PICO #2- Surgery

Summary: 75 y/o male with a PMHx of HTN, DM type 2, and mild COPD presents with acute cholecystitis. Patient is hemodynamically stable. Surgical team is discussing possible cholecystectomy tube placement with possible later cholecystectomy.

Search Question: In adult patients with acute cholecystitis who are high-risk surgical candidates due to advanced age and comorbidities, how does percutaneous cholecystostomy tube placement compared to early laparoscopic cholecystectomy or medical management lead to improved outcomes (complication rates, mortality, resolution of infection, hospital length of stay)?

Question Type: What kind of question is this? (boxes now checkable in Word)

☐ Prevalence
☐ Screening
☐ Diagnosis
☐ Prognosis
☐ Treatment
☐ Harms

If meta-analyses or systematic reviews were unavailable, retrospective cohort studies and prospective observational studies can be used. In high-risk populations, randomized controlled trials are limited and retrospective cohort studies can provide valuable information on mortality, complications, and outcomes over time. Additionally, prospective observational studies can track outcomes in real time and allow for the assessment of measured outcomes. Both study designs provide robust real world clinical outcomes and evidence for this PICO.

PICO Search Terms

P	I	C	O
Acute cholecystitis	Cholecystostomy	Cholecystectomy	Mortality
Cholecystitis	Percutaneous Cholecystostomy	Surgical management	Complications
High-risk	Cholecystostomy tube	Medical management	Hospital length of stay
Elderly	Gallbladder drainage		Recurrence
Critically ill			Resolution
Comorbid			

Search tools and strategy used:

Pub Med:
Search Terms:
("acute cholecystitis"[Title/Abstract] OR "cholecystitis"[MeSH Terms])
AND ("percutaneous cholecystostomy"[Title/Abstract] OR "cholecystostomy tube"[Title/Abstract] OR "cholecystostomy"[Title/Abstract] OR "gallbladder drainage"[Title/Abstract])
AND ("cholecystectomy"[Title/Abstract] OR "surgical management"[Title/Abstract] OR "medical management"[Title/Abstract] OR "non-surgical"[Title/Abstract])
AND ("mortality"[Title/Abstract] OR "complications"[Title/Abstract] OR "hospital length of stay"[Title/Abstract] OR "recurrence"[Title/Abstract] OR "resolution"[Title/Abstract])
AND ("elderly"[Title/Abstract] OR "high risk"[Title/Abstract] OR "critically ill"[Title/Abstract] OR "comorbid"[Title/Abstract])

Articles found: 91
With filters: 76 (past 10 years)

Cochrane Library:
Search Terms:
("acute cholecystitis" OR "cholecystitis, acute") AND ("percutaneous cholecystostomy" OR "cholecystostomy tube") AND ("cholecystectomy" OR "surgical management" OR "conservative management") AND ("high risk" OR "elderly" OR "critically ill" OR "comorbid")

Results: 1 Review, 13 trials
No filter added

Google Scholar:
Search Terms:
"acute cholecystitis" AND ("percutaneous cholecystostomy" OR "cholecystostomy tube") AND ("cholecystectomy" OR "surgical management") AND ("elderly" OR "high risk" OR "critically ill" OR "comorbid")

Results: 4,500
With filters: 1,620 (past 10 years)

I decided to use two articles from PubMed and one from Google Scholar. I narrowed down my selection by first skimming the title. If the title seemed relevant, I would skim the abstract to see if it pertained to my PICO. After that I would skim the rest of the article to see how it pertains to my PICO in addition to reviewing the level of evidence and the study type/design.

Results found

1. Ullah, N., Kannan, V., Ahmed, O., Geddada, S., Ibrahiam, A. T., Al-Qassab, Z. M., & Malasevskaia, I. (2024). Effectiveness and Safety of Cholecystectomy Versus Percutaneous Cholecystostomy for Acute Cholecystitis in Older and High-Risk Surgical Patients: A Systematic Review. *Cureus*, *16*(9), e70537. https://doi.org/10.7759/cureus.70537

   Abstract:

Acute cholecystitis (AC) is a prevalent surgical emergency, particularly among elderly individuals who present with high perioperative risks. While early cholecystectomy (CCY) is the standard treatment, percutaneous cholecystostomy (PC) is proposed as an alternative for high-risk patients. This systematic review aims to evaluate the comparative safety and efficacy of CCY versus PC in managing AC among elderly and high-risk surgical patients. This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A comprehensive search was conducted across multiple electronic databases, including PubMed/Medline, Cochrane Central Register of Controlled Trials (CENTRAL), ScienceDirect, Europe PMC, ClinicalTrials.gov, and EBSCO Open Dissertations, from July 1 to 15, 2024. Studies published from January 2019 to July 15, 2024, were included if they focused on patients aged 65 and older or those classified as high-risk surgical candidates. The review encompassed 72,366 participants across 22 studies, predominantly observational. Key outcomes assessed included postoperative complications, readmission rates, recurrence of cholecystitis, and mortality rates. This study highlights the need for individualized treatment strategies for managing AC in elderly populations. While CCY remains the preferred approach when feasible, PC offers a critical alternative for high-risk patients. Future research is necessary to optimize outcomes for this vulnerable population.

Key Points:

- Systematic review of 22 studies including >70,000 patients comparing cholecystectomy vs percutaneous cholecystostomy (PCT) in elderly/high-risk patients.
- Cholecystectomy was associated with lower mortality and fewer complications compared to PCT.
- Patients who underwent PCT had higher rates of recurrent biliary disease and need for readmission.
- PCT was effective as a temporary measure, particularly in patients who were not immediate surgical candidates.
- Overall, evidence suggests that definitive surgical management leads to better long-term outcomes, while PCT is best used as a bridge or alternative in select patients.

Selection Explanation: I chose this article because it directly compares cholecystectomy and percutaneous cholecystostomy, which aligns exactly with my PICO question. It includes a very large sample size across multiple studies, making it high-level evidence. It also evaluates key outcomes such as mortality, complications, and recurrence, which are directly relevant to my patient scenario.

2. Curry, J., Chervu, N., Cho, N. Y., Hadaya, J., Vadlakonda, A., Kim, S., Keeley, J., & Benharash, P. (2024). Percutaneous cholecystostomy tube placement as a bridge to cholecystectomy for grade III acute cholecystitis: A national analysis. *Surgery open science*, *18*, 6–10. https://doi.org/10.1016/j.sopen.2024.01.006

Abstract:

Introduction: Percutaneous cholecystostomy (PCT) is an alternative to cholecystectomy (CCY) in high-risk surgical candidates with severe acute cholecystitis. A subset of these patients ultimately undergo delayed CCY. We therefore compared outcomes of delayed CCY in patients with grade III acute cholecystitis who received a PCT on index admission, to those who did not.

Methods: Non-elective adult hospitalizations for grade III acute cholecystitis that underwent delayed CCY were identified in the 2016–2020 Nationwide Readmission Database. Patients who received a PCT during their index admission comprised the *PCT* group (others: *Non-PCT)*. Outcomes were assessed for the CCY hospitalization. Entropy balancing was used to generate sample weights to adjust for differences in baseline characteristics. Regression models were created to evaluate the association between *PCT* and the outcomes of interest.

Results: Of an estimated 13,782 patients, 13.3 % comprised *PCT*. Compared to *Non-PCT*, *PCT* were older (71.1 ± 13.1 vs 67.4 ± 15.3 years) and more commonly in the highest income quartile (22.5 vs 16.1 %, both $p < 0.001$). After risk adjustment, *PCT* was associated with reduced odds of respiratory (AOR 0.67, CI 0.54–0.83) and infectious (AOR 0.77, CI 0.62–0.96) complications after eventual CCY. Finally, *PCT* had comparable pLOS (β +0.31, CI [−0.14, 0.77]) and operative hospitalization costs (β $800, CI [−2300, +600]).

Conclusion: In the present study, *PCT* was associated with decreased odds of perioperative complications and comparable resource utilization upon readmission CCY. Our findings suggest that PCT may be helpful in bridging patients with grade III acute cholecystitis to eventual CCY.

Key points:

- Retrospective cohort study using the Nationwide Readmissions Database (U.S.).

- Included 13,782 patients with severe (grade III) acute cholecystitis.
- Patients who received PCT prior to delayed cholecystectomy had lower rates of respiratory, infectious, and thrombotic complications along with similar hospital length of stay and costs compared to those without PCT
- PCT did not delay eventual surgery and was associated with improved perioperative outcomes when used as a bridge.
- Suggests that PCT may be beneficial in stabilizing patients before surgery rather than replacing surgery.

Selection Explanation: I chose this article because it directly evaluates percutaneous cholecystostomy tube placement as a bridge to cholecystectomy, which is highly relevant to my PICO question. It also uses a large U.S.-based database, making it more applicable to my patient population. Additionally, it compares outcomes such as complications, length of stay, and cost, which are important when deciding between PCT and surgical management. This article helps clarify that PCT may be useful as a temporary strategy rather than definitive treatment, which directly applies to my clinical scenario.

3. Markopoulos, G., Mulita, F., Kehagias, D., Tsochatzis, S., Lampropoulos, C., & Kehagias, I. (2021). Outcomes of percutaneous cholecystostomy in elderly patients: a systematic review and meta-analysis. *Przeglad gastroenterologiczny*, *16*(3), 188–195. https://doi.org/10.5114/pg.2020.100658

Abstract:

Introduction: Percutaneous cholecystostomy (PC) represents a management option to control sepsis in patients with acute cholecystitis, who are unable to tolerate surgery.

Aim: This review aimed to evaluate the outcomes of elderly patients treated with PC and compare it with emergent cholecystectomy.

Material and methods: An electronic search of the Embase, Medline Web of Science, and Cochrane databases was performed. Percutaneous cholecystostomy was used as the reference group, and weighted mean differences (WMD) were calculated for the effect of PC on continuous variables, and pooled odds ratios (POR) were calculated for discrete variables.

Results: There were 20 trials included in this review. Utilisation of PC was associated with significantly increased mortality (POR = 4.85; 95% CI: 1.02–7.30; p = 0.0001) and increased re-admission rates (POR = 2.95; 95% CI: 2.21–3.87; p < 0.0001).

Conclusions: This pooled analysis established that patients treated with PC appear to have increased mortality and readmission rates relative to those managed with cholecystectomy.

Key Points:

- Systematic review and meta-analysis including 20 studies evaluating percutaneous cholecystostomy (PCT) vs cholecystectomy.
- PCT was associated with: Significantly higher mortality and Higher readmission rates
- While PCT is effective for short-term control of infection, it does not provide definitive treatment.
- Patients treated with cholecystectomy had better overall outcomes.
- Suggests that PCT should be reserved for patients who cannot tolerate surgery, rather than used as first-line treatment.

Selection explanation: I chose this article because it is a systematic review and meta-analysis, which represents a high level of evidence. It directly compares percutaneous cholecystostomy and cholecystectomy, making it highly relevant to my PICO question. It also evaluates important outcomes such as mortality and readmission rates, which are key in determining the best management strategy for my patient.

Foreign study consideration:

- Cultural Context: Differences in attitudes toward surgery may influence whether patients undergo cholecystectomy versus PCT.
- Social Context: Variations in patient populations, including comorbidities and overall health status, may affect outcomes.
- Economic Context: Differences in healthcare systems and access to surgery may lead to increased use of PCT in some countries.

Clinical Bottom Line:

For adult patients with acute cholecystitis who are hemodynamically stable but have comorbidities or moderate surgical risk, percutaneous cholecystostomy tube (PCT) placement can provide effective short-term control of infection and may be used as a bridge to later cholecystectomy. However, evidence from both U.S.-based and international studies shows that PCT alone is associated with higher mortality, higher recurrence, and increased readmissions compared to definitive cholecystectomy. When feasible, early laparoscopic cholecystectomy remains the preferred treatment, as it provides better overall outcomes, lower complication

rates, and lower long-term mortality. PCT should generally be reserved for patients who are temporarily unstable or cannot tolerate immediate surgery, with the goal of stabilizing them for eventual cholecystectomy whenever possible.