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Corresponding author:
Yen-Ta Huang

uncleda.huang@gmail.com

Author Affiliation:
Department of Surgery, National
Cheng Kung University Hospital,
College of Medicine, National Cheng
Kung University, Tainan City, Taiwan.

**Impact of Balanced Buffered Crystalloids versus
Normal Saline on Mortality in Acute Pancreatitis: A
Comprehensive Evidence-Based Medicine Approach
with Bayesian meta-analysis**

Su, PA; Lai, PC; Huang, YT.

ADMINISTRATIVE INFORMATION

Support - Not applicable.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202570026

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 7 July 2025 and was last updated on 7 July 2025.

INTRODUCTION

Review question / Objective Does the choice of intravenous fluid (balanced buffered crystalloids or normal saline) affect mortality outcomes in acute pancreatitis?

Condition being studied Isotonic crystalloids remain the first-line therapy for intravenous fluid resuscitation. However, the choice between 0.9% NaCl (normal saline, NS) and balanced buffered crystalloids (BBC) like lactated Ringer's (LR) or Plasmalyte remains under active investigation. Among seven SRs comparing NS versus LR in acute pancreatitis, only two 2025 publications achieved high A MeaSurement Tool to Assess systematic Reviews 2 (AMSTAR2) quality ratings. LR demonstrated benefits including reduced moderate-to-severe pancreatitis, fewer ICU admissions, decreased local complications, and shorter hospital stays. However, both SRs showed no statistically significant difference in mortality rates.

METHODS

Participant or population Acute pancreatitis.

Intervention Balanced buffered crystalloids.

Comparator Normal saline.

Study designs to be included RCTs and non-RCTs.

Eligibility criteria We included studies comparing BBC (lactated Ringer's, Ringer's acetate, Plasmalyte) versus NS reporting mortality outcomes..

Information sources PA Su & PC Lai performed an updated SR, searching PubMed, Embase, ClinicalTrials.gov, China National Knowledge Infrastructure (CNKI), and Cochrane through July 5, 2025 without language restriction. PA Su & PC Lai performed an updated SR, searching PubMed, Embase, ClinicalTrials.gov, China National

Knowledge Infrastructure (CNKI), and Cochrane through July 5, 2025 without language restriction.

Main outcome(s) Mortality.

Quality assessment / Risk of bias analysis Risk of bias was assessed using Cochrane revised Risk of Bias for RCTs and Risk Of Bias In Non-randomized Studies of Interventions Version 2 for non-RCTs.

Strategy of data synthesis Bayesian analysis utilized R packages `multinma` and `rstanarm`. We assessed sample size adequacy with target 95% CrI width <2%, representing clinically meaningful precision. We reported median risk difference (RD) with 95% credible intervals (CrI), and number needed to treat (NNT). Publication bias was assessed using Bayesian Egger regression. Publication bias risk was classified as high, moderate, or low based on predefined criteria.

Subgroup analysis Meta-analysis of included RCTs alone.

Sensitivity analysis Sensitivity analysis simulated potentially missing studies when asymmetry was observed.

Language restriction Without language restriction.

Country(ies) involved Taiwan.

Keywords Balanced buffered crystalloids, saline, acute pancreatitis, Bayesian.

Contributions of each author

Author 1 - Po-An Su.

Author 2 - Pei-Chun Lai.

Author 3 - Yen-Ta Huang.