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RESEARCH ARTICLE

INFECTION RATE IN PERCUTANEOUS ENDOSCOPIC GASTROSTOMY VERSUS ONE-STEP GASTROSTOMY IN HOSPITALIZED CHILDREN AT A TERTIARY CARE HOSPITAL IN JEDDAH, SAUDI ARABIA

*Dr. Bakr Alhussaini and Dr. Nawaf Al-Dajani

Department of Pediatrics, Division of Pediatric Gastroenterology, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

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ABSTRACT

Background: The process of gastrostomy has been used for long time for health purposes while the procedures been evolving according to the requirements and advancements of times. This research study is based on the comparison between Percutaneous Endoscopic Gastrostomy and One-Step Gastrostomy regarding the infectious rate in hospitalized Children at a Tertiary Care Hospital in Jeddah, Saudi Arabia. **Methodology:** Our retrospective study of 132 Patients, at King Abdul-Aziz university hospital KAUH from 1st January 2002 to 31st December 2019 was approved by the Institutional ethical committee, File numbers were reviewed from Log Sheets in the endoscopy unit & hospital record archives. The inclusion criteria for the study were below 14 years of age, regardless of their diagnosis who had gastrostomy tube placement. And the exclusion criteria Patients who had done surgical gastrostomy. **Results:** According to the research study, the rate of infection was considerably low for the participants with the one-step Gastrostomy. The difference was around 10.62%. **Conclusion:** The research concludes that the One step Technique is better than the pull-through technique regarding infection rate, but further large study needed for solid conclusion.

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INTRODUCTION

Percutaneous endoscopic gastrostomy (PEG) has gained worldwide acceptance as a safe technique for providing enteral feeding in patients with poor oral intake who have a functional gastrointestinal (GI) system (Rahneimai-Azar, *et al.* 2014). One of the commonest techniques used is Pull Through (PT) which was described by Dr. Gauderer and Dr. Ponsky, first published the technique in 1980, This technique was used for the last several years and some complications; infection, leakage and perforation were reported. (Treem, Etienne, Hyams, 1993; Kozarek *et al.* 1995). It is a matter of fact that there are significant patients who suffer from the disability of swallowing while the impacting factors may include the medical background or condition and sometimes factors like age or disease (Wilson, Oliva-Hemker, 2001). Besides the fact that the procedure has been utilized for ages (Jacob, *et al.* 2015), the advancements in the procedure are still constant (Peters, Balduyck, Nour, 2010). The process can be further optimized and utilized if the risk of infection becomes less (Segal, *et al.* 2001).

Often patients, who went through gastrostomy have to deal with some minor to major infection (Göthberg, Björnsson, 2016; Jacob, *et al.* 2015). Recently a newer technique One Step (OS), (MIC-KEY INTRODUCER KIT) which was developed by Kimberly-Clark Corporation in 2008 (Gothberg, Björnsson, 2016) and was used in different centers as replacement method for PEG (Gothberg, Björnsson, 2016). Tube site infection is the most common minor complication following PEG placement. The prevalence varies between 5%-25% in different studies, although mild redness around the stoma site is common due to tube movement, an extension of the redness and addition of purulent discharge or other signs of systemic inflammation should raise suspicion regarding wound infection. Minor infections usually resolve with the application of local antiseptics and daily dressing changes (Vanis, *et al.* 2012; Preclik *et al.* 1999). The objective of the study is to compare the infection rate between the older technique known as Pull-Through the other advanced technique known as one step.

METHODOLOGY

The research is based on the retrospective study of 132 Patients, at King Abdul-Aziz university hospital KAUH from 1st January 2002 to 31st December 2019 approved by the Institutional ethical committee; file numbers were reviewed

*Corresponding author: Dr. Bakr Alhussaini,
Department of Pediatrics, Division of Pediatric Gastroenterology,
Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi
Arabia.

from Log Sheets in the endoscopy unit & hospital record archives. The inclusion criteria for the study were below age of 14 year, regardless of their diagnosis who had gastrostomy tube placement. The exclusion criteria for the patients were those who had gone through the surgical gastrostomy. The technique on which this research is based was introduced in 2013 at KAUH, from this date all the gastrostomy tube was one step so, from 2013 to 2019 there were 66 patients one step. We recruited the same number from the old technique with the same age group elaborated as the demographics of the patients. Patients were divided into two groups, first group, one step (OS), and the second group pull through (PT), all the diagnoses of our patients are described separately in the table. In consideration, any factors that could increase the probability of infection after the procedure such as autoimmune disease or medications (corticosteroid or chemotherapy) which may cause immunosuppression.

To identify postprocedural infections between the two techniques we developed criteria based on published data in the literature (8); 1- Any patients who develop signs of local infection such as fever, redness, swelling, itching, bleeding or purulent discharge. 2- Any patient with a positive culture from gastrostomy site 3- Any patient who received post operation Intravenous antibiotics for more than 4 days. All the Statistical Equations were calculated by SPSS Version 22. Discrete variables (Infection Criteria) were compared by the chi-square test.

RESULTS

The results were elaborated by taking different factors into consideration including the demographics of the patient elaborated in Table 1. Furthermore, other demographics were taken under consideration in order to make the comparison study un-biased. These demographics are demonstrated in table 2. The research study analyzed the variables such as diagnosis, organism summarized in table 2 and we analyzed the groups based on infection criteria to identify those with post-procedural infection as shown in Table 3.

Table. 1 age distribution of patients for each procedure

Type / Age	1 – 24 Months	3 – 6 Years	6.1 – 14 years	Total
One-step	42	16	8	66
Pull-through	28	22	16	66
Total	70	38	24	132

Table. 2 Brief demographics of the participants of the study

		OS	PT
Gender	Male	36	34
	Female	30	32
Diagnosis	Cerebral Palsy	48	56
	Metabolic Disorder	6	2
	Edward & Patau Syndrome	1	0
	Teratoma Thyroid	1	0
	Arthrogryposis Multiplex Syndrome	1	0
	Spinal Muscular Atrophy	2	0
	Spastic Paraplegia	1	2
	Nephrotic syndrome	0	2
	Accidental Corrosive Ingestion	4	0
	Pierre Robin Sequence	1	0
	Stricture of esophagus	0	2
	Congenital Musculoskeletal Anomaly	0	2
	Pulmonary Atesia	1	0
Organism	Gram Negative Bacilli (<i>Pseudomonas</i>)	1	7
	Gram Positive Cocci	0	1

OS; one-step and PT; Pull-through

Table. 3 infection rate in both techniques in different age group

		1 - 24 Months	3 - 6 Years	7 - 14 Years	Total %
One Step	Infected	1	0	0	1.5 %
	Non-infected	41	16	8	98.5 %
Pull Through	Infected	6	1	1	12.12 %
	Non-infected	22	21	15	87.88 %

Among the post-procedural infected wound group, there were no patients who had taken any immunosuppressive medication prior to the procedure. The results of the observations were expressive and tend to provide a significant difference between both of the techniques. The further observations were collected and compared to get the required outcome that is exhibited in table 4. According to the results of the research, there is a noteworthy difference was observed between the result of two techniques. With the traditional pull-through technique there was 12.12% rate of infection whereas, for the one-step technique, the rate was analyzed as 1.5%.

DISCUSSION

A percutaneous gastrostomy tube (PEG) is typically performed under moderate sedation. PEG tubes can be kept for quite a long time or years (Brewster, Weil, Ladd, 2012). PEG can be removed readily on the grounds that they become malfunctioning; leaking or become obstructed over broadened timeframes, (Evans, Thorne M, Taufiq, George, 2006). They can be removed most of the time without sedation (Rahnemai-Azar, *et al.* 2014), in spite of the fact that many gastroenterologist may pick to utilize sedation and endoscopy at times (Brewster, Weil, Ladd, 2012; Peters, Balduyck, Nour, 2010). Both procedures (PT & OS) were compared in previous studies for timing of procedure and period to establish feeds (Göthberg, Björnsson, 2016; Jacob, *et al.* 2015),

Post procedure complications; infection, bleeding, perforation and leakage are most common encountered.

Prophylactic antimicrobial agents usually used to forestall infection and bacterial growth, however, this isn't constantly vital (Khattak *et al.* 1998)

PEG site infection is considered one of the most common complication shortly post-operative and on the long term alike. Hence, we conducted our study to compare both procedure for primary outcome; infection rate.

Our research study shows the infection rate in pull-through procedure (n=66) was 12.12 % (as in shown in table 3) and in comparison to multiple researches done previously with various sample size was from 2.7 % to 16.5 (9-17). Our data shows similar rate of infection in pull-through type and we have to take in consideration that all of them were diagnosed with cerebral palsy, hence many factors contributed for higher infection rate (Moore, Cowman, 2007). Out of 66 patients of pull through, eleven patients were given preoperative antibiotics and 1 of them developed infection afterward. All of the post-procedural infected (n=8) had done Swab culture and 87.5 % (n=7) of them were found to have Gram-Negative Bacilli (*pseudomonas*) and 12.5 % (n=1) had gram-positive cocci as shown in table 2.

Table. 4 Results of the comparison of two techniques

	Pull through		One step	
Infection rate	12.12 %		1.5 %	
Age Group	1 – 24 Months	28.75 %	1 – 24 Months	1 %
	3 – 6 years	9.09 %	3 – 6 years	0 %
	7 – 11 years	12.5 %	6.1 – 11 years	0 %
Comm on Diagnosis	CP		CP	
Preoperative Antibiotics	16.66 % (11 case)		3% (2 case)	
Swab culture done	Done		Done	
Organism	87.5 % Gram-Negative Bacilli		Gram-Negative Bacilli	
	12.5 % had gram-positive cocci			

The infection rate in one step procedure was 1.5% (n=1) (as shown in table 2) and in comparison, to a research done in 2009 with sample (n=213) was 10.9 % (9) our study has a lower infection rate but their sample size was larger than ours. The data shows significant difference up to eight fold drop in infection rate but it was not head to head comparison as we compared with for previous years (historical) to one step procedure era. This drop could have been also attributed to various changes in our pre and post procedure care. Of note the cases of cerebral palsy were higher in pull through procedure which may have impact on infection rate as they were most vulnerable for infection.

Gram negative organisms were most prevalent, *pseudomonas* was the commonest isolated which indicates hospital acquired process. Gram positive cocci were isolated in one case. Despite more case (16.6%) in pull through procedure received antibiotic prophylaxis compared with one step procedure (3%), the infection rate is in contrary which probably indicate infection prevention is multifaceted process and prophylactic antibiotic is not going to be effective if other measures were not applied.

Conclusion

The research study showed that One step technique is probably better than pull-through technique regarding infection rate in gastrostomy tube insertion. The rate was quite noteworthy since the digit exhibit the differences, eight folds lower. However, due to limited sized cohort, the study needs to be assessed in the bigger cohort in order to extract better solid conclusion. The study can be utilized under the observations of the expert while the future studies can repronounce its authenticity by identifying other factors of involvement.

Conflict of Interests: The authors have no conflicts of interest to declare.

REFERENCES

Avitsland TL, Kristensen C, Emblem R, Veenstra M, Mala T, Bjornland K. Percutaneous endoscopic gastrostomy in children: a safe technique with major symptom relief and high parental satisfaction. *J Pediatr Gastroenterol Nutr.* 2006;43(5):624-8.

Brewster BD, Weil BR, Ladd AP. 2012. Prospective determination of percutaneous endoscopic gastrostomy complication rates in children: still a safe procedure. *Surgery.* 152(4):714-9; discussion 9-21.

Evans JS, Thorne M, Taufiq S, George DE. Should single-stage PEG buttons become the procedure of choice for PEG placement in children? *Gastrointest Endosc.* 2006;64(3):320-4; quiz 89-92.

Fortunato JE, Troy AL, Cuffari C, Davis JE, Loza MJ, Oliva-Hemker M, *et al.* Outcome after percutaneous endoscopic gastrostomy in children and young adults. *J Pediatr Gastroenterol Nutr.* 2010;50(4):390-3.

Gauderer MW, Ponsky JL, Izant RJ, Jr. Gastrostomy without laparotomy: a percutaneous endoscopic technique. *J Pediatr Surg.* 1980;15(6):872-5.

Göthberg G, Björnsson S. 2016. One-Step Insertion of Low-Profile Gastrostomy in Pediatric Patients vs Pull Percutaneous Endoscopic Gastrostomy: Retrospective Analysis of Outcomes. *JPEN J Parenter Enteral Nutr.*, Mar;40(3):423-30.

Gothberg G, Bjornsson S. One-Step Insertion of Low-Profile Gastrostomy in Pediatric Patients vs Pull Percutaneous Endoscopic Gastrostomy: Retrospective Analysis of Outcomes. *JPEN J Parenter Enteral Nutr.* 2016;40(3):423-30.

Jacob A, Delesalle D, Coopman S, Bridenne M, Guimber D, Turck D, Gottrand F, Michaud L. 2015. Safety of the One-Step Percutaneous Endoscopic Gastrostomy Button in Children. *J Pediatr.*, Jun;166(6):1526-8

Khattak IU, Kimber C, Kiely EM, Spitz L. Percutaneous endoscopic gastrostomy in paediatric practice: complications and outcome. *J Pediatr Surg.* 1998;33(1):67-72.

Kozarek RA, Payne M, Barkin J, Goff J, Gostout C. Prospective multicenter evaluation of an initially placed button gastrostomy. *Gastrointest Endosc.* 1995;41(2):105-8.

Moore Z, Cowman S. Effective wound management: identifying criteria for infection. *Nurs Stand.* 2007;21(24):68, 70, 2 passim.

Novotny NM, Vegeler RC, Breckler FD, Rescorla FJ. Percutaneous endoscopic gastrostomy buttons in children: superior to tubes. *J Pediatr Surg.* 2009;44(6):1193-6.

Peters RT, Balduyck B, Nour S. Gastrostomy complications in infants and children: a comparative study. *Pediatr Surg Int.* 2010;26(7):707-9.

Preclik G, Grune S, Leser HG, Lebherz J, Heldwein W, Machka K, *et al.* Prospective, randomised, double blind trial of prophylaxis with single dose of co-amoxiclav before percutaneous endoscopic gastrostomy. *BMJ.* 1999;319(7214):881-4.

Rahnemai-Azar AA, Rahnemai-azar AA, Naghshizadian R, Kurtz A, Farkas DT. 2014. Percutaneous endoscopic gastrostomy: indications, technique, complications and management. *World J Gastroenterol.* 20(24):7739-51.

Rahnemai-Azar AA, Rahnemai-azar AA, Naghshizadian R, Kurtz A, Farkas DT. 2014. Percutaneous endoscopic gastrostomy: indications, technique, complications and management. *World J Gastroenterol.*, 20(24):7739-51.

- Segal D, Michaud L, Guimber D, Ganga-Zandzou PS, Turck D, Gottrand F. Late-onset complications of percutaneous endoscopic gastrostomy in children. *J Pediatr Gastroenterol Nutr.* 2001;33(4):495-500.
- Treem WR, Etienne NL, Hyams JS. Percutaneous endoscopic placement of the "button" gastrostomy tube as the initial procedure in infants and children. *J Pediatr Gastroenterol Nutr.* 1993;17(4):382-6.
- Vanis N, Saray A, Gomjakovic S, Mesihovic R. Percutaneous endoscopic gastrostomy (PEG): retrospective analysis of a 7-year clinical experience. *Acta Inform Med.* 2012;20(4):235-7.
- Wilson L, Oliva-Hemker M. Percutaneous endoscopic gastrostomy in small medically complex infants. *Endoscopy.* 2001;33(5):433-6.
