One in Four Patients with Gastrointestinal Bleeding Develops Shock or Hemodynamic Instability

A Systematic Review and Meta-analysis

Mahmoud Obeidat[1,2], Brigitta Teutsch[1,2], Anett Rancz[1,3], Edina Tari[1,4], Katalin Márta[1,4], Dániel Sándor Veres[1,5], Nóra Hosszúfalusi[1,3], Emese Mihály[1,3], Péter Hegyi[1,2,4], Bálint Erőss[1,2,4]

AFFILIATIONS

1- Centre for Translational Medicine, Semmelweis University, Budapest, Hungary

2- Institute for Translational Medicine, Medical School, University of Pécs, Pécs, Hungary

3- Department of Internal Medicine and Hematology, Semmelweis University, Faculty of Medicine, Budapest, Hungary

4- Institute of Pancreatic Diseases, Semmelweis University, Budapest, Hungary

5- Department of Biophysics and Radiation Biology, Semmelweis University, Budapest, Hungary

Introduction

Hemodynamic instability (HI) and shock are associated with untoward outcomes in **gastrointestinal bleeding** (GIB). However, there are no studies in the existing literature on the proportion of patients who developed HI or shock after gastrointestinal bleeding. We aimed to meta-analyze the available data to determine these proportions in different bleeding sources.

Methods

The protocol was registered on PROSPERO in advance (CRD42021283258). A systematic search was performed in three databases (PubMed, Embase, and CENTRAL) on 14th October 2021. Pooled proportions with 95% confidence intervals (CI) were calculated with a random-effects model. A subgroup analysis was carried out based on the time of assessment **(on admission or during hospital stay)** of the investigated outcomes. Heterogeneity was assessed by Higgins and Thompson's I². The Joanna Briggs Institute Prevalence Critical Appraisal Tool was used for the risk of bias assessment.

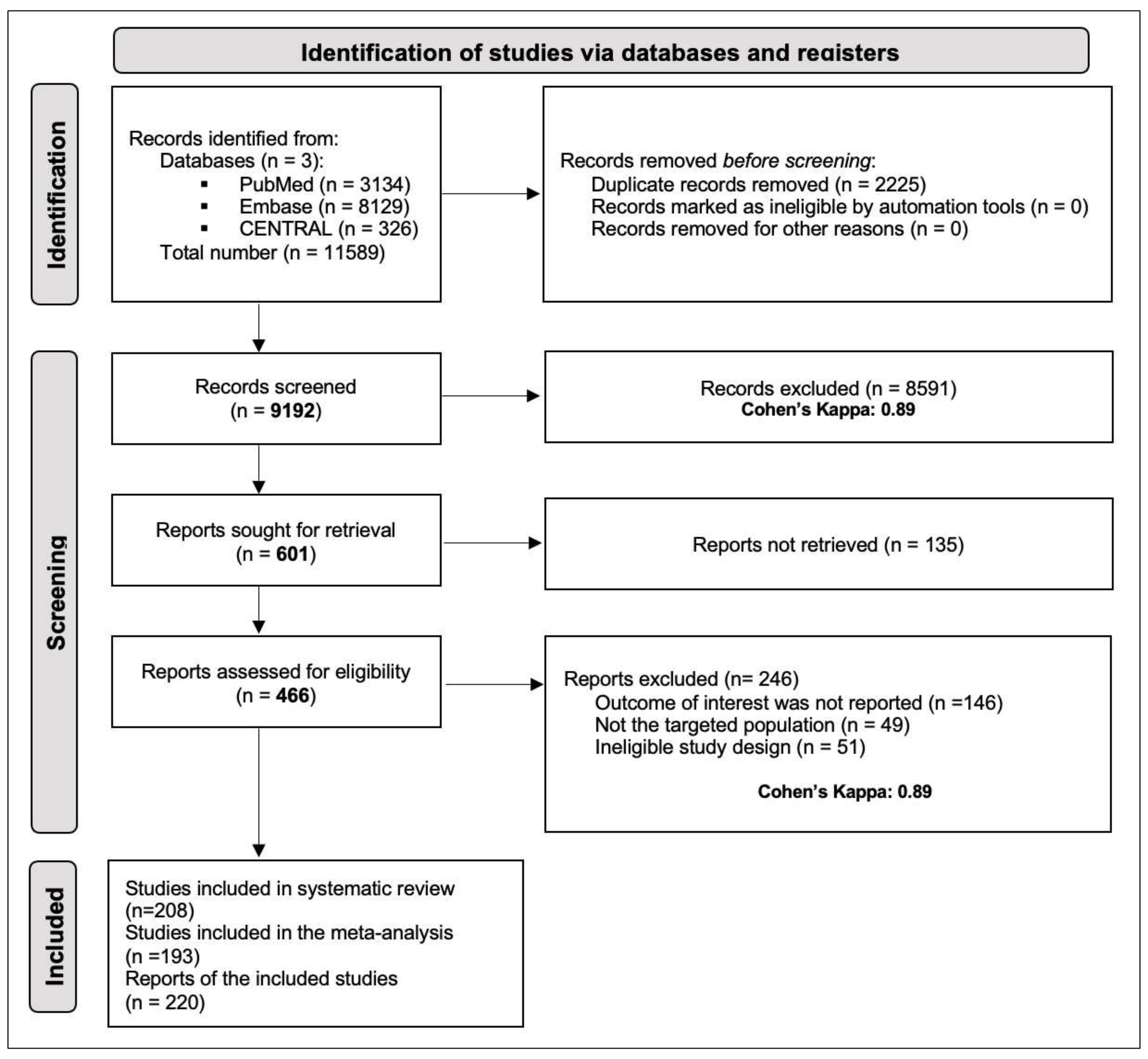

Figure 1. PRISMA 2020 flow chart of the screening and selection process of the studies

Results

We identified 11,589 records, of which **220** studies were eligible for data extraction. The overall proportion of shock and hemodynamic instability in gastrointestinal bleeding patients was **0.25** (CI: 0.17–0.36). In non-variceal bleeding, the proportion was **0.22** (CI: 0.14–0.31), whereas it was **0.25** (CI: 0.19–0.32) in variceal bleeding. The proportion of patients with colonic diverticular bleeding who developed shock or HI was **0.12** (CI: 0.06–0.22). The risk of bias was low, and heterogeneity was high in all analyses.

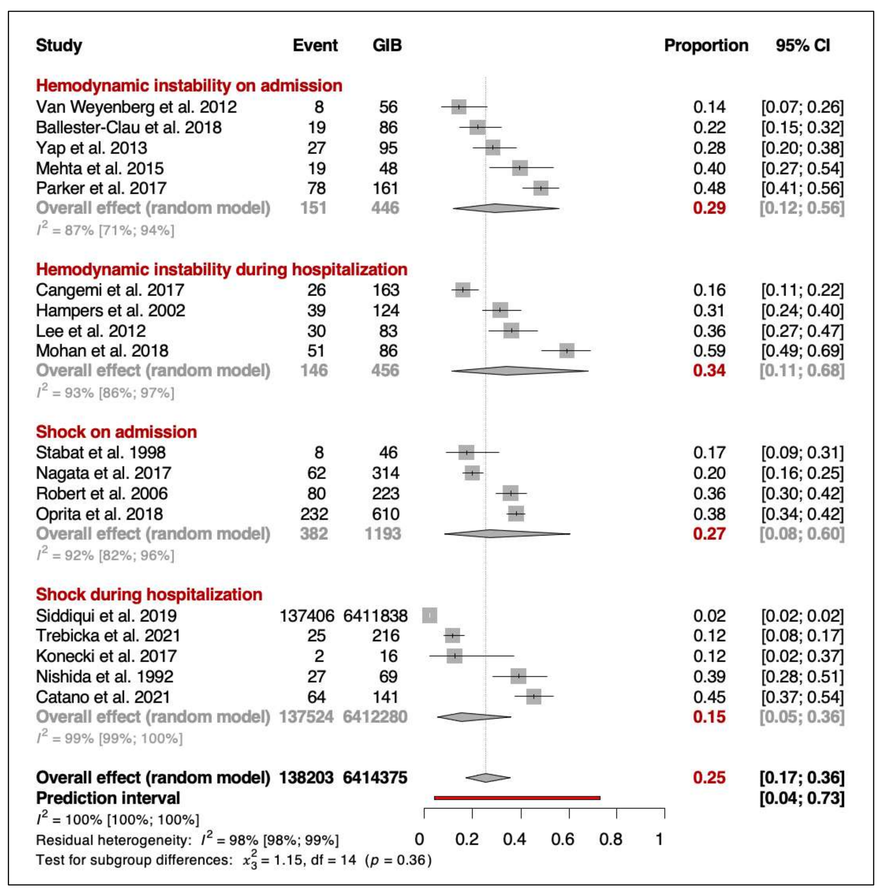

Figure 2. Forest plot demonstrating the proportion rates for hemodynamic instability and shock in unspecified gastrointestinal bleeding sources. GIB, gastrointestinal bleeding; CI, confidence interval

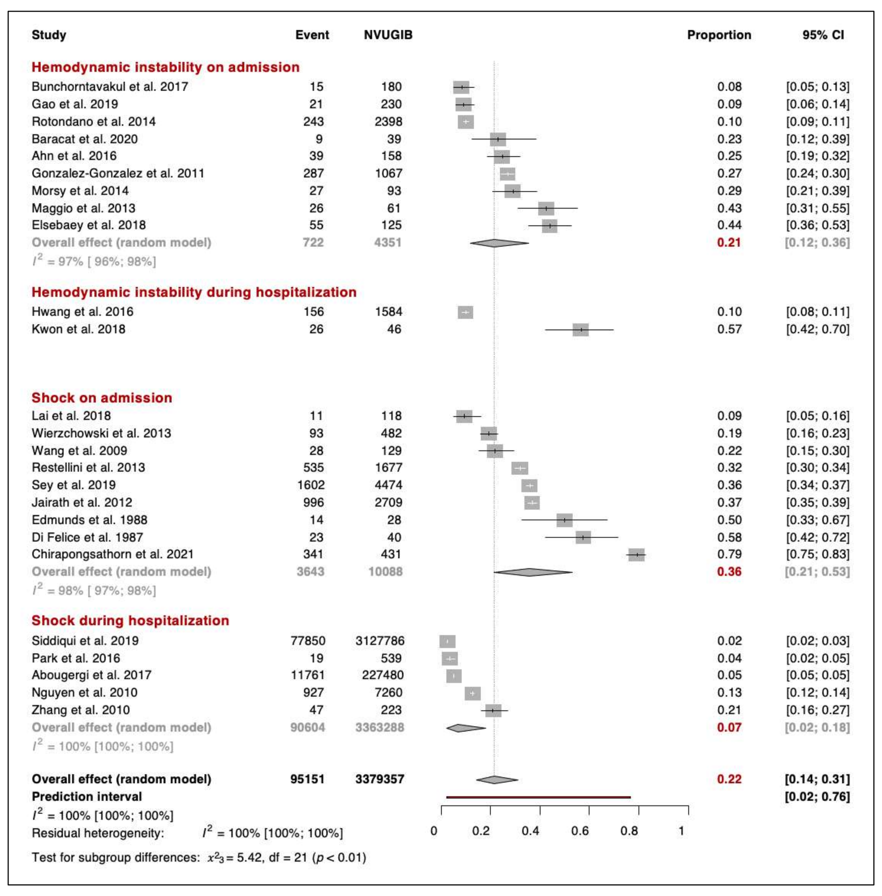

Figure 3. Forest plot demonstrating the proportion rates for hemodynamic instability and shock in non-variceal bleeding. NVUGIB, non-variceal upper gastrointestinal bleeding; CI, confidence interval

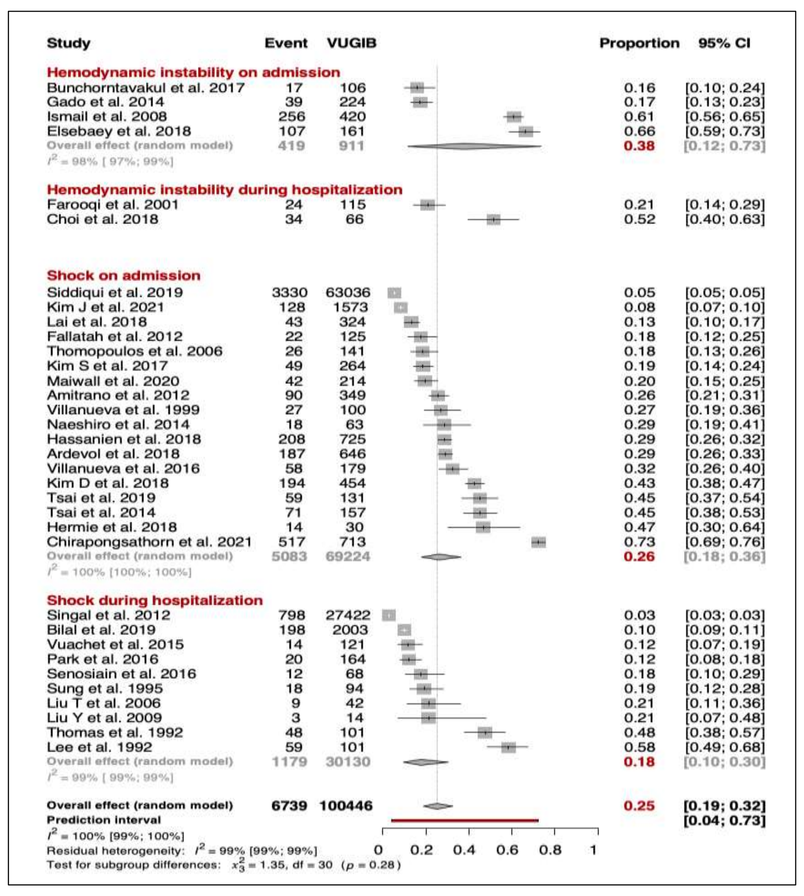

Figure 4. Forest plot demonstrating the proportion rates for hemodynamic instability and shock in variceal bleeding. VUGIB, variceal upper gastrointestinal bleeding; CI, confidence interval

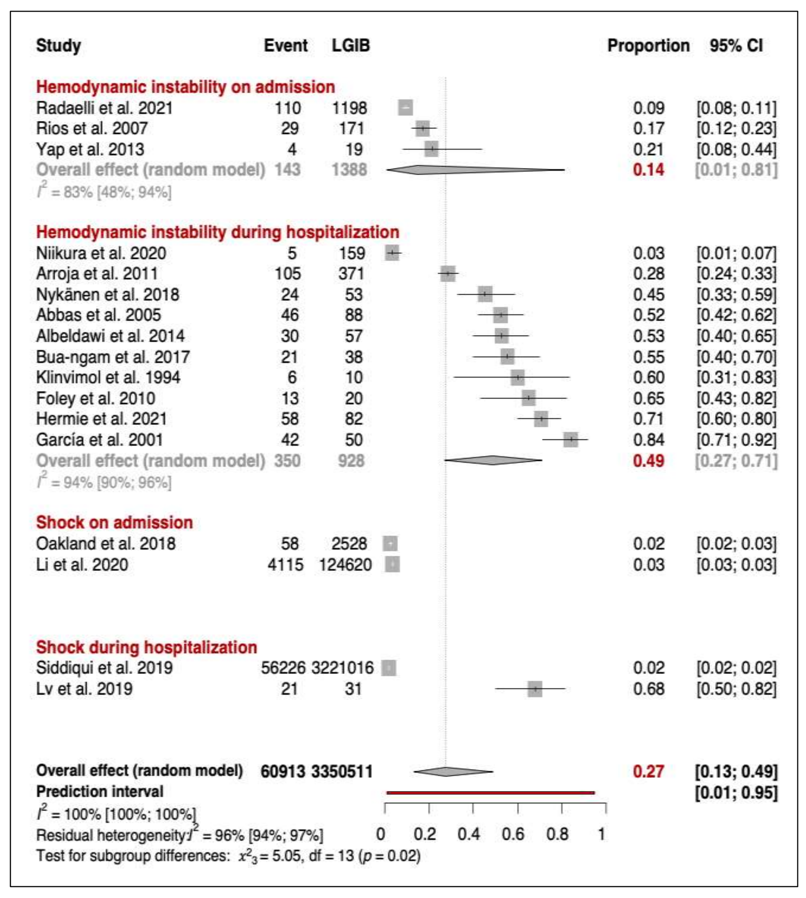

Figure 5. Forest plot demonstrating the proportion rates for hemodynamic instability and shock in lower gastrointestinal bleeding sources. LGIB, lower gastrointestinal bleeding; CI, confidence interval

Conclusion

One in five, one in four and one in eight patients develops shock or hemodynamic instability on admission or during the hospital stay in the case of non-variceal, variceal and colonic diverticular bleeding, respectively. Patients need a more proactive treatment strategy and require continuous monitoring to prevent untoward outcomes.