Comparison of Open versus Arthroscopic Treatment of Glenohumeral Septic Arthritis: A Systematic Review

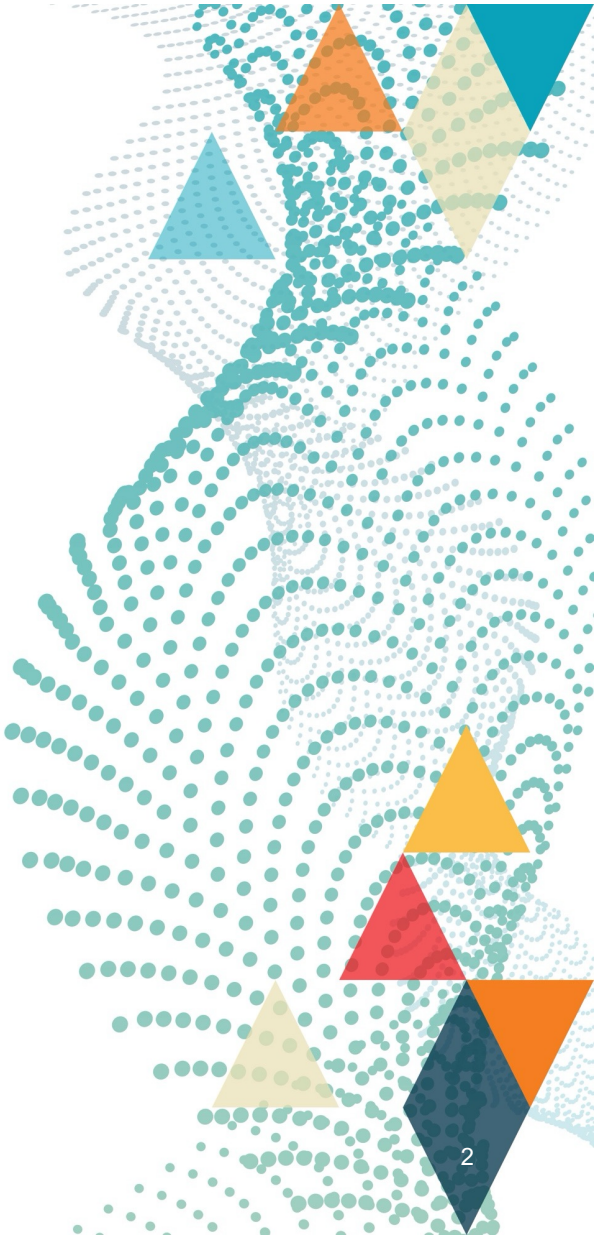
Bryan Chong MBBS, Rachel Sze Jen Goh MBBS, Sean Kean Ann Phua, MBBS, MRCS, Sean Wei Loong Ho, MBBS, MRCS, MMed(Ortho), FRCSEd(Ortho)

Singapore

ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

Faculty Disclosure Information

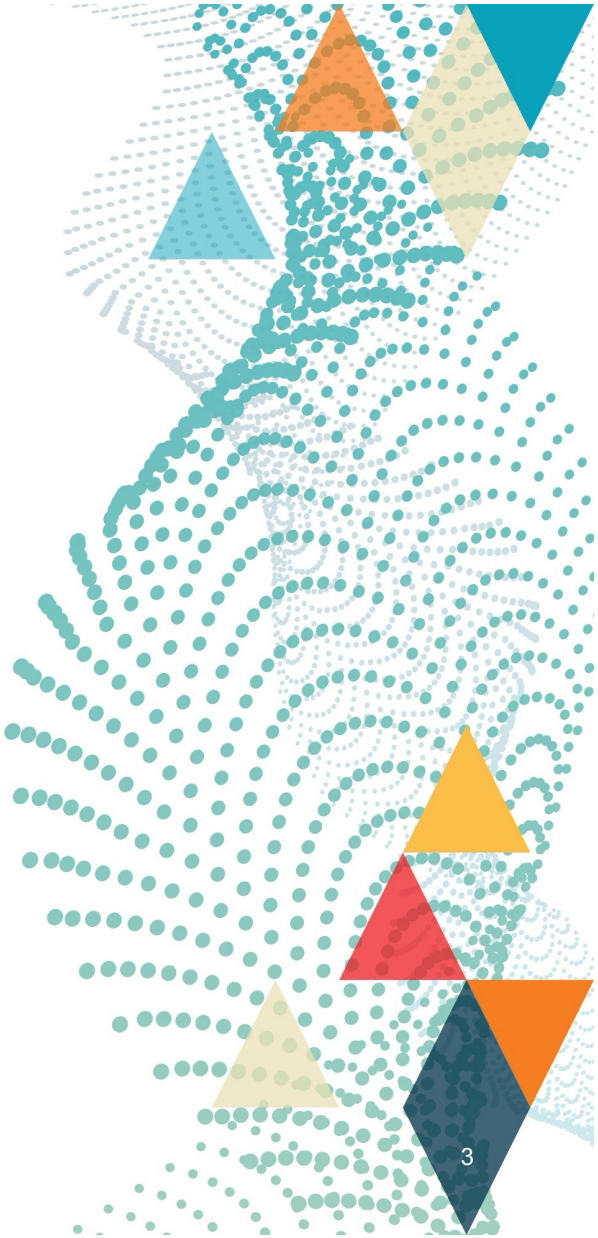
I do not have a financial interest or other relationship with a commercial company or institution.



ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

Background

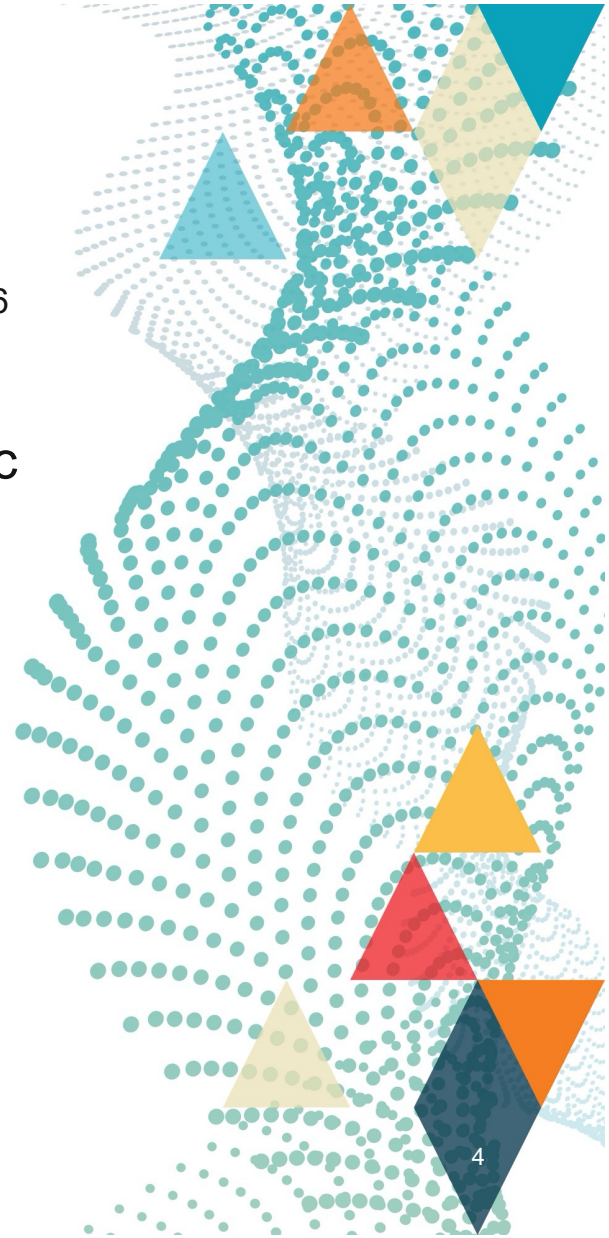
- **Incidence:** 4 to 6 cases per 100,000 persons per year[1]
- **High mortality and morbidity**
  - Up to 10% mortality following initial presentation[2]
  - Can cause widespread articular damage with stiffness, reduced function and even joint loss
- **Most common pathogen:** Staphylococcus aureus in native joints in up to 56% of cases[3]
- **Risk Factors[4,5]**
  - Immunocompromised
  - Prior surgery or intraarticular injection of the joint
  - Pre-existing joint conditions including osteoarthritis, rheumatoid arthritis or crystals arthropathies



Arthroscopic versus Open treatment

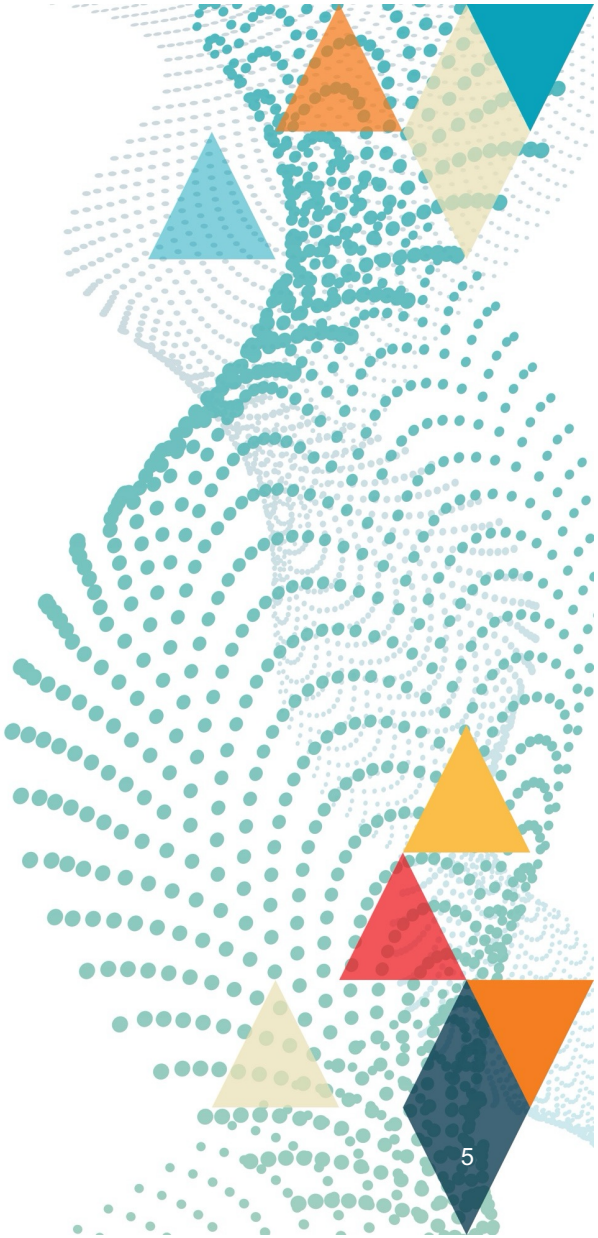
- Arthroscopy has been established as an effective modality of treatment for septic arthritis of various joints such as the knee[6]
- Remains controversial for glenohumeral septic arthritis
- This is the largest study systematically comparing arthroscopic vs open treatment for glenohumeral joint septic arthritis

Advantages of Arthroscopy	Disadvantages of Arthroscopy
Less invasive	Limited access and exposure
Reduce post-operative pain	
Faster functional recovery	
Increased rehabilitative potential	



Search Strategy

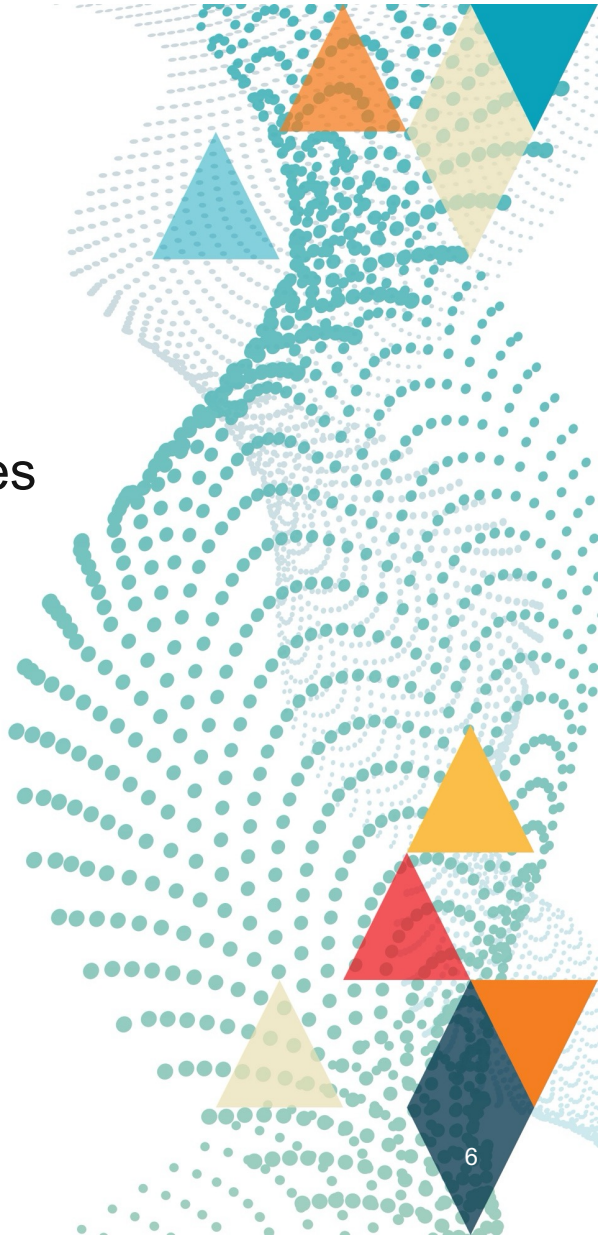
- Search terms: “glenohumeral”, “septic arthritis”, “arthroscopy” and “arthrotomy”
- Databases: PubMed, Embase/Medline
- Inclusion criteria:
  - Cohort studies or randomized controlled trials
  - Studies that reported outcomes (re-infection or re-operation rates) of both arthroscopic and open treatment for glenohumeral septic arthritis
- Exclusion criteria: Other study types, non-native joint glenohumeral septic arthritis



Quality assessment

- MINORS: mean score of 18.1/24 (14 – 22)
- ROBINS-II: 7 low risk, 2 moderate risk
- GRADE Evaluation (higher certainty is better)
- High certainty: Re-operation or re-infection rates, mortality rates

High certainty	• Re-operation or re-infection rates • mortality rates
Moderate certainty	• Length of hospitalization • 30-day all cause complications • blood transfusion
Low certainty	• Readmission • Operative timing

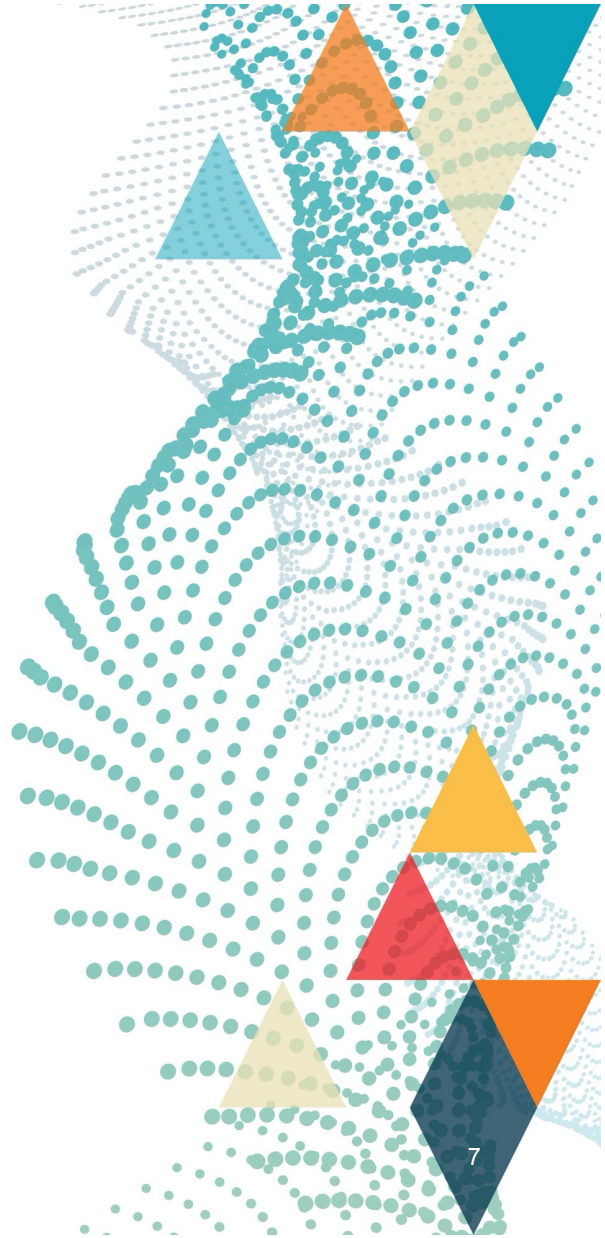


ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

Baseline characteristics

- 9 included studies
- 10,352 cases of glenohumeral septic arthritis
- Follow up duration – ranging from 30 days to 32 months
- 5 from the United States, 3 from Korea, 1 from Austria

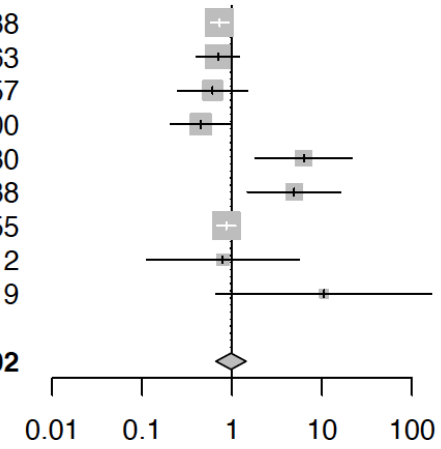
Baseline Characteristics	Arthroscopic arm	Open treatment arm
Number	4,250 patients	6,102 patients
Age	63.2 ± 16.3	60.9 ± 18.7



Primary outcome: Reoperation or reinfection rates

Study	Arthroscopy Events	Arthroscopy Total	Arthrotomy Events	Arthrotomy Total	OR	95%–CI	Weight
Upfill–Brown et al. 2024	207	2775	134	1338	0.72	[0.58; 0.91]	21.3%
Padaki et al. 2022	35	300	26	163	0.70	[0.40; 1.20]	15.7%
Khazi et al. 2020	15	147	9	57	0.61	[0.25; 1.48]	10.4%
Bovonratwet et al. 2019	13	155	17	100	0.45	[0.21; 0.97]	12.0%
Lee et al. 2019	15	27	5	30	6.25	[1.84; 21.25]	7.0%
Bohler et al. 2017	11	21	7	38	4.87	[1.49; 15.95]	7.3%
Jiang et al. 2017	88	799	549	4355	0.86	[0.68; 1.09]	21.2%
Cho et al. 2015	3	22	2	12	0.79	[0.11; 5.53]	3.4%
Rhee et al. 2008	3	4	2	9	10.50	[0.67; 165.11]	1.8%
Random effects model		**4250**		**6102**	**0.97**	**[0.66; 1.43]**	**100.0%**

Heterogeneity: $I^2 = 70\%$, $\tau^2 = 0.1685$, $p < 0.01$



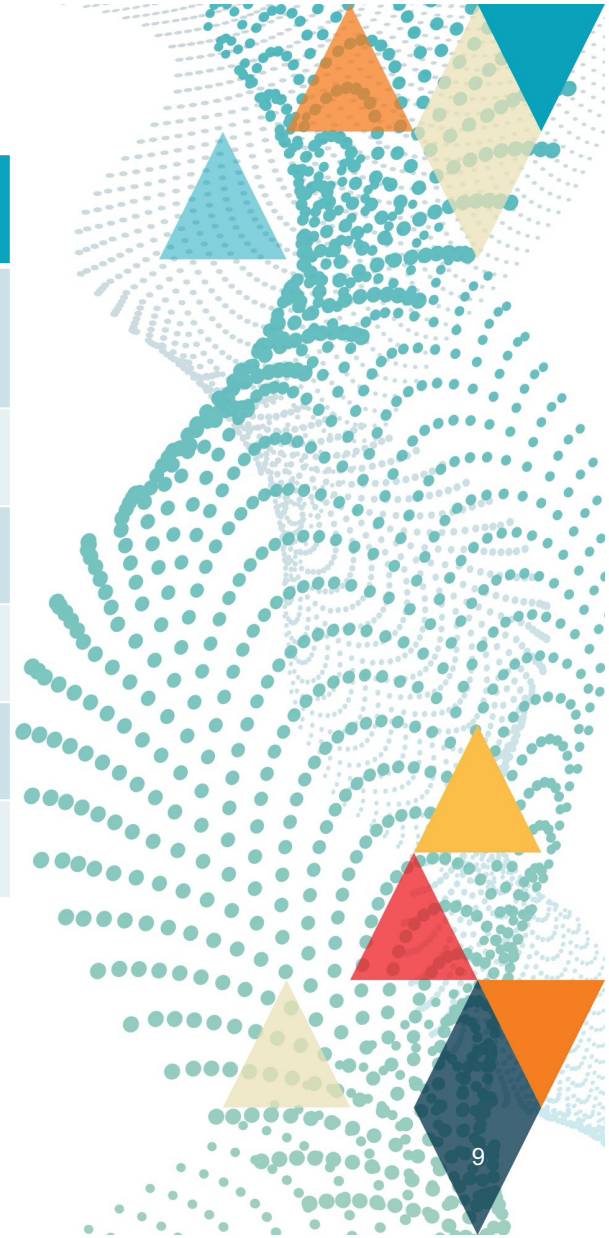
Over the years, there is a shift towards higher number of arthroscopic treatment of glenohumeral septic arthritis

ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

Secondary outcomes:

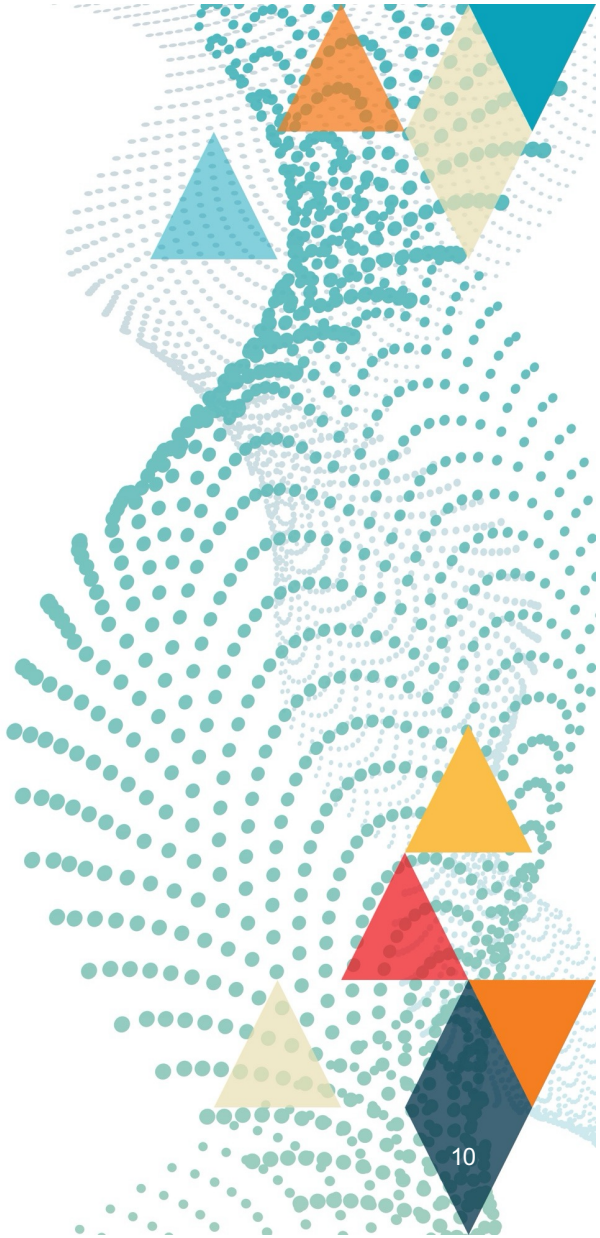
Outcomes	No of studies	Odds Ratio (OR) /Mean Difference (MD)	P value
Length of hospitalization	4	MD: -0.55 days (95% CI -1.57-0.48)	0.295
Readmission	2	OR: 0.92 (95% CI: 0.61-1.38)	0.678
Operative time	2	MD: -2.73 (95% CI: -13.3-7.76)	0.610
Mortality Rates	4	OR: 1.01 (95% CI: 0.72-1.40);	0.076
30 day complications	4	OR: 0.86 (95% CI 0.76-0.97)	0.014
Blood transfusion	4	OR: 0.73 (95% CI 0.56-0.97)	0.028

*p-value < 0.05 is deemed significant



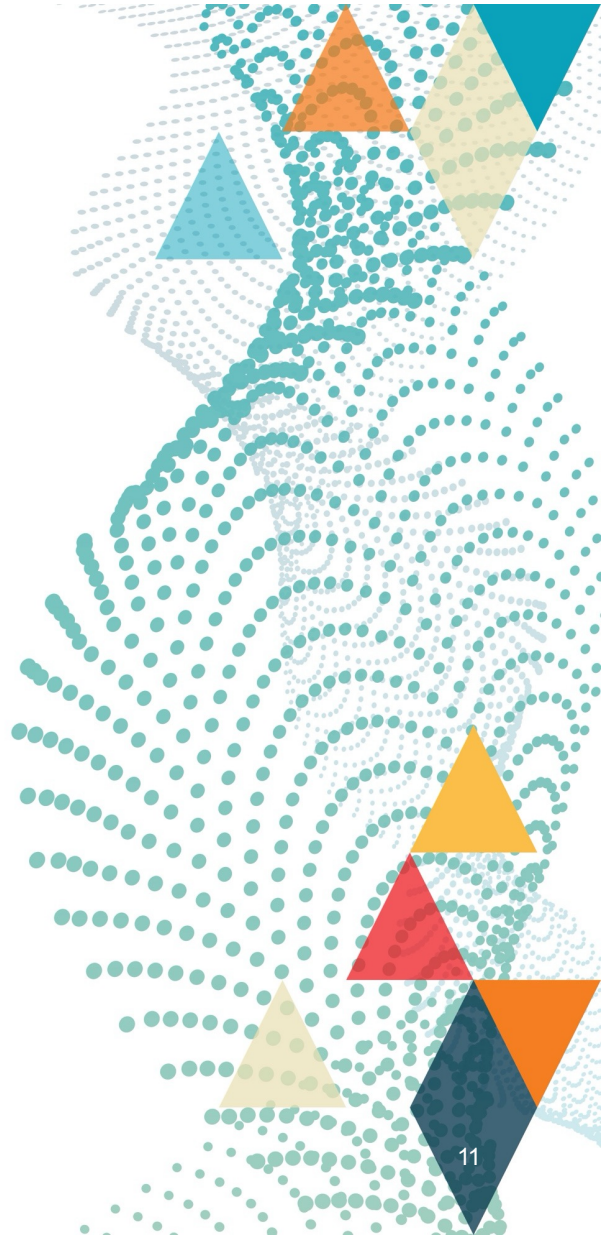
Discussion & Clinical implications

- Non-inferiority of arthroscopic treatment in glenohumeral joint septic arthritis
- Attributed to advancements in arthroscopic techniques
- Incorporation of robotic assistance → increased surgical precision[7]
- Arthroscopy is a promising alternative, especially in high-risk patients



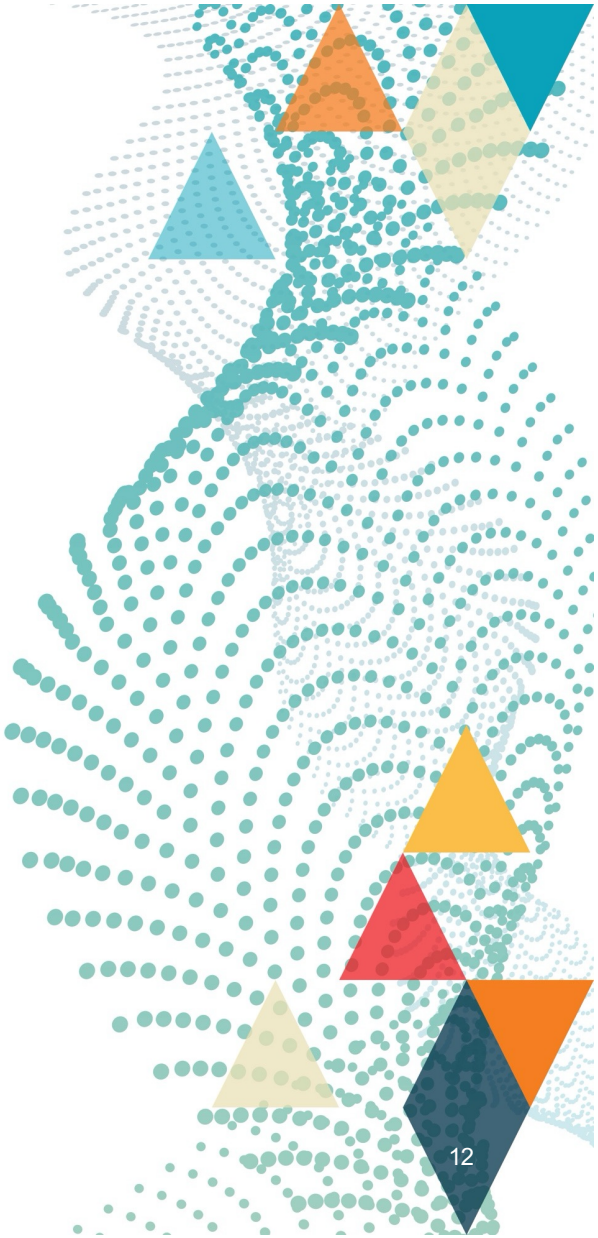
Limitation

- All studies were retrospective; no RCTs
- Potential selection bias (sicker patients → open surgery)
- Certain outcomes were reported by few studies → challenging to draw definitive conclusions
- Functional outcomes not consistently reported
- Surgical approaches are operator dependent



Conclusion

- Arthroscopy is non-inferior for infection eradication
- Comparable reinfection, mortality, length of stay
- Fewer complications and blood transfusion needs
- Arthroscopy may be appropriate in frail patients or where minimally invasive surgery is preferable
- Future studies could report more on functional outcomes of both techniques



References

1. Rüther J, Taubert L, Loose K, et al. Mid- to Long-Term Survival of Geriatric Patients with Primary Septic Arthritis of the Shoulder: A Retrospective Study over a Period of 20 Years. J Pers Med. 2023;13.
2. Huang Y-C, Ho C-H, Lin Y-J, et al. Site-specific mortality in native joint septic arthritis: a national population study. Rheumatology. 2020;59:3826-3833.
3. Kennedy N, Chambers ST, Nolan I, et al. Native Joint Septic Arthritis: Epidemiology, Clinical Features, and Microbiological Causes in a New Zealand Population. J Rheumatol. 2015;42:2392-2397.
4. Kaandorp CJ, Van Schaardenburg D, Krijnen P, Habbema JD, van de Laar MA. Risk factors for septic arthritis in patients with joint disease. A prospective study. Arthritis Rheum. 1995;38:1819-1825.
5. García-Arias M, Balsa A, Mola EM. Septic arthritis. Best practice & research Clinical rheumatology. 2011;25:407-421.
6. Mathews CJ, Kingsley G, Field M, et al. Management of septic arthritis: a systematic review. Ann Rheum Dis. 2007;66:440-445.
7. Kurmis AP, Ianunzio JR. Artificial intelligence in orthopedic surgery: evolution, current state and future directions. Arthroplasty. 2022;4:9.