

# Gastrostomy placement in children: the method of operation

## Abstract

**Purpose:** The aim of this report is to summarize recent reports comparing the outcomes and the complications between the two most adopted procedures for gastrostomy placement in children: percutaneous endoscopic Gastrostomy (PEG) and laparoscopic Gastrostomy (LG).

**Methods:** Electronic databases were queried for comparative studies of the two most common insertion techniques, including the PEG and LG. Major Complications were defined as reoperation within 30 days or death.

**Results:** Recent studies comparing PEG and LG revealed an increased risk in major complications with PEG.

**Conclusion:** PEG is associated with an increased risk of major complications when compared to the LG approach.

**Keywords:** gastrostomy, laparoscopy, percutaneous endoscopy, children, outcome, complications

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**Einar Arnbjörnsson**

Department of Pediatric Surgery, Skåne University Hospital and the Department of Clinical Sciences, Sweden

**Correspondence:** Einar Arnbjörnsson, MD, PhD, Department of Pediatric Surgery, Skåne University Hospital and the Department of Clinical Sciences, Pediatrics, Lund University, 221 85 Lund, Sweden, Tel +467-064-963-80, Email [einar.arnbjornsson@telia.com](mailto:einar.arnbjornsson@telia.com)

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## Introduction

The various technical options that have been described for gastrostomy tube placement in children include the time honored Stamm procedure, percutaneous endoscopic gastrostomy (PEG), percutaneous fluoroscopy-guided gastrostomy, several types of laparoscope-assisted gastrostomy (LG), video-assisted gastrostomy, and a combined laparoscopic and endoscopic approach as well as different variations of the methods used in the hands of the reporting surgeons.<sup>1</sup> Minimally invasive procedures for enteral access in children have evolved over the years, resulting in various techniques of gastrostomy tube placement. The two most common techniques are PEG and LG. This study compares the reported outcomes of both procedures exclusively in children. Consensus is lacking as to which procedure, if any, is superior.

Increasing evidence has suggested a lower rate of serious complications following LG in comparison to PEG, open gastrostomy, or other techniques.<sup>1,2</sup> The advantages of video-assisted gastrostomy are placement of the gastrostomy under direct visualization and the performance of the gastropexy.<sup>1-6</sup> Complication rates associated with laparoscopic- or video-assisted or fully laparoscopic techniques have been reported to be inferior to those associated with other techniques.<sup>7-11</sup> However, previous studies examining postoperative complications in children undergoing LG have included only small numbers of patients and have had various durations of follow-up and without any comparison with other techniques for gastrostomy placement.<sup>12-20</sup> The same applies to the PEG technique.<sup>21-24</sup> PEG and LG are widely used in the pediatric population. The aim of this literature review was to determine which one of the two procedures is the most effective and safe method.

## Methods

Electronic databases were queried for comparative studies of the two most common insertion techniques, including the PEG and

LG. Complications are generally classified as major or minor.<sup>25</sup> Major complications, the object of this review, were defined as reoperation within 30 days or death. Major complications were to include pneumoperitoneum, hemorrhage, duodenal hematoma, colon injuries, liver injuries, small bowel injuries, gastric perforation, gastro-colic fistula, peritonitis, and buried bumper syndrome.<sup>26</sup> Minor complications, in line with previous studies were to include granuloma, infection requiring antibiotic treatment, leakage, vomiting, pain, and dislocation of the button.<sup>12-20</sup>

## Results

Eleven reports were found discussing the comparison of the PEG and LG.<sup>1,2,7,11,27-33</sup> All revealed a significantly increased risk in major complications with PEG. During the same period, there were no reports showing lower number of major complications after PEG compared with LG in children. The operating time for LG is 2-3 times longer than the quarter of an hour usually needed for the PEG insertion. There is a shorter time to enteral nutrition after LG insertion compared by PEG.

## Discussion

This study aimed to compare two different techniques for placement of gastrostomy tubes in a pediatric population. The PEG procedure involves a blind puncture through the abdominal cavity while the LG procedure involves visualization of the stomach through an umbilical port and a selection of a second epigastric gastrostomy site to select and anchor the stomach with sutures prior to the placement of a low profile gastrostomy feeding device. Several major complications have been associated with PEG. On the contrary, only a few major complications, including gastric perforation, gastrostomy dislodgment, and conversion to open procedure have been described in association with LG. Minor complications have been shown to diminish significantly over time whereas pain and dislodgment of the gastrostomy device does not.<sup>34</sup> The minor complications, on the

other hand, are equally encountered in both PEG and video-assisted gastrostomy.<sup>35</sup> The operating time needed for LG is 2–3 times longer than the quarter of an hour needed for the PEG insertion. This advantage in operative time is outweighed by the increased safety profile of LG insertion. The data on the shorter time to enteral nutrition after LG insertion compared by PEG seem to be hampered by local traditions. Buried bumper syndrome, in which the internal fixation device migrates alongside the tract of the stoma outside the stomach, is known to be a severe complication to PEG placement only.<sup>36</sup>

## Conclusion

Summary of the findings of the reports of PEG compared with LG in the literature indicates that LG should be the preferred method of gastrostomy placement in children. The results suggest that by performing LG in children it is possible to avoid the serious intestinal fistula complications caused by a blind puncture through the abdominal cavity when performing the PEG.

Thus, PEG is associated with an increased risk of major complications when compared to the LG approach. Some advantages in operative time for PEG appear outweighed by the increased safety profile of LG insertion as well as shorter time to enteral nutrition after LG. Because of the lack of well-designed studies, we have to be cautious in making definitive conclusions comparing PEG to LG. To decide which type of gastrostomy placement is best practice in pediatric patients, randomized controlled trials comparing PEG to LG are highly warranted. Prospective analysis of the various techniques is needed to confirm which minimally invasive techniques for gastrostomy tube placement are associated with a less complicated post-operative course. The most important question of how we manage to make the performance of a gastrostomy placement in children still safer remains to be answered.

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## Conflict of interest

The author declares that no financial interest or any conflict of interest exists.

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