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REVIEW

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The efficacy of total hip arthroplasty in patients with systemic lupus erythematosus: a systematic review and meta-analysis

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Abstract

Introduction Systemic lupus erythematosus (SLE) can lead to avascular necrosis (AVN) of the femoral head, often requiring total hip arthroplasty (THA). However, outcomes and complications of THA in SLE patients remain unclear. This study aims to analyze the differences in clinical outcomes and complications between SLE and non-SLE patients undergoing THA.

Methods This study adhered to the PRISMA guidelines and was registered in PROSPERO (CRD42024564792). Literature was retrieved from the Cochrane Library, Web of Science, PubMed, and Embase databases, supplemented by manual searches of relevant references. Studies meeting specific diagnostic criteria were included, with eligible study types comprising case-control and cohort studies. The intervention of interest was THA surgery, and primary outcome measures included adverse events and clinical outcomes. Risk of bias was assessed using the Cochrane Risk of Bias tool for randomized trials and the Newcastle-Ottawa Scale for observational studies. Statistical analyses were performed using RevMan 5.4 software. Dichotomous variables were analyzed using relative risk (RR), while continuous variables were assessed using the mean difference (MD) or standardized mean difference (SMD), both with 95% confidence intervals for effect size estimation. Heterogeneity was assessed via the X^2 test and I^2 statistic, with $P \leq 0.05$ considered statistically significant.

Results No significant difference in Harris Hip Scores (HHS) (MD= -0.69, 95% CI: -2.11 to 0.73, I^2=0%, P = 0.34) was observed between SLE and non-SLE patients. However, compared to non-SLE patients, SLE patients had higher risks of prosthesis dislocation (RR = 2.44, 95% CI: 1.74 to 3.42, I^2=52%, P<0.01), wound infection (RR = 2.30, 95% CI: 1.87 to 2.83, I^2=0%, P<0.01), and blood transfusion (RR = 2.50, 95% CI: 2.14 to 2.92, I^2=0%, P<0.01), as well as longer hospital stays (MD = 1.64, 95% CI: 1.44 to 1.64, I^2=100%, P<0.01).

Discussion In conclusion, although SLE patients show similar improvements in hip function postoperatively compared to non-SLE patients, they face a significantly higher risk of complications, including prosthetic dislocation, blood transfusion requirements, DVT, and wound infections. These patients also experience longer hospital stays and slower recovery, likely due to their underlying health conditions and preoperative treatments. Personalized

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management strategies and risk assessments are crucial to minimize complications and optimize recovery outcomes for SLE patients undergoing THA. However, the included studies exhibit significant heterogeneity, including variations in prosthesis types, fixation methods, sample sizes, and study designs, which may introduce potential bias and affect the generalizability of the findings. Further high-quality research is needed to address these issues.

Keywords Total hip arthroplasty, Systemic lupus erythematosus, THA, SLE

Introduction

Systemic lupus erythematosus (SLE) is a chronic inflammatory autoimmune disease that typically involves multiple organs and systems, including the skin, joints, kidneys, cardiovascular system, and central nervous system [1]. In recent years, with advancements in diagnostic and therapeutic techniques, as well as the widespread use of biologics, the long-term survival rate of SLE patients has significantly improved, with a 10-year survival rate now exceeding 90% [2]. However, as life expectancy increases, the incidence of chronic complications, such as chronic renal insufficiency, cardiovascular disease, and musculoskeletal disorders, has also risen. Among these, avascular necrosis (AVN) of the femoral head stands out as one of the most severe and common complications in SLE patients, with an incidence ranging from 4–30% [3, 4]. The primary cause of AVN in SLE patients is associated with long-term use of glucocorticoids and immunosuppressants [5].

Kennedy et al. [2] reported that the reduction in quality of life caused by AVN of the femoral head in SLE patients is greater than that caused by the underlying systemic disease itself, severely affecting daily life and functional activities. While non-surgical management options, such as medication adjustments, physical therapy, and joint-preserving procedures, are often considered for early stages of AVN, these interventions are generally less effective in advanced stages of the disease, where significant joint destruction has occurred. Total hip arthroplasty (THA) is currently considered one of the most effective treatments for AVN and is widely applied in SLE patients with AVN. Multiple studies have confirmed that SLE patients undergoing THA have a higher incidence of postoperative complications and adverse events, including an increased risk of infections, thromboembolic events, and poor hip function during the postoperative recovery period, which may also contribute to an elevated postoperative mortality rate in these patients [6]. However, some studies have suggested that SLE patients undergoing THA often show favorable outcomes, with no significant differences in hip function recovery, pain relief, and quality of life improvements when compared to non-SLE patients, as assessed by Harris Hip Score, WOMAC, and SF-36 outcomes [7, 8], indicating that some patients may benefit significantly from the procedure. In this context, understanding the basic outcomes of SLE patients undergoing THA, including functional recovery, length of hospital stay, and adverse event rates, is crucial for both patients and surgeons in developing surgical and postoperative care plans [8].

In addition, previous meta-analyses mainly focused on the impact of SLE patients on the incidence of postoperative complications and postoperative function of THA, without exploring clinical efficacy such as length of hospital stay and transfusion status [9]. Therefore, this meta-analysis aims to systematically review all relevant literature on SLE patients undergoing THA, providing robust evidence to assist patients and surgeons in making informed decisions regarding surgical treatment and postoperative care. Additionally, this study will evaluate both short- and long-term quality-of-life improvements in SLE patients following THA, providing valuable insights for future clinical practice.

Materials and methods

This review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [10–12]. This study was registered in the International Prospective Register of Systematic Reviews (Prospero CRD42024564792). This article is a systematic review and meta-analysis. All the data came from the articles that were published.

Inclusion and exclusion criteria

Inclusion criteria: ① Study population: Patients diagnosed with SLE according to clinical diagnostic criteria; the control group consists of non-SLE patients. ② Study types: Case-control studies, cohort studies, randomized controlled trials(RCT), Cross-sectional and registries-based studies. ③ Intervention or exposure: THA surgery. ④ Outcome measures: Wound infection, dislocation, deep vein thrombosis (DVT), hospital stays, Harris score, and postoperative transfusion requirements.

Exclusion criteria: ① Studies with fewer than 10 cases (avoid unnecessary bias); ② Duplicate publications; ③ Studies where the full text is unavailable or only an abstract is provided; ④ Articles that do not provide specific data on adverse events; ⑤ Studies not published in Chinese or English.

Search strategy

The computer-based search was conducted in the Cochrane Library, Web of Science, PubMed, and Embase databases. The search period extended from the

inception of the databases to October 2024. Additionally, references of included studies were supplemented by conducting manual searches. The search strategy involved a combination of subject terms and free-text terms. Supplementary Document 1 provides the complete search strategy.

Data collection and analysis

Two researchers independently conducted literature screening and data extraction based on the inclusion and exclusion criteria, with cross-verification. In case of discrepancies, a third researcher was involved for collaborative decision-making. After screening titles and abstracts, studies that potentially met the criteria underwent further assessment of full-text content. The extraction process included the following information: researchers, publication date, patient age, gender, sample size, study type, follow-up duration, and outcome indicators.

Assessment of risk of Bias

Divergences were resolved through consensus, and if necessary, a third author was consulted for evaluation. Risk of bias assessment for cohort studies and case-control studies utilized the Newcastle-Ottawa Scale (NOS) [13]. The assessment included the selection of study subjects (four items, 1 point each), comparability between groups (one item, 2 points), and evaluation of outcomes or exposure factors (three items, 1 point each), with a total score of 9 points. The rating scale ranged from 0 to 3 points for low-quality studies, 4 to 6 points for moderate-quality studies, and 7 to 9 points for high-quality studies. Risk of bias analysis was conducted for RCTsusing the assessment tool recommended by the Cochrane Handbook version 5.1.0 [14]. This tool encompasses seven aspects, with bias risk categorized into three levels: low risk, unclear risk, and high risk. If a study meets all seven criteria, its quality level is designated as Grade A; if only partially met, the quality level is Grade B; and if none of the criteria are met, the quality level is Grade C.

Statistical analysis

The included literature was subjected to meta-analysis using RevMan 5.4 software. Outcome measures in this study encompassed both continuous and dichotomous variables. For dichotomous variables, the relative risk (RR) served as the summary statistic, while continuous variables were analyzed using the mean difference(MD) or standardized mean difference (SMD), with a 95% confidence interval (CI) for effect size estimation. Heterogeneity among included studies was assessed using the $\chi 2$ test and I^2 statistic. A P-value greater than 0.1 and I^2 less than 50% indicated no significant statistical heterogeneity among the studies, warranting the use of a fixed-effects model for analysis. Otherwise, a random-effects model was employed. Sensitivity analysis was utilized to evaluate the robustness of significant results. A significance level of $P \leq 0.05$ was considered indicative of statistically significant differences.

Result

Study selection

A preliminary search of the databases yielded a total of 697 relevant articles. After removing duplicates using Endnote 20 software and reviewing titles and abstracts, 20 articles were selected for full-text review. Ultimately, 9 articles were included in the final analysis. The literature screening process is depicted in Fig. 1. The NOS bias assessment scale can be found in Supplementary Document 2.

In terms of random sequence generation (selection bias), most studies demonstrated a low risk of bias, with only Schnaser [15] showing an unclear risk in this category. Regarding allocation concealment (selection bias), most studies indicated a low risk, but Schnaser [15] and Viswanathan [16] were rated as having an unclear risk in this aspect. For blinding of participants and personnel (performance bias), the majority of studies showed a low risk, with no other studies exhibiting a high or unclear risk. In terms of blinding of outcome assessment (detection bias), Roberts [17] and Schnaser [15] were rated as having an unclear risk, while all other studies demonstrated a low risk in this category. For incomplete outcome data (attrition bias), most studies indicated a low risk. Regarding selective reporting (reporting bias), all studies were rated as having a low risk. Finally, for other biases, the majority of studies showed a low risk. The specific details can be found in Figs. 2 and 3.According to our statistics and calculations, the kappa statistic is calculated to be 0.91. This indicates that the consistency between the two screening results is at a very good level. This result indicates that there is a high degree of consistency between different screening steps in the data screening process of this study, and the screening results have strong reliability and stability, providing a solid data foundation for subsequent research analysis based on the screened data.

Study characteristics

A total of 9 articles [7, 15–22] were included in this study. The basic characteristics of the included literature are presented in Table 1.

Blood transfusion need

Two studies [16, 19]compared the rate of blood transfusion requirements between groups, with low heterogeneity observed ($P = 0.77$, $I^2 = 0\%$). A random-effects model was used for meta-analysis. The results demonstrated a statistically significant increase in the risk of transfusion

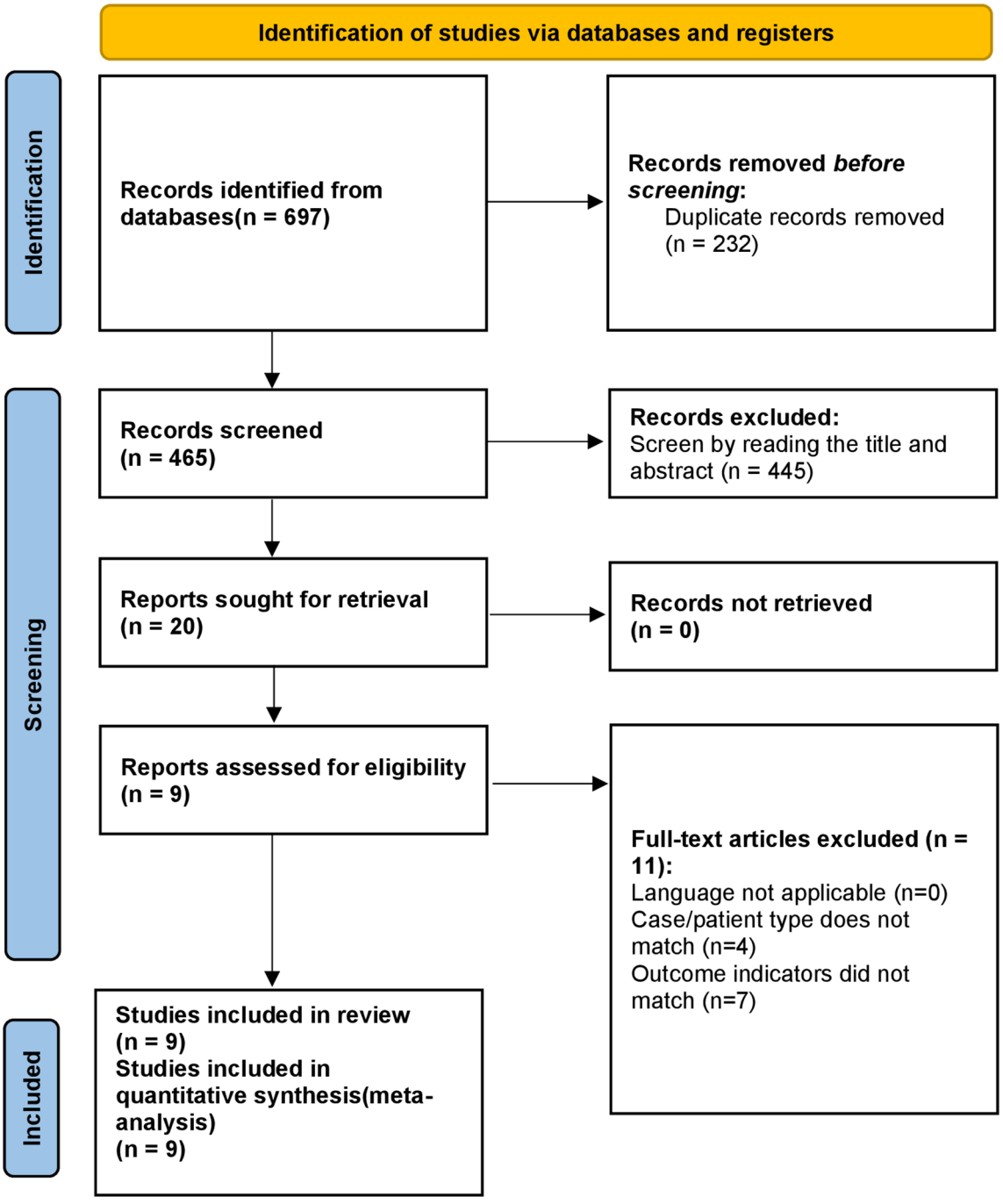

Fig. 1 The literature screening process

in the experimental group compared to the control group (RR = 2.50, 95% CI: 2.14 to 2.92, $P < 0.001$), as depicted in Fig. 4.

DVT incidence

Four studies [17, 18, 20, 22] reported the incidence of DVT, showing moderate heterogeneity ($P = 0.52$, I^2 = 0%). Using a fixed-effects model, a statistically significant higher risk of DVT in the experimental group was observed (RR = 3.13, 95% CI: 1.19 to 8.22, $P = 0.02$), as presented in Fig. 5.

Hospital time

Two studies [16, 19] compared the mean duration of hospital stay between groups, with substantial heterogeneity ($P < 0.00001$, I^2 = 100%). A random-effects model analysis indicated that the experimental group had a statistically

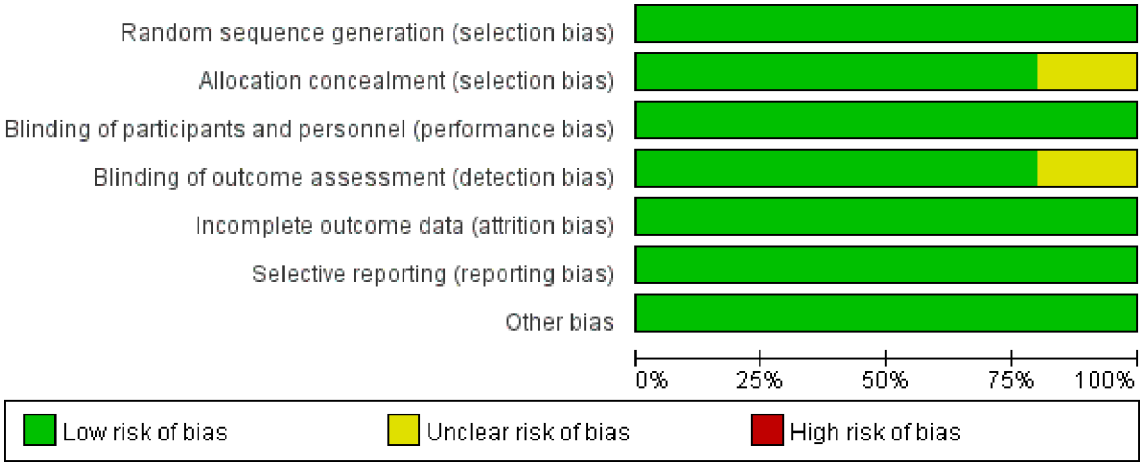

Fig. 2 Risk of bias graph

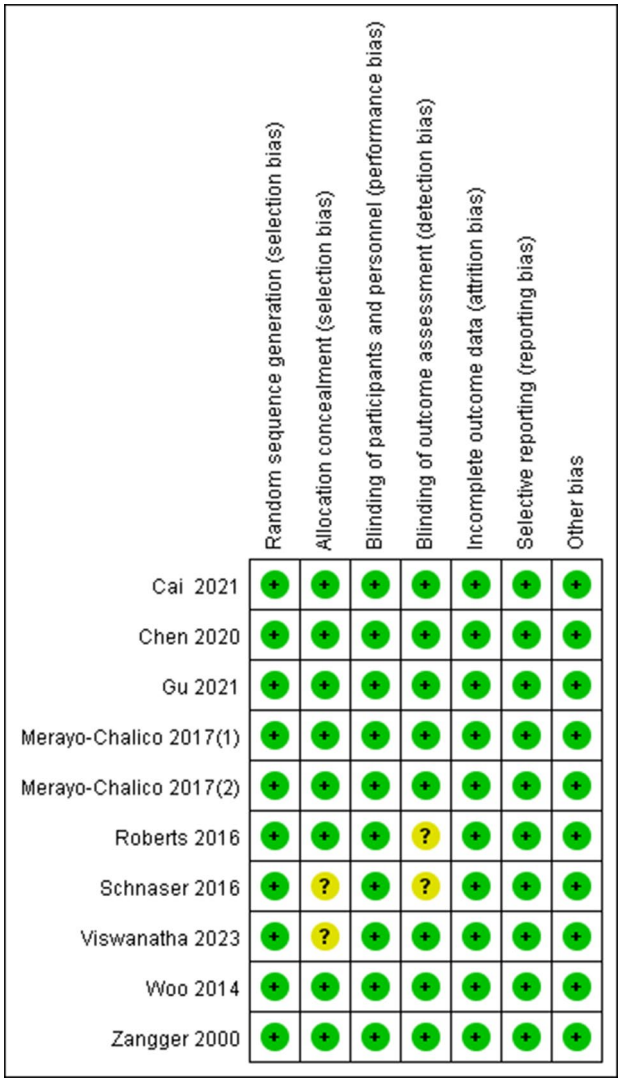

Fig. 3 Risk of bias summary

significant increase in hospital stay duration (MD = 2.26, 95% CI: 0.28 to 4.25, $P = 0.03$), as displayed in Fig. 6.

HSS scores

Three studies [7, 20, 21] evaluated postoperative Hospital for Special Surgery (HSS) scores. No significant heterogeneity was noted ($P = 0.47$, $I^2 = 0\%$). Using a fixed-effects model, the meta-analysis indicated no significant difference between groups in postoperative HSS scores (MD = -0.69, 95% CI: -2.11 to 0.73, $P = 0.34$), as shown in Fig. 7.

Prosthesis dislocation

Four studies [15–17, 21] examined prosthesis dislocation rates. Heterogeneity was moderate ($P = 0.10$, $I^2 = 52\%$). A random-effects model demonstrated a significantly higher dislocation rate in the experimental group compared to the control group (RR = 2.44, 95% CI: 1.74 to 3.42, $P < 0.001$), as illustrated in Fig. 8.

Wound infection rates

Six studies [16–20, 22] investigated the rate of wound infection. Low heterogeneity was observed ($P = 0.83$, $I^2 = 0\%$). A fixed-effects model revealed a significantly higher wound infection rate in the experimental group (RR = 2.30, 95% CI: 1.87 to 2.83, $P < 0.001$), as presented in Fig. 9.

Sensitivity analysis

Due to the high heterogeneity observed in prosthesis dislocation and hospital time across studies, we conducted a leave-one-out sensitivity analysis for these two outcomes. The results indicated that excluding each study sequentially did not change the overall meta-analysis findings for prosthesis dislocation and hospital time. This may be attributed to variations in prosthesis components and fixation methods among the included studies. However, in order to eliminate relevant heterogeneity,

Table 1 Characteristics of included studies

Study	Published time	Study type	Sample size(SLE: control)	Age(SLE/Control)	Male: Female(SLE/Control)	BMI(SLE/Control)	follow-up time(SLE/Control)	Outcome
Zangger et al. [18]	2000	Cohort Study	26:29	46.08/45.58	NA	NA	5.08/4.08	HSS, PD
Woo et al. [6]	2014	Cohort Study	13:19	41.3 ± 12.5/58.1 ± 10.4	1:18/2:17	23.3 ± 2.9/24.7 ± 2.7	97.8 ± 50.8/81.2 ± 30.0	HSS
Roberts et al. [13]	2016	Cohort Study	58:116	52.0 ± 2.3/50.3 ± 1.8	6:52/9:105	27.2 ± 0.8/ 27 ± 0.6	NA	PD, DVT, WI
Schnaser et al. [15]	2016	Cohort Study	12555:2018567	53/66	1560: 10,995/890027:1128540	NA	NA	PD, WI
Merayo-Chalico et al. [16]	2017	Cohort Study	58:58/58	34.4 ± 1.05/66.3 ± 1.37	9:49/10:48	NA	NA	HT, WI. BTR
Chen et al. [14]	2020	Cohort Study	325:325	44.3 ± 12.0/46.1 ± 14.0	88:237/88:237	NA	NA	DVT, WI
Gu et al. [17]	2021	Cohort Study	92:92	39.3 ± 13.6/41.0 ± 14.1	18:74/18:74	23.3 ± 3.5/23.6 ± 4.3	47.5 ± 41.5/54.2 ± 29.5	HSS, DVT, WI
Cai et al. [20]	2021	Cohort Study	45:45	40.78/46.91	5:40/5:40	21/23.34	733.28/703.68	DVT. WI
Viswanathan et al. [19]	2023	Cohort Study	1684:366210	57.3 ± 14.5/65.9 ± 11.4	175: 1509/161997:204233	NA	16.7 ± 3.0/15.8 ± 2.4	HT, PD, WI, BTR

HSS: Hospital for Special Surgery Knee Score; PD: Prosthesis Dislocation; DVT: Deep venous thrombosis; WI: Wound infection; HT: Hospital Time; BTR: blood transfusion requirement

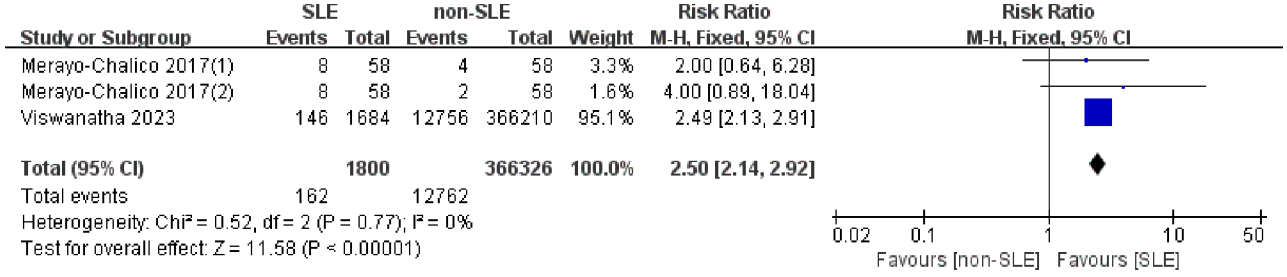

Fig. 4 Blood Transfusion Need of SLE patients

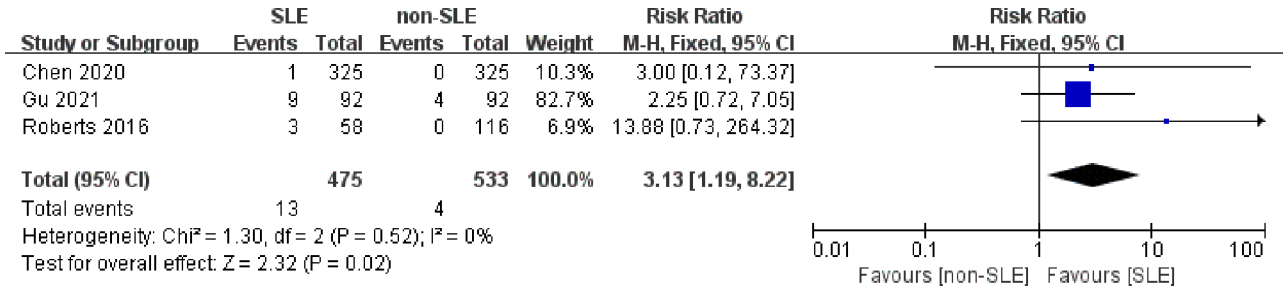

Fig. 5 DVT Incidence of SLE patients

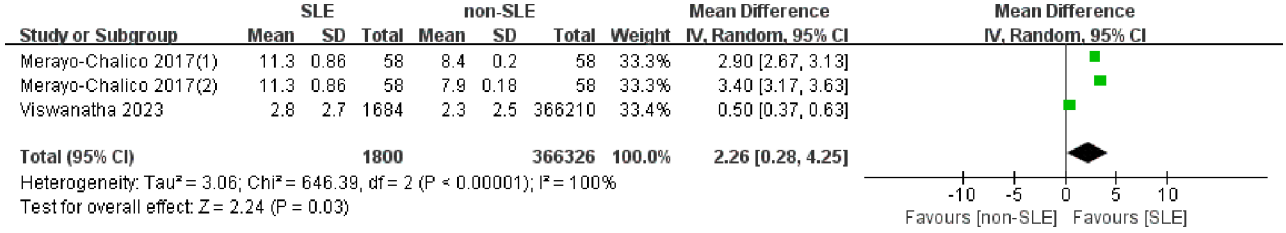

Fig. 6 Hospital Time of SLE patients

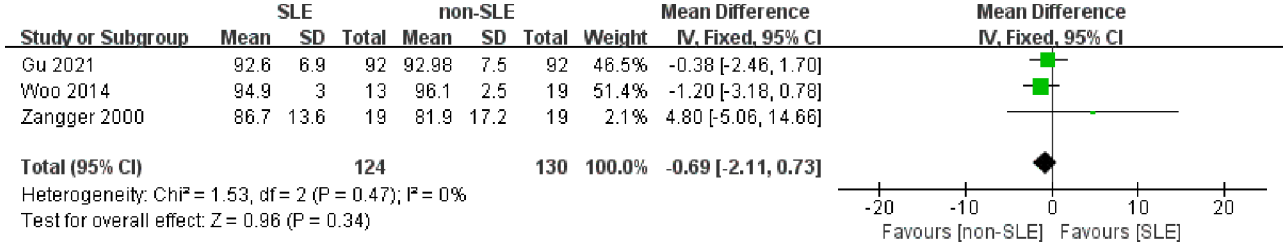

Fig. 7 HSS Scores of SLE patients

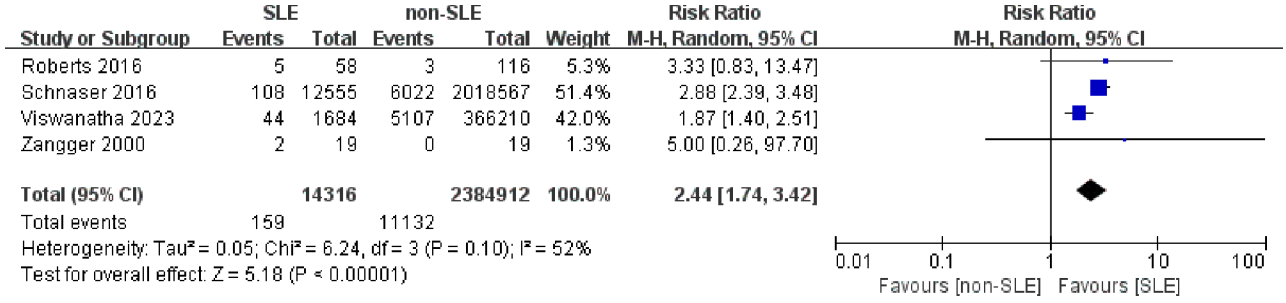

Fig. 8 Prosthesis Dislocation of SLE patients

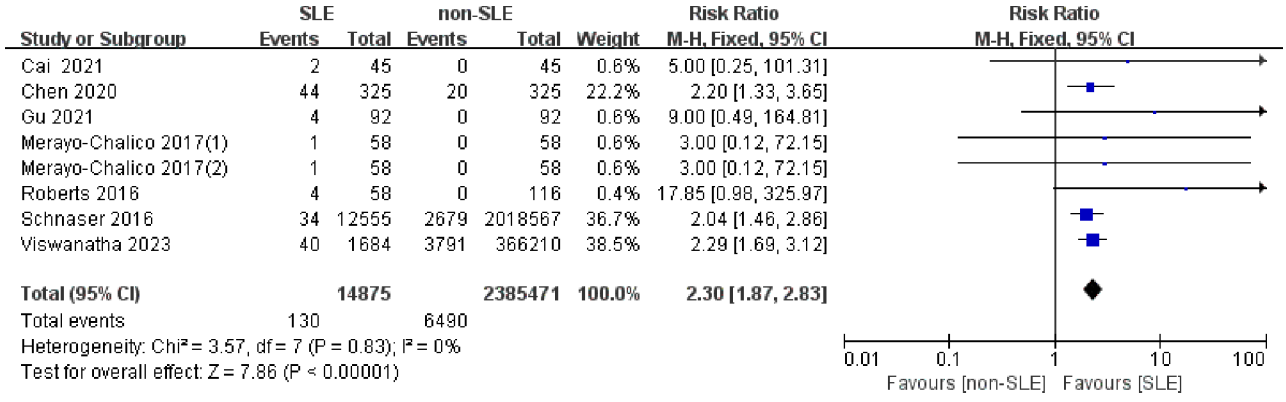

Fig. 9 Wound Infection Rates of SLE patients

we still analyzed the articles. In the study by Roberts et al. [17], SLE patients had a higher incidence of complications following total hip arthroplasty (THA), primarily due to the common comorbidities in SLE patients and the use of immunosuppressive drugs, which increase the risk of postoperative infections. The heterogeneity in the study may also arise from the mismatch in sample sizes between SLE and OA patients. Schnaser et al. [15] demonstrated that perioperative complications were more common in SLE patients compared to OA patients. The heterogeneity in the study likely stems from differences in types of joint diseases (such as RA, AS, etc.) and treatment methods, with variations in sample size and patient conditions also potentially affecting the results. In the study by Merayo-Chalico et al. [19], SLE patients exhibited a higher rate of postoperative complications,

mainly due to immunosuppressive therapy and heterogeneity caused by sample size differences. Differences in follow-up duration may also have contributed to the variations in long-term complications. The study by Zangger et al. [21] found that SLE patients used both cemented and uncemented prostheses, and the differences in prosthesis types and surgical techniques could be the main sources of heterogeneity. The study by Viswanathan et al. [16] indicated that SLE patients had longer hospital stays, with a higher incidence of complications such as prosthetic dislocation and postoperative anemia. Heterogeneity factors included differences in prosthesis types and the age and gender differences of SLE patients.

Publication bias

Due to the inclusion of fewer than 10 studies for all outcome measures in this study, a funnel plot analysis was not conducted.

Discussion

In this study, we compared postoperative outcomes and complications between SLE patients and non-SLE patients who underwent THA. Although no significant difference was found in HHS between the two groups, indicating similar improvements in hip function postoperatively, SLE patients exhibited significantly higher risks of complications, including prosthetic dislocation, blood transfusion requirements, DVT, wound infection, and longer hospital stays.Firstly, SLE patients generally have greater soft tissue laxity, a wider range of motion, and less restriction of the femoral head [2]. Moreover, many patients included in this study were younger than 40 years old at the time of surgery, with the youngest being only 18. Younger patients generally have higher activity levels before and after surgery, and as they gradually resume physical activities postoperatively, the prosthesis may become unstable, leading to a higher risk of dislocation [15]. Johannson's review [23] also indicate that the revision rate of surgical patients has decreased since 1990, which is related to the use of updated hip replacement designs and more frequent use of non cemented implants [24]. These factors may contribute to prosthetic instability postoperatively, leading to an increased risk of dislocation. Additionally, long-term corticosteroid use causes bone loss and extensive necrosis extending to the femoral trochanter, which may compromise the stability of the femoral components and reduce the quality of implant fixation. As a result, the risk of prosthetic dislocation and revision surgery is significantly higher in SLE patients compared to non-SLE patients [2, 25]. In clinical practice, it is important to carefully monitor SLE patients postoperatively, especially those who are younger and have higher activity levels, to reduce the risk of prosthetic dislocation and the need for revision surgery. Close follow-up and tailored rehabilitation protocols may help mitigate these risks.Specifically, we analyzed the blood transfusion requirements and bleeding risks in SLE patients following THA. It has been shown that SLE patients are at higher risk of bleeding, which is closely associated with platelet dysfunction, anemia, and the use of anticoagulants [26, 27]. According to Li et al. [4] kidney damage resulting from SLE can reduce erythropoietin (EPO) production, impairing red blood cell production and further increasing the need for blood transfusions postoperatively. Additionally, some studies suggest that SLE patients may have platelet dysfunction and/or antibodies against coagulation factors [28–30], which can result in inadequate platelet aggregation and a lower bleeding threshold [30, 31]. Particularly, antibodies against coagulation factors and hematopoietic progenitor cells may significantly increase the risk of bleeding and anemia [28]. Furthermore, lower preoperative hemoglobin levels and higher perioperative blood loss may also serve as triggers for blood transfusions in SLE patients.

Moreover, the presence of antiphospholipid syndrome in SLE patients increases the likelihood of thrombosis, contributing to a higher incidence of DVTz [16]. The findings of this study regarding the incidence of DVT are in contrast to those of Ravi et al. [32] One possible explanation for this discrepancy is that hospital stay duration is a key factor influencing the incidence of DVT. In this study, the hospital stay for SLE patients was significantly longer than that reported by Ravi et al. [32], which may account for the more pronounced difference in DVT incidence observed here.

In terms of wound infection, SLE patients are more prone to poor wound healing due to immune system dysfunction, as well as the use of immunosuppressants and corticosteroids prior to surgery. This compromised immune function, coupled with a higher rate of blood transfusions, increases the risk of infection following THA [33, 34]. Zheng et al. [33] also noted that SLE patients, due to immunosuppressive therapy and long-term medication use, have a weaker functional status and healing capacity, making them more susceptible to infection. Some studies suggest that all patients in their series were in remission at the time of surgery and did not receive corticosteroids perioperatively, which may have contributed to the lower incidence of complications. They proposed that if patients had not been in remission, the complication rate would likely have been higher. Kang further noted that, in addition to low disease activity, SLE patients were typically given more antibiotics than the general population, which may help reduce the risk of infection [35]. In contrast, Hanssen`s study found no significant correlation between corticosteroid administration at the time of surgery and postoperative complications [36]. Some researchers hypothesize

that the association between systemic corticosteroids and prosthetic joint infections could be partially attributed to impaired wound healing, which facilitates the entry of infectious organisms [37]. Moreover, when evaluating infection rates, it is challenging to isolate the effects of the underlying disease from the influence of immunosuppressive therapy [38]. The discrepancies between infection rates reported in the studies included in this systematic review and those found in other publications further emphasize the need for stronger evidence regarding the impact of SLE on joint replacement outcomes.Finally, due to the poorer baseline health of SLE patients, postoperative recovery is generally slower, and their hospital stays are longer compared to non-SLE patients. Merayo et al. [39]. suggested that SLE patients tend to have longer operative times, but some studies have reported that surgeons may try to shorten the duration of surgery to reduce the risk of infection and manage the relatively hypercoagulable state of SLE patients, which could potentially result in shorter operative times. However, due to the limited number of studies on surgical duration, further high-quality research is needed to clarify this issue.

While this study identifies several factors contributing to the higher incidence of complications in SLE patients undergoing THA, it is essential to critically assess the quality of the supporting evidence. The majority of the conclusions drawn regarding the increased risks of complications such as prosthetic dislocation, bleeding, DVT, and wound infection are based on observational studies, which inherently carry a risk of bias. For example, the study primarily relied on data from a single center, which may limit the generalizability of the findings to other patient populations or settings. Moreover, potential confounding factors such as disease severity, medication usage, and comorbidities were not fully controlled for in some studies, which may introduce biases in the interpretation of the results.

Additionally, many of the studies referenced, particularly those that discuss the impact of corticosteroids and immunosuppressants on wound healing and infection rates, are case reports or small cohort studies with limited sample sizes. These types of studies often lack rigorous controls and randomization, which could impact the robustness of the conclusions. To improve the evidence quality, future research should consider using larger, multicenter, RCTs that better control for confounding factors and offer more reliable data on the long-term outcomes of THA in SLE patients. Furthermore, conducting systematic reviews and meta-analyses would help consolidate the findings from various studies and offer a more comprehensive understanding of the risks associated with THA in SLE patients. In conclusion, SLE patients face a higher risk of postoperative complications and prolonged recovery compared to non-SLE patients. Although both groups showed similar improvements in hip function as measured by HHS, SLE patients require more extended recovery periods due to their compromised health status and the effects of preoperative medications. These findings highlight the need for individualized risk assessment and management strategies for SLE patients undergoing THA. Tailoring interventions to address the specific risks associated with SLE, such as prosthetic instability, bleeding, and infection, is crucial to minimize complications and promote better recovery outcomes. While further research is needed to better understand the long-term outcomes and refine surgical strategies for this patient population, the current findings provide valuable insights into the challenges faced by SLE patients undergoing THA and emphasize the importance of personalized care.

Limitations

This meta-analysis has several limitations. First, there was significant heterogeneity in the types of femoral prostheses and fixation methods used across the included studies, which may affect the generalizability of the results. Additionally, variations in sample sizes and study designs (such as case-control and cohort studies) may introduce bias. Some studies also did not fully account for potential confounding factors, such as preoperative corticosteroid use and comorbidities, which could affect the reliability of the conclusions. Publication bias is another concern, as studies with positive results are more likely to be published, potentially skewing the outcomes.

Heterogeneity in the studies was also observed in differences in postoperative management and follow-up durations, which could impact complication rates and overall outcomes. Furthermore, many of the studies relied on single-center data, which limits the generalizability of the findings to other patient populations or clinical settings. Most conclusions were based on small sample sizes, case reports, or non-randomized cohort studies, which are limited in sample size and often lack comprehensive control of confounding factors. Particularly, some studies primarily relied on observational data, which inherently carries a higher risk of bias and often lacks rigorous controls and randomization. Therefore, future research should focus on large-scale, multicenter, RCTs to better control for confounding factors and provide more reliable data on the long-term outcomes of THA in SLE patients. Additionally, conducting systematic reviews and meta-analyses will help consolidate findings from various studies and provide a more comprehensive understanding of the risks associated with THA in SLE patients.

Conclusion

Existing evidence indicates that SLE patients undergoing THA have significantly higher risks of prosthetic dislocation, blood transfusion requirements, DVT, and wound infections compared to non-SLE patients, with longer hospital stays. However, there is no difference between the two groups in HHS scores. The conclusions of our study provide some reference for clinical management and perioperative care of SLE patients undergoing THA, aiming to reduce postoperative complications. Future research should focus on understanding the disease characteristics of SLE in greater depth and developing targeted strategies to address adverse reactions following THA, to improve patients' overall health and quality of life.

Abbreviations

SLE	Systemic lupus erythematosus
AVN	Avascular necrosis
THA	Total hip arthroplasty
RR	Relative risk
MD	Mean difference
SMD	Standardized mean difference
CI	Confidence interval

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13018-025-05791-3.

Supplementary Material 1

Supplementary Material 2

Author contributions

J.Y. and J.L. wrote the main manuscript text and X.W. and T.H. prepared figures. All authors reviewed the manuscript.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Not Applicable.

Consent for publication

Not Applicable.

Competing interests

The authors declare no competing interests.

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