II	1, 2, 3, 4, 6	30 months
Guosheng Li [19]	2013	60 (32/28)	46.14 ± 9.36	45.68 ± 9.73	MALND	CALND	I/II/III	1, 2, 3, 5, 6, 7	20 months
Shunyuan Liu [20]	2014	79 (39/40)	48.8 ± 6.7		MALND	CALND	I/II	1, 2, 3, 7	36 months
Yanyong Zhang [21]	2015	104 (52/52)	43.76 ± 4.83	45.61 ± 3.34	MALND	CALND	\	1, 3, 5, 6	\
Jie Liu [22]	2015	60 (30/30)	32.48 ± 6.47	34.48 ± 5.3	MALND	CALND	\	1, 2, 3, 4, 6	\
Shengxiang Zhang [23]	2015	58 (29/29)	48.2 ± 6.8	48.4 ± 6.9	MALND	CALND	\	1, 2, 3, 7	24 months
Xiaoyu Deng [24]	2015	100 (50/50)	45.5 ± 2.5	45.5 ± 2.3	MALND	CALND	I/II	1, 2, 3, 7	24 months
Xifeng Tang [25]	2017	200 (100/100)	57.7 ± 7.75	58.0 ± 6.0	MALND	CALND	I	1, 2, 3, 4, 6, 7	\
Jiameng Gu [26]	2017	126 (63/63)	51.8 ± 16.3	51.8 ± 16.3	MALND	CALND	I/II	1, 2, 3, 6	\
Liping Su [27]	2017	90 (45/45)	47.3 ± 9.5	47.3 ± 9.5	MALND	CALND	I/II	1, 2, 3, 4, 5, 6, 7	9 months
Xiaoyue Chen [28]	2018	65 (33/32)	49.92 ± 11.02	50.24 ± 10.32	MALND	CALND	I/II	1, 2, 3, 4, 5, 6, 7	12 months
Chen Chen [29]	2019	40 (20/20)	52.4 ± 4.5	52.7 ± 4.5	MALND	CALND	I/II	1, 2, 3, 4, 6	24 months
Yashun Qiao [30]	2019	76 (38/38)	48.5 ± 7.6	48.6 ± 7.5	MALND	CALND	I/II	1, 2, 3, 4, 6, 7	12 months

Outcome: 1. Duration of surgery; 2. Number of lymph nodes dissected; 3. Bleeding volume; 4. Postoperative drainage; 5. Length of hospital stay; 6. Incidence rate of adverse reaction; 7. Recurrence rate.

units are the same, and standardized mean difference (SMD) will be used if the measurement units or methods are different. The above effect sizes were expressed as 95% confidence interval (CI). Heterogeneity between studies was tested according to I^2 and P values. If the test result $I^2 \leq 50\%$ and $P \geq 0.1$, indicated good homogeneity of the included studies and meta-analysis was performed using a fixed effects model. If the test result $I^2 > 50\%$ and $P < 0.1$, indicated heterogeneity between studies, meta-analysis was performed using a random-effects model. If some clinical heterogeneity existed, subgroup analysis was performed. If the heterogeneity was too great and the source of heterogeneity could not be found, only qualitative evaluation was performed. Sensitivity analyses were performed using the one-by-one exclusion method to see whether individual studies contributed to the stability of the combined results, and if none of the P values changed after testing (no more than 0.05), the stability of the results was considered good. When the number of studies included in the outcome index was more than 9, publication bias would be evaluated by using funnel plots, and if the funnel plots were symmetrical then no significant publication bias was considered to exist.

RESULTS

Literature search

Computer search of various databases was conducted to obtain 496 relevant literature, 189 duplicates were

excluded, 244 literature were excluded after reading the titles and abstracts, 43 literature were excluded after reading the full text, and 20 literature were finally included [11-30] and meta-analysis was performed. The specific literature screening process is shown in Figure 1.

Study characteristics

The basic characteristics of the included studies are shown in Table 1. Both the trial and control groups were treated with breast-conserving surgery or radical surgery, with breast lumpectomy for axillary lymph node dissection in the trial group and conventional open axillary lymph node dissection in the control group. Twenty studies [11-30] reported the duration of surgery, 18 studies [11-20, 22-30] reported the number of lymph nodes dissected, 17 studies [14-30] reported the bleeding volume, 11 studies [12, 14-16, 18, 22, 25, 27-30] reported the postoperative drainage, and 6 studies [11, 17, 19, 21, 27, 28] reported length of hospital stay, 15 studies [11-13, 16-19, 21, 22, 25-30] reported the incidence rate of adverse reaction, and 9 studies [11, 19, 20, 23-25, 27, 28, 30] reported the recurrence rate.

Risk of bias and methodological design

The quality of the 20 included literature was evaluated using the RCT risk of bias assessment tool recommended by the Cochrane Handbook. 6 literature [11, 15, 18, 26, 28, 30] used the correct random sequence generation method, 5

Study	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Chaoyou Huang 2012	?	?	?	?	?	?	?
Chen Chen 2019	?	?	?	?	?	?	?
de Wilde 2003	?	?	?	?	?	?	?
Guo, M. Q. 2006	?	?	?	?	?	?	?
Guosheng Li 2013	?	?	?	?	?	?	?
Hüscher 2002	?	?	?	?	?	?	?
Jiameing Gu 2017	?	?	?	?	?	?	?
Jian Zhang 2013	?	?	?	?	?	?	?
Jie Liu 2015	?	?	?	?	?	?	?
Liping Su 2017	?	?	?	?	?	?	?
Luo, C 2012	?	?	?	?	?	?	?
SalvatJ 1996	?	?	?	?	?	?	?
Shengxiang Zhang 2015	?	?	?	?	?	?	?
Shunyuan Liu 2014	?	?	?	?	?	?	?
Xiaoyu Deng 2015	?	?	?	?	?	?	?
Xiaoyue Chen 2018	?	?	?	?	?	?	?
Xifeng Tang 2017	?	?	?	?	?	?	?
Yanyong Zhang 2015	?	?	?	?	?	?	?
Yashun Qiao 2019	?	?	?	?	?	?	?
Yu Gong 2013	?	?	?	?	?	?	?

Fig. 2 Bias risk assessment of included studies

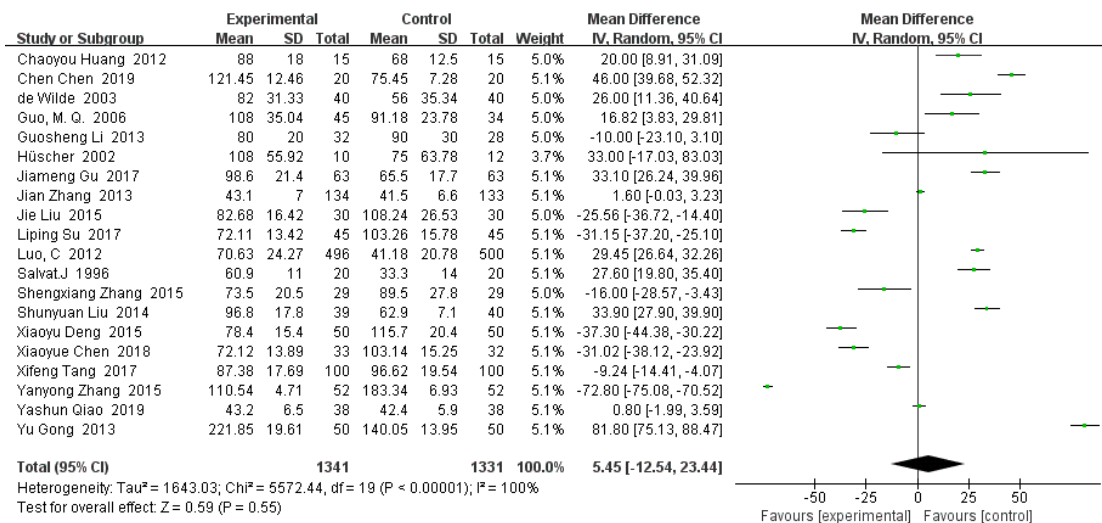


Fig. 3 Meta-analysis of the duration of surgery between the experimental group and the control group

literature [11, 15, 18, 26, 30] used the correct allocation concealment method, and the remaining 14 literature did not describe the specific random sequence method and allocation concealment method and rated as unclear risk. All literature did not mention the blinded method and rated as unclear risk. All literature was rated as low risk of bias in terms of outcome indicators and selective reporting, 7 literature [11, 14, 19-23] were rated as unclear risk in terms of other biases and the rest were rated as low risk. The results of the risk of bias evaluation are shown in Figure 2.

Results of Meta-analysis

Duration of surgery Twenty literatures [11-30] containing 2, 672 patients were included, and a meta-analysis was performed to determine the duration of surgery in each study's test group versus the control group. The results of the heterogeneity test showed some heterogeneity between studies [$P < 0.00001$, $I^2 = 100\%$]. Sensitivity analysis was performed using the one-by-one exclusion method, and the heterogeneity test results did not change significantly after exclusion, indicating that the heterogeneity did not originate from any of the single literature and that the combined results were stable. Review of the original article did not reveal clinical heterogeneity or methodological heterogeneity, and statistical heterogeneity was considered, and the results were combined using a random-effects model. The results

of the study showed that the comparison between the test and control groups in duration of surgery was not statistically significant [MD = 5.45, 95% CI (-12.54, 23.44), $P = 0.55$] (Figure 3).

Number of lymph node dissected Eighteen literatures [11-20, 22-30] containing 2, 488 patients were included in the meta-analysis of the number of lymph node dissected in the trial and control groups of each study. There was no significant heterogeneity between studies [$P = 0.49$, $I^2 = 0\%$], and analysis using a fixed-effects model showed no statistically significant comparison of the number of lymph nodes cleared between the two groups [MD = 0.26, 95% CI (-0.06, 0.58), $P = 0.12$]. Sensitivity analysis using the one-by-one exclusion method revealed no significant change in P values, indicating a stable combined outcome (Figure 4).

Bleeding volume Seventeen literatures [14-30] containing 2, 530 patients were included and a meta-analysis of the bleeding volume in the trial and control groups of each study was performed. There was some heterogeneity among the studies [$P < 0.00001$, $I^2 = 100\%$], and sensitivity analysis using the one-by-one exclusion method revealed that the heterogeneity did not originate from any of the literature, and the P values were less than 0.05 after one-by-one exclusion, and the included data did not have a large impact on the stability of the combined

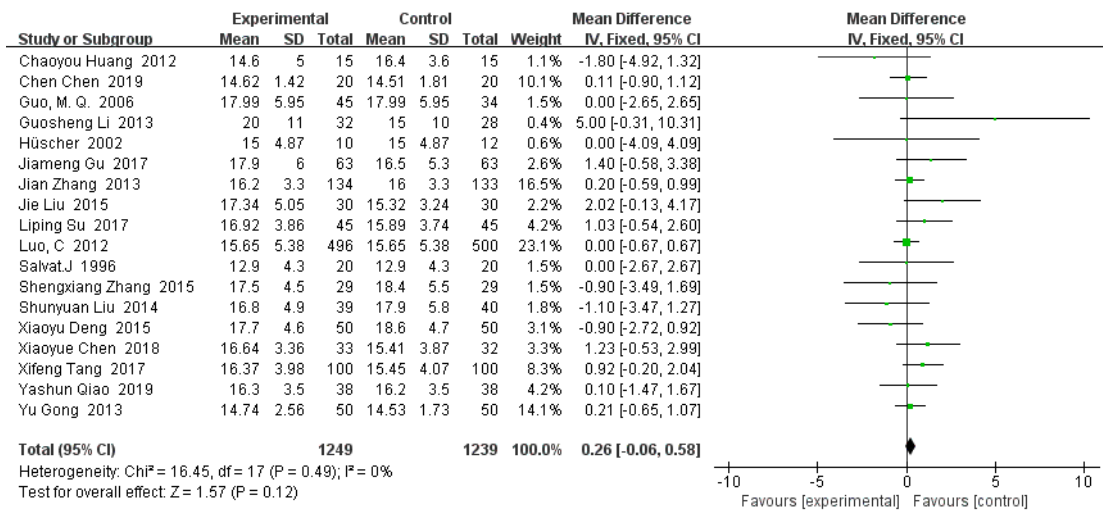


Fig. 4 Meta-analysis of the number of lymph node dissected between the experimental group and the control group

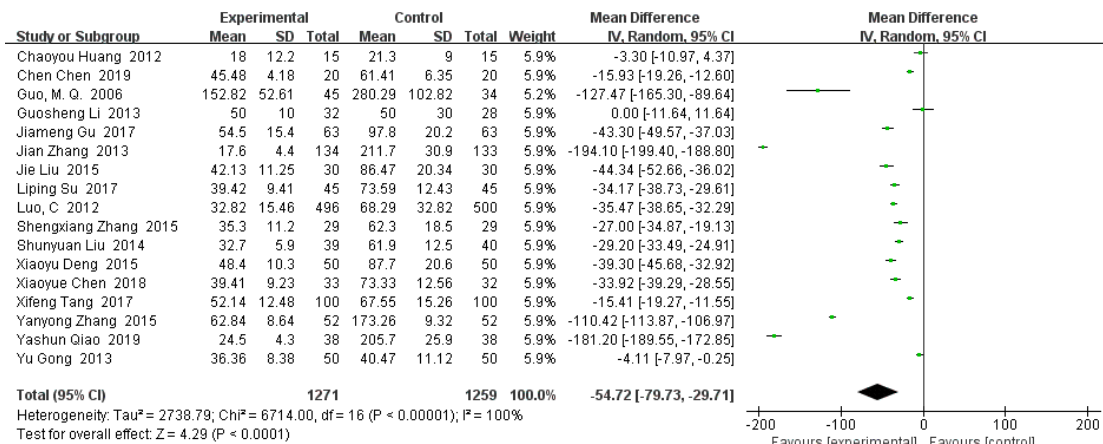


Fig. 5 Meta-analysis of the bleeding volume between the experimental group and the control group

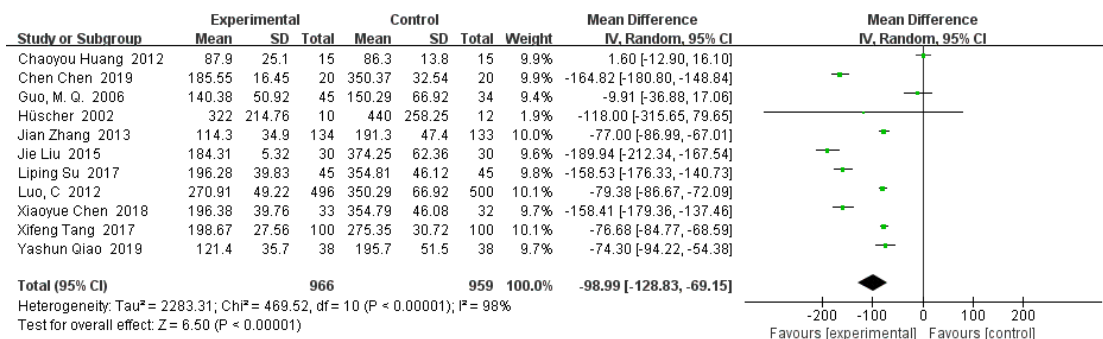


Fig. 6 Meta-analysis of the postoperative drainage between the experimental group and the control group

results, and the stability of the combined results was good. No significant clinical heterogeneity or methodological heterogeneity was found in the original article reviewed, so a random-effects model was used for analysis. The results showed a statistically significant difference in the comparison of bleeding volume between the test and control groups [MD = -54.72, 95% CI (-79.73, -29.71), P < 0.00001] (Figure 5).

Postoperative drainage Eleven literatures [12, 14-16, 18, 22, 25, 27-30] containing 1, 925 patients were included in the meta-analysis of the postoperative drainage in the trial and control groups of each study. There was some

heterogeneity between studies [P < 0.00001, I² = 98%], and sensitivity analysis using the one-by-one exclusion method revealed that the heterogeneity did not originate from any of the literature and that the combined results were stable. And no significant clinical heterogeneity or methodological heterogeneity was found, so a random-effects model was used for analysis. The results showed a statistically significant difference in the comparison of postoperative drainage between the test and control groups [MD = -98.99, 95% CI (-128.83, -69.15), P < 0.00001] (Figure 6).

Length of hospital stay Six literatures [11, 17, 19, 21, 27, 28] containing 459 patients were included in the meta-

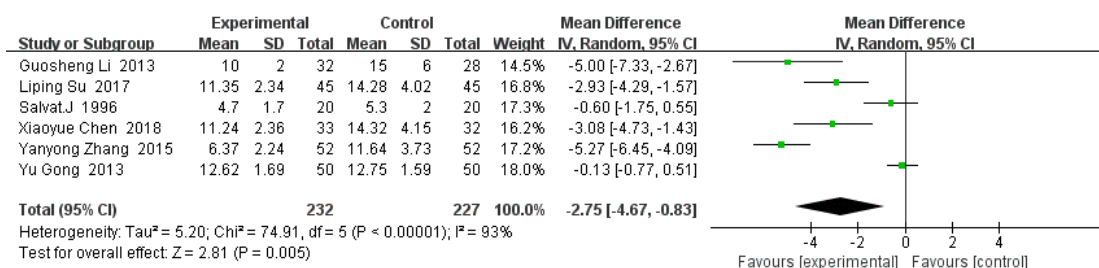


Fig. 7 Meta-analysis of the length of hospital stay between the experimental group and the control group

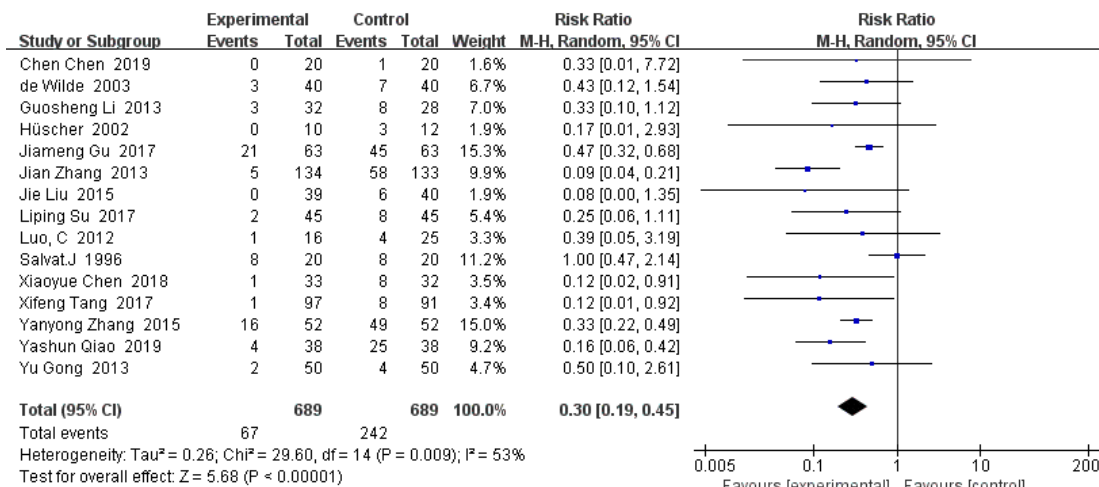


Fig. 8 Meta-analysis of the incidence rate of adverse reactions between the experimental group and the control group

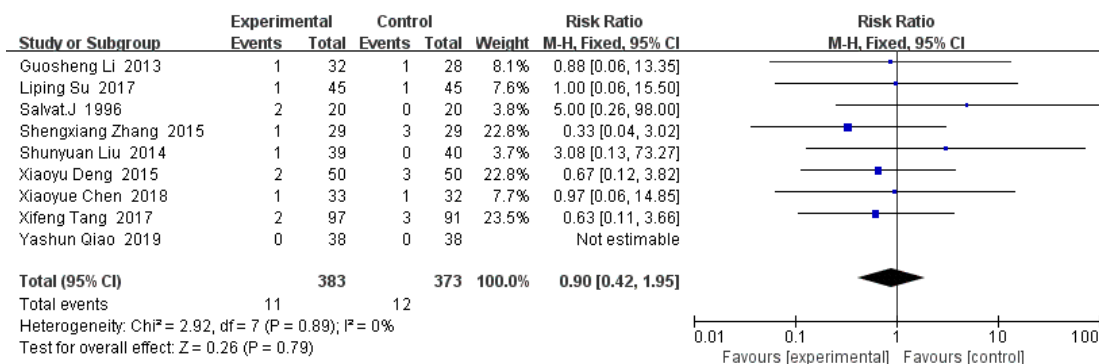


Fig. 9 Meta-analysis of the recurrence rate between the experimental group and the control group

analysis of the length of hospital stay in the trial and control groups of each study. There was some heterogeneity between studies [$P < 0.00001$, $I^2 = 93\%$], and sensitivity analysis using the one-by-one exclusion method revealed that the heterogeneity did not originate from any of the literature and that the stability of the combined results was good. Review of the original article did not reveal significant clinical heterogeneity or methodological heterogeneity, so a random-effects model was used for analysis. The results showed a statistically significant difference in length of hospital stay between the test and control groups [MD = -2.75, 95% CI (-4.67, -0.83), $P = 0.005$] (Figure 7).

Incidence rate of adverse reactions Fifteen literatures [11-13, 16-19, 21, 22, 25-30] containing 1, 378 patients were included in the meta-analysis of the incidence rate of adverse reactions in the trial and control groups of each study. There was some heterogeneity between studies [$P =$

0.009, $I^2 = 53\%$], sensitivity analysis was performed using a case-by-case exclusion method, heterogeneity did not originate from any of the single literature, and stability of the combined results was good. No clinical heterogeneity or methodological heterogeneity was found, so a random-effects model was used for analysis. The results showed a difference between the two groups in the incidence of adverse reactions and the difference was statistically significant [RR = 0.30, 95% CI (0.19, 0.45), $P < 0.00001$] (Figure 8).

Recurrence rate Nine literatures [11, 19, 20, 23-25, 27, 28, 30] containing 756 patients were included and the recurrence rate in the trial and control groups of each study was meta-analysed. There was no significant heterogeneity between the studies [$P = 0.89$, $I^2 = 0\%$], and the results of the analysis using a fixed-effects model showed no statistically significant comparison of recurrence rate between the two groups [RR = 0.90, 95% CI (0.42, 1.95), P

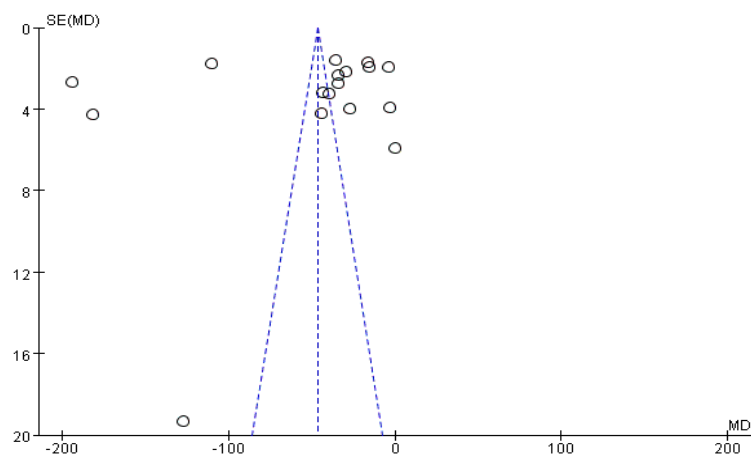


Fig. 10 Funnel plot of publication bias evaluation

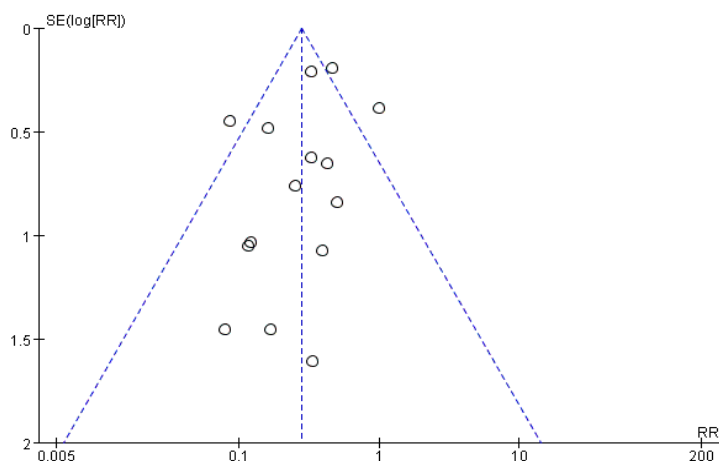


Fig. 11 Funnel plot of publication bias evaluation

= 0.79]. Sensitivity analysis using the one-by-one exclusion method revealed no significant change in P values, indicating good stability of the combined results (Figure 9).

Sensitivity analysis Sensitivity analysis of the included studies was performed using the one-by-one exclusion method to observe the effect sizes and P -value changes in the data of the seven test groups of the duration of surgery, bleeding volume, number of lymph nodes dissected, postoperative drainage, length of hospital stays, incidence rate of adverse reaction, recurrence rate. The results showed that none of the P -values changed significantly after exclusion one by one, demonstrating that no single study had an effect on the stability of the combined data and that the combined results were stable.

Publication bias These 17 studies that included bleeding volume data and 15 studies that included the incidence of adverse reactions were tested for publication bias, and the funnel plots showed that the indicators of the test and control groups that included bleeding volume were asymmetrical, as shown in Figure 10, which might have some publication bias. The indicators of the test and control groups that included the incidence of adverse reactions were more symmetrical, as shown in Figure 11, indicating no significant publication bias.

DISCUSSION

Breast cancer is a systemic disease, breast cancer in the early onset of tumor cells can be spread throughout the body. Hematogenous dissemination and lymph node metastasis are important ways of breast cancer metastasis. Tumor metastasis related genes can reach any tissues and organs through blood circulation and lymph node circulation [31, 32]. Axillary lymph node dissection remains essential in the treatment of breast cancer because it can play a great role in prognosis and treatment [33]. Conventional surgical techniques remove the intact axillary contents, preserving the large vascular and nerve components but destroying a certain amount of small arteries, veins, lymphatics and nerves, which can easily lead to complications such as edema effusion, abnormal sensation, pain, axillary deformity, scarring and arm swelling [34]. With the continuous development of minimally invasive lumpectomy techniques, breast lumpectomy has rapidly evolved [35]. Breast lumpectomy breast cancer surgery is performed by first breast lumpectomy axillary lymph node dissection, which blocks the pathway of metastasis via blood and lymphatic routes from the primary site of breast cancer, followed by mastectomy or breast-cancellation with breast preservation [36]. Breast lumpectomy combined with axillary lymph node dissection reduces the damage to normal tissues while

ensuring the dissection effect, which can significantly reduce the occurrence of complications [37], obtain better upper limb function, better chest and axillary aesthetics and their resulting functional breast outcomes [38], and achieve physiologically minimally invasive and psychologically minimally invasive treatment effects [39].

Axillary lymph node surgery consists of axillary fat aspiration, axillary air cavity creation, axillary lymph node dissection, and trimming of the fibrous septum to remove fat and lymph nodes [40]. High-quality axillary fat aspiration directly influences the speed of the surgical process [41] and facilitates lumpectomy, allowing better postoperative flap apposition and reducing complications [42].

Surgical wound shedding of cancer cells is one of the factors that cause local recurrence of tumors [43]. Clinical studies have shown that the use of breast lumpectomy causes less chance of shedding tumor cells into the blood, which at least can indicate that breast lumpectomy axillary lymph node dissection does not increase the risk of tumor blood metastasis [44]. From the perspective of tumor markers, compare to CALND, MALND did not increase the expression of CEA, CA153 [45], ICAM-1 and CD44, showing certain oncology safety [46]. Recent studies have shown that VCAM-1 [47] and NLR are important in determining the presence or absence of metastasis and prognosis of breast cancer, and these clinical indicators can be tested to further improve the prognosis [48].

In this paper, we systematically evaluated the efficacy and prognosis of breast lumpectomy axillary lymph node dissection, and conducted a meta-analysis of 20 studies, which showed that: (1) In terms of bleeding volume, postoperative drainage, incidence rate of adverse reactions and hospital stay, the experimental group was more effective than the control group in controlling bleeding volume, postoperative drainage, adverse reactions and hospital stay. (2) In terms of improving prognosis, the results of the experimental group compared with the control group were different, and the differences were statistically. The difference between the two groups in terms of recurrence rate was not statistically significant, which can at least indicate that compared with conventional open surgery, breast lumpectomy does not significantly increase the risk of recurrence and has a certain degree of safety. (3) The differences between the test and control groups in terms of operative time and the number of lymph nodes cleared were not statistically significant. In contrast, observation of the operative time data from a single study reveals that there is also a learning curve for lumpectomy axillary lymph node dissection as the time change, and it is possible to further reduce the operative time as experience is gained.

This study was strictly included in a randomized controlled trial, and the results of the trial maintained relative objectivity. This study also has some shortcomings, the quality of included studies was low, only 6 studies mentioned specific random sequence generation method and allocation concealment method, all studies did not mention blinding method, the methodological quality was low and there may be some subjective factors influencing. The funnel plots identified studies that may have had some publication bias or other bias. Some studies did not mention the follow-up time or the follow-up time was too

short, and indicators such as the incidence of adverse effects as well as the recurrence rate still need to be supported by the results of long-term follow-up. The meta-analysis was strongly influenced by the number and quality of included studies, and it is hoped that more high-quality studies with reasonable rigorous design and large sample size will be available in the future to support the above findings.

CONCLUSION

From the current analysis, it can be concluded that mastoscopic axillary lymph node dissection has more advantages in terms of bleeding, postoperative drainage, hospital stay, and lower incidence of adverse events compared with conventional axillary lymph node dissection.

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Abbreviations: CNKI = China National Knowledge Infrastructure; VIP = China Science and Technology Journal Database; CBM = Chinese BioMedicine Literature Database; RCT = Randomized controlled trials; Mastoscopic Axillary Lymph Node Dissection = MALND; Conventional Axillary Lymph Node Dissection = CALND; RR = risk ratio; WMD = weighted mean difference; SMD = stand mean difference; CI = confidence interval; carcinoembryonic antigen = CEA; carbohydrate antigen 153 = CA153; intercellular adhesion molecule 1 = ICAM-1; Vascular cell adhesion protein 1 = VCAM-1; neutrophil-to-lymphocyte ratio = NLR.

Competing interests: The authors declare that they have no conflict of interest.

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