



Gastrocutaneous fistulae in children – A systematic review and meta-analysis of epidemiology and treatment options[☆]



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ABSTRACT

Background: Gastrostomy tubes are a common adjunct to the care of vulnerable pediatric patients. This study systematically evaluates the epidemiology and risk-factors for gastrocutaneous fistulae (GCF) after gastrostomy removal in children and reviews treatment options focusing on nonoperative management (NOM).

Methods: After protocol registration (CRD-42017059565), multiple databases were searched. Studies describing epidemiology in children and GCF treatment at any age were included. Critical appraisal was performed (MINORS risk-of-bias assessment tool). One-sided meta-analysis was executed to estimate efficacy of therapeutic adjuncts using a random-effects model.

Results: Sixteen articles evaluating pediatric GCF were identified. 44% defined GCF as persistence > 1 month which occurred in 31 ± 7% of cases. Risk factors for pediatric GCF include age at gastrostomy, timing of removal, open technique, and fundoplication. Mean MINORS score was 0.60 ± 0.16. Seventeen additional studies were identified reporting 142 patients undergoing NOM (endoscopic, systemic, and local therapies), and one pediatric comparative study was identified. Overall aggregate proportion of GCF closure after any NOM is 77% (80% success rate in local/systemic therapies; 75% success rate in endoscopic approaches). No adverse events were reported.

Conclusion: Persistent GCF complicates the management of gastrostomies in 1/3 of children with predictable risk factors. Several treatment options exist that obviate the need for general anesthesia. Their efficacy is unclear. Further prospective investigations are clearly warranted.

Level of Evidence: III – Systematic Review and Meta-Analysis Based on Retrospective Case Control Studies.

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Gastrostomy tube placement is one of the most commonly performed procedures in pediatric surgery and serves as an important adjunct to the care of many vulnerable patients. While multiple techniques have been described, the laparoscopic approach appears to have the most favorable short and long term side effect/complication profile [1]. One of the more common and vexing long-term complications is the development of a persistent gastrocutaneous fistula (GCF) after gastrostomy removal – an issue that traditionally requires a second operative intervention.

While multiple reports have retrospectively reported the rate of GCF and/or risk factors associated with its development, there are at present a paucity of summative epidemiologic data and even less information regarding nonoperative preventative or therapeutic options and their success rates. The aim of this systematic review was to answer the following questions: (1) is there a consensus in the literature regarding the epidemiology and risk-factors for gastrocutaneous fistulae (GCF) in children, and (2) what is the efficacy of nonoperative treatment options described for the management of this condition? These answers are needed to improve counselling of patients and parents and to identify potential prophylactic and/or therapeutic options in need of further prospective evaluation.

1. Methods

1.1. Search strategy

In accordance with the Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans, institutional ethics approval

Abbreviations: GCF, gastrocutaneous fistula; NOM, nonoperative management; PEG, percutaneous endoscopic gastrostomy; OR, odds ratio; MINORS, methodological index for nonrandomized studies; PRISMA, preferred reporting items for systematic reviews and meta analyses.

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was not required for this systematic review of previously published data. The study protocol was registered *a priori* on the PROSPERO international prospective register of systematic reviews (CRD-42017059565). The search strategy, detailed in Appendix A, was developed in collaboration with a senior hospital librarian (EG). The following nine databases were searched from inception to April 13, 2017: Africa-Wide Information (EBSCO), Biosis (Ovid), Cochrane (Wiley), Embase (Ovid), Global Health Information (LILACS), Medline (Ovid), PubMed (NLM) and Web of Science (Thomson Reuters). The systematic literature search identified articles which included variations of the terms gastric or gastrocutaneous fistula or gastrostomy complications, found in the subject headings as well as text words in the title, abstract or keyword fields. No time or language limits were applied to the search and animal studies were excluded, when possible.

1.2. Eligibility criteria

Eligibility of articles was determined based on their description of the epidemiology of GCF, comparison of risk factors for persistent GCF rather than spontaneous gastrostomy closure, and comparison of

closure rates for various surgical, endoscopic, systemic and local therapeutic modalities for GCF closure. All article types except for single-case reports, editorial, commentary, letters and prior meta-analyses were included. While articles pertaining to the epidemiology of GCF in children were limited to the pediatric age range, articles salient to non-operative treatment options were searched for all age-groups. Articles were excluded if they described postoperative GCF occurring after bariatric or upper gastrointestinal procedures, if they were a duplicate, or if they described fistulae arising from other locations in the gastrointestinal tract. The primary outcome of interest was proportion of successful GCF closure. Secondary outcomes included time to fistula closure in local and systemic therapies, fistula recurrence after closure in all nonoperative approaches, and any other complications resulting from the various modalities described.

1.3. Screening process

After return of search results and removal of duplicates, two independent reviewers (ESL, NS) performed a first screen based on titles and abstracts alone. Disagreements which could not be resolved by discussion were arbitrated by the senior author (RB). Subsequently,

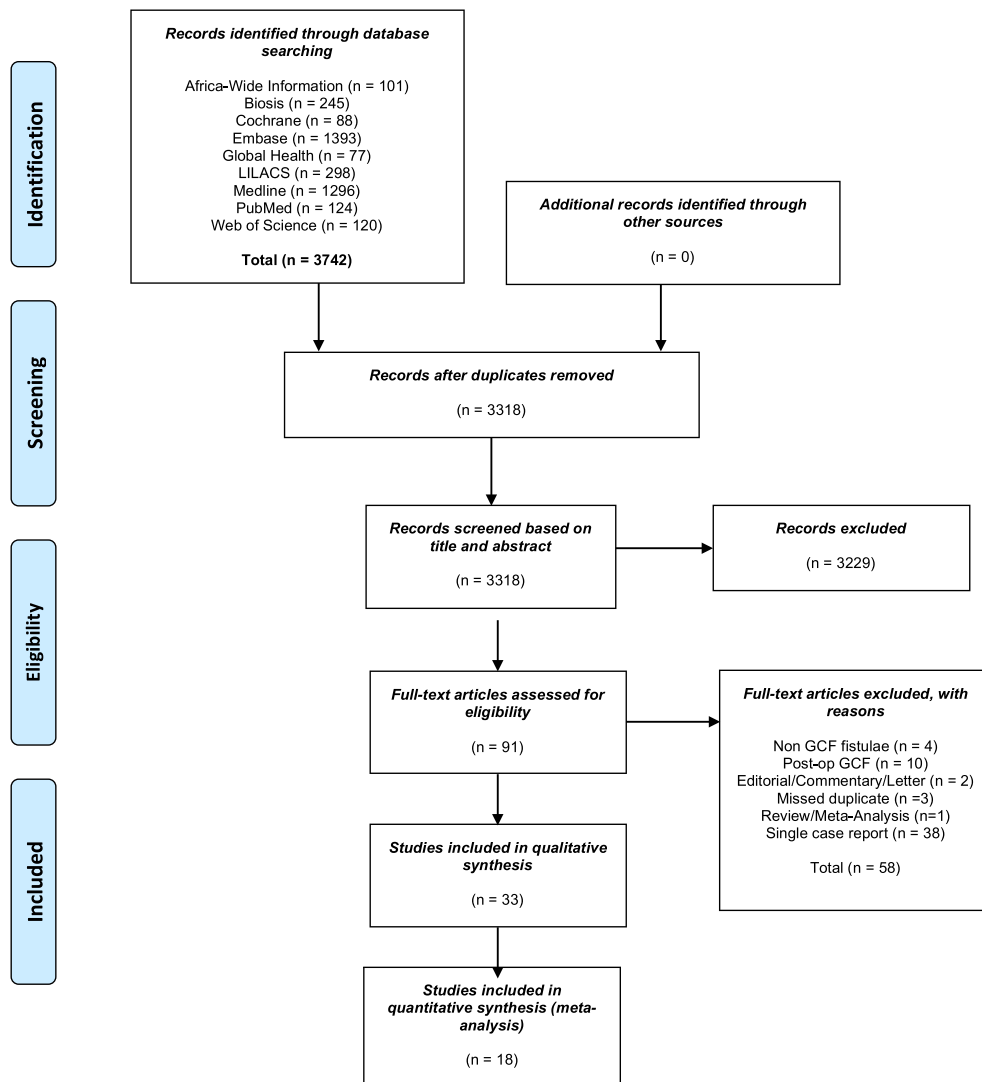


Fig. 1. PRISMA Diagram.

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