

Outcomes and complications of radiologic gastrostomy vs percutaneous endoscopic gastrostomy for enteral feeding: an updated systematic review and meta-analysis

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ABSTRACT

Introduction

Percutaneous endoscopic gastrostomy (PEG) and percutaneous radiological gastrostomy (PRG) are commonly utilized to establish access to enteral nutrition. However, data comparing the outcomes of PEG vs. PRG are conflicting. Our aim was to conduct an updated systemic review and meta-analysis comparing PRG and PEG outcomes.

Methods

A systematic review was conducted using Medline, Embase, and Cochrane library databases until December 21, 2021. Primary outcomes included 30-day mortality, tube leakage, tube dislodgement, perforation, and peritonitis. Secondary outcomes included bleeding, infectious complications, and aspiration pneumonia. All analyses were conducted using comprehensive meta-analysis software.

Results

The initial search revealed 819 studies. Of these, 41 of these studies met our inclusion criteria and were included in the final meta-analysis. Of 471,091 total patients, 194,350 received PRG and 276,741 received PEG. PRG was associated with higher odds of 30-day mortality when compared to PEG (OR: 1.220, 95% CI: 1.162-1.282, I²=54.2%). In addition, tube leakage and tube dislodgement were higher in the PRG group than in PEG (OR: 2.231, 95% CI: 1.184-4.2 and OR: 2.612, 95% CI: 1.917-3.56 respectively). Perforation, peritonitis, bleeding, and infectious complications were also higher with PRG than PEG, although this was not statistically significant on sensitivity analysis. There was no significant difference in the risk of aspiration pneumonia.

Discussion

This systematic review and meta-analysis comparing PRG and PEG outcomes found higher odds of 30-day mortality, tube leakage, and tube dislodgement with PRG compared to PEG. Rates of bleeding, perforation, infectious complications, and peritonitis were significantly higher with PRG than with PEG, but these results did not achieve statistical significance in a sensitivity analysis. Our meta-analysis has the following strengths: systematic literature search with well-defined inclusion criteria, the inclusion of all available studies in the current literature, careful exclusion of redundant studies, high-quality studies with detailed data extraction, and rigorous study quality evaluation. Our pooled rates are calculated from 471,091 patients, a very robust figure. In summary, PRG is associated with higher 30-day mortality and gastrostomy tube-related complications than PEG. Additional studies, particularly large RCTs, are warranted.

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INTRODUCTION

- Enteral nutrition is superior to parenteral nutrition in terms of nutritional outcomes, morbidity reduction, and gut function preservation¹
- Gastrostomy is favored over nasogastric tube feeding when medium or long-term enteral nutrition is indicated and oral feeding is not feasible or insufficient²
- Percutaneous radiologic gastrostomy (PRG) and percutaneous endoscopic gastrostomy (PEG) are two commonly utilized methods of establishing enteral feeding access
- However, current literature comparing adverse events of PEG vs PRG are conflicting
- Previously published systematic reviews and meta-analyses have certain drawbacks, including mainly focusing on a single outcome or only including a small number of studies³

OBJECTIVE

To conduct an updated systematic review and meta-analysis comparing PRG and PEG outcomes.

METHODS

- A systematic review was conducted using Medline, Embase, and Cochrane library
- Primary outcomes included 30-day mortality, tube leakage, tube dislodgement, perforation, and peritonitis
- Secondary outcomes included bleeding, infection, and aspiration pneumonia
- All analyses were conducted using comprehensive meta-analysis software

DISCUSSION

- The higher 30-day mortality rate in PRG could potentially be explained by the different comorbidity rates in each group; head and neck cancer was more common in the PRG group while neurological disorders was more common in the PEG group
- Prophylactic antibiotic use may also have affected the 30-day mortality rates, as they are widely used for patients undergoing PEG but not PRG placement^{4,5}
- PRG tubes are secured using a balloon retention system, which may be less secure and possibly result in a greater risk of peristomal leakage and tube displacement⁶
- PRG tubes are also typically smaller in diameter, which may lead to tube blockage

RESULTS

- Of 819 studies found on the initial search, 41 studies met our inclusion criteria and were included in the final meta-analysis, including 471,091 total patients, with 194,350 receiving PRG and 276,741 receiving PEG.
- Rates of bleeding, perforation, infectious complications, and peritonitis were higher with PRG than PEG, although these results did not achieve statistical significance in our sensitivity analysis. There was no significant difference in the risk of aspiration pneumonia.

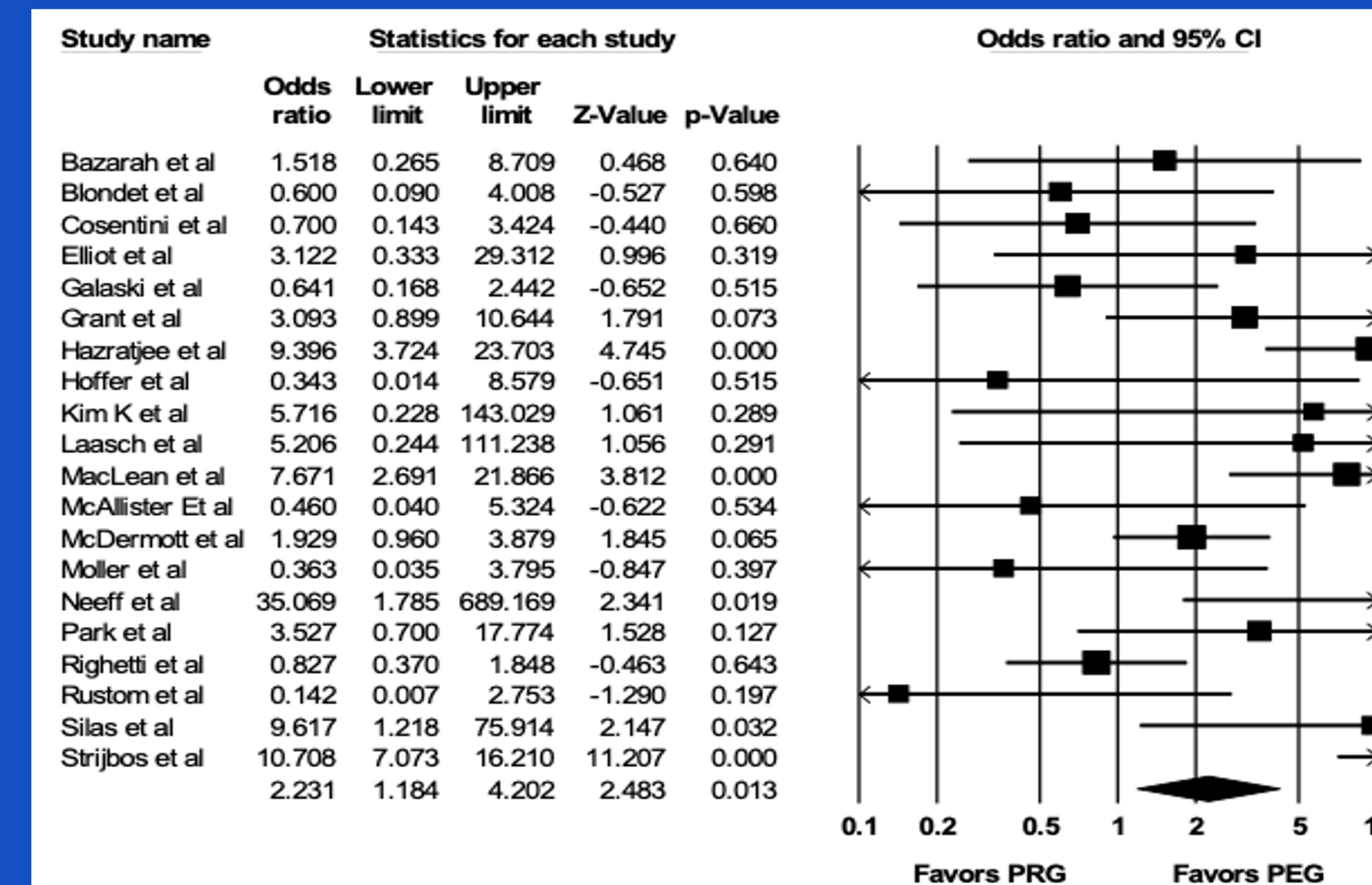


Figure 2. Tube leakage. Odds of tube leakage were higher in the PRG group than PEG (OR: 2.23, 95% CI: 1.18-4.2, I²=76%).

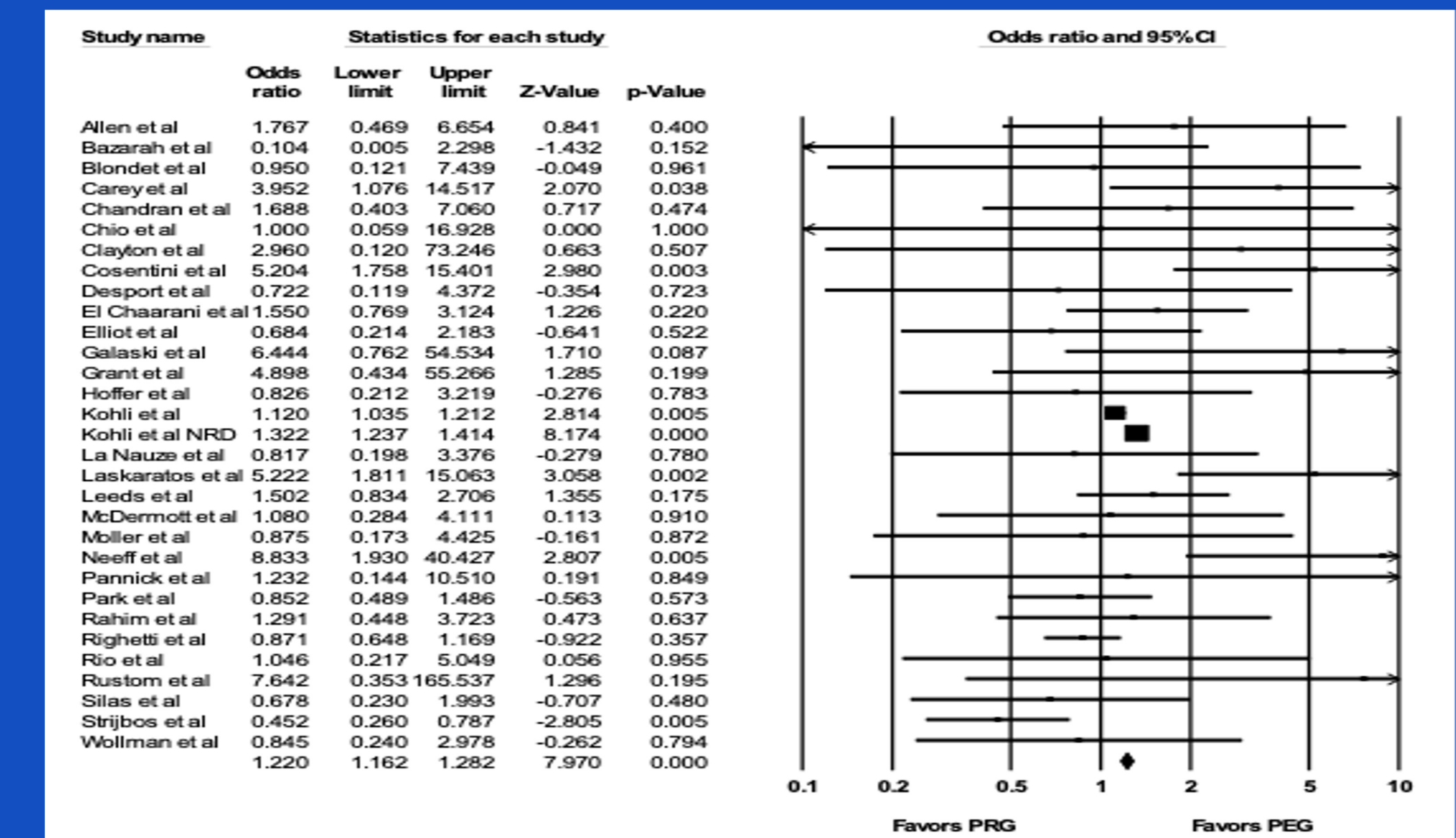


Figure 1. 30-day mortality. Odds of 30-day mortality were higher in the PRG group than PEG (OR: 1.22, 95% CI: 1.16-1.28, I²=54.2%).

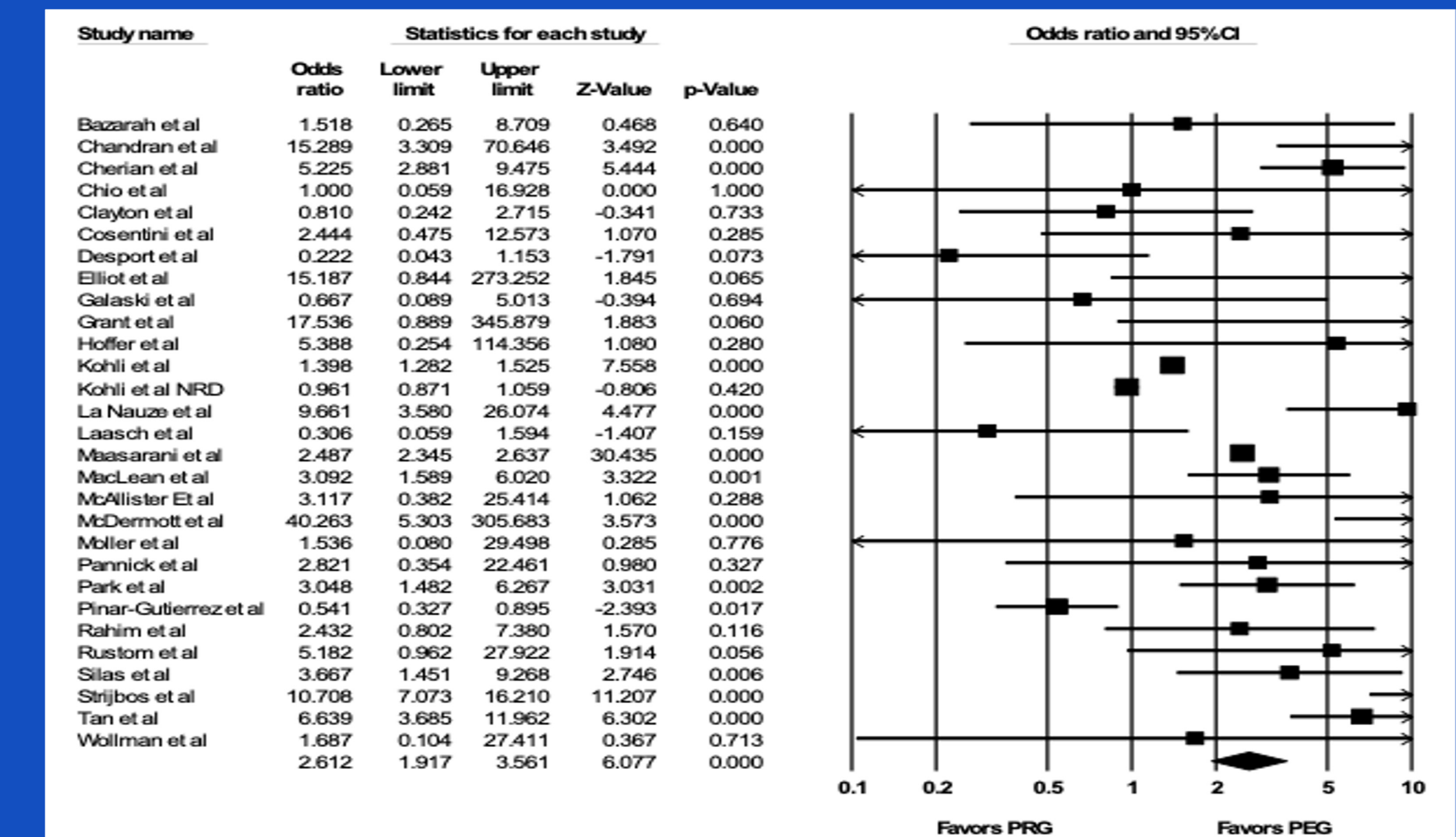


Figure 3. Tube dislodgement. Odds of tube dislodgement were higher in the PRG group than PEG (OR: 2.61, CI: 1.92-3.56, I²=94.2%).

CONCLUSIONS

- PRG is associated with higher odds of 30-day mortality, tube leakage, and tube dislodgement when compared to PEG
- There was a non-statistically significant trend towards higher rates of perforation, peritonitis, bleeding, and infectious complications with PRG when compared to PEG

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