



Delayed Gastrostomy Tube Insertion in Children: Identifying the Knowledge Gap among Pediatricians

Alomair S[#], Alshehri A^{**}, Alzaby A, Altokhais T and Alfraih Y

Department of Surgery, College of Medicine, King Saud University, Riyadh, Saudi Arabia

[#]These authors contributed equally to this work

Abstract

Background: Transitioning pediatric patients from short term Nasogastric Feeding Tube (NGT) to Gastrostomy Tube (GT) is not often guided by evidence. We have noticed significant delays in our patients before referral for GT insertion. We aimed to explore the practice of pediatricians toward GT in several hospitals and identify knowledge gaps that could explain such delay.

Methods: A 14-item questionnaire was designed and distributed to pediatricians from five hospitals. The survey aimed to assess their knowledge of GT insertion along with its complications, care, referral patterns, and reasons for delayed referrals.

Results: 106 participants completed the survey. 32 (30.2%) consultants, 10 (9.4%) specialists, and 64 (60.4%) trainees. When asked about referring a patient who is a candidate for GT, 69 (65.1%) of participants chose to refer to surgery. 94 (88.7%) thought GT improves patients' quality of life, 103 (97.2%) believed GT helps patients to receive their caloric requirement. 18 (17%) felt they could comfortably explain the procedure to the parents, and 66 (62.3%) were aware of the common procedural complications. 75 (70.8%) stated parental resistance as the main reason of delaying referral. 49 (46.2%) were able to provide GT care and 85 (80.2%) would benefit from educational sessions about GTs.

Conclusion: Our study is the first to identify gaps in knowledge and approach of participating pediatricians about GTs. This might explain the delay of transitioning patients from NGT to GT. We think addressing those gaps will likely improve parental interest and consequently patients' access to GTs.

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*Correspondence:

Abdullah Alshehri, Department of Surgery, Division of Pediatric Surgery, College of Medicine, King Saud University, P.O. Box: 86572, Riyadh 11632, Saudi Arabia, Tel: +966-11-8066421;

E-mail: Abalshehri@ksu.edu.sa

Received Date: 05 Dec 2022

Accepted Date: 23 Dec 2022

Published Date: 27 Dec 2022

Citation:

Alomair S, Alshehri A, Alzaby A, Altokhais T, Alfraih Y. Delayed Gastrostomy Tube Insertion in Children: Identifying the Knowledge Gap among Pediatricians. *Clin Surg*. 2022; 7: 3607.

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Introduction

Enteral Nutrition (EN) using various types of feeding tubes is frequently used for children both in hospital or at home settings [1]. Nasogastric or nasojejunal tubes are the most commonly used methods for short-term EN support. As a method of long-term feeding access, Gastrostomy Tube (GT) insertion is considered one of the most commonly performed surgical procedures in the pediatric population [2]. There has been a significant increase in GT insertion rates worldwide which could be related to the refined minimally invasive insertion techniques and the low morbidity of the procedure [3-5]. The patient population requiring GT insertion is diverse with wide range of underlying diagnoses. A GT is the preferred feeding method for patients who cannot receive oral feeding, and for patients who are unable to meet their daily caloric requirements due to an underlying pathology. Indications for GT insertion include: Neurological impairment with poor swallowing mechanism, congenital malformations, poor weight gain with faltering growth [4-7]. There is currently no evidence-based consensus among physicians on the timing of transitioning from short to long-term feeding access [8,9]. In addition to the limited morbidity of the GT insertion procedure, the overall positive effect of GT placement on the children's quality of life and growth has been consistently observed [9]. In our practice, we have noticed a marked delay in referral of patients to pediatric surgery for GT insertion which often results in malnutrition or complications secondary to the chronic use of Nasogastric Tubes (NGTs). Therefore, this study aimed to examine the referral pattern of pediatric patients who require GT insertion and identify knowledge gaps with regards to GTs among pediatricians in several tertiary care hospitals.

Materials and Methods

The study was approved by the Institutional Review Board (No. E-21-5833) at College of

Medicine, King Saud University.

Study design

Cross-sectional descriptive survey study using web-based questionnaire.

Participants

Pediatricians including trainees (residents and fellows), specialists, and consultants from five tertiary hospitals.

Survey tool

A 14-item, web-based, multiple-choice questionnaire was created by an experienced pediatric surgeon based on review of relevant literature. For each of the clinical knowledge-based questions, a single correct answer was predetermined. The questionnaire was not validated or tested for reliability; however, it was constructed in order to examine the essential knowledge and referral patterns of the participants toward GT usage. A link to the anonymous questionnaire was distributed to participants *via* email and cell phone text messages. Participants had to answer every question before moving to the next one. The only demographic data that was included was the position rank i.e., trainee, specialist, or consultant. It was followed by questions eliciting approach and referral pattern regarding GTs in questions 3 to 5. Questions 6 to 10 examined the participants knowledge about techniques of GT insertion, postoperative care and related postoperative complications. Question 12 explored reasons behind delayed referral and questions 13 and 14 addressed attitude and comfort level in dealing with patients with GTs. Questionnaire is included in as a supplementary file (S1 File).

Data analysis

Data from the completed electronic questionnaire was exported to Excel spreadsheet and then were analyzed using the Statistical Package for Social Sciences (SPSS) version 23.0 (SPSS Inc., IBM, Armonk, New York, USA). Frequencies were expressed as numbers and percentages for categorical variables. Chi-square test of independence was performed to examine the relation between physician's position ranks and choosing the correct answer. A *P* value of <0.05 was considered statistically significant.

Results

The questionnaire was distributed to 727 physicians at five

main referral hospitals with large pediatric care services. A total of 106 participants completed the survey thus resulting in a 14.6% response rate. Among the respondents, 32 (30.2%) were consultant pediatricians, 10 (9.4%) were pediatric specialists, and 64 (60.4%) were trainees (including residents and fellows enrolled in postgraduate pediatric training programs). The questionnaire answers were grouped as follows:

Parental discussion

When asked who usually initiates the discussion with the parents about the need for GT insertion for their child, 91 (85.8%) of participants responded primary pediatricians, while only 12 (11.30%) answered pediatric surgeons.

Gastrostomy tube knowledge

Question 3 consisted of a scenario on how to manage a patient in need for GT and the correct answer was to insert NGT and refer the patient to surgery for GT discussion. 69 (65.1%) of participants answered correctly, while 15 (14.2%) chose to continue following the patient with swallowing team, and 14 (13.2%) chose to refer the patients to Gastroenterology team. Those who answered correctly were 53.1% of the consultants, 67.2% of the trainees and 90% of the specialists. There was no significant relationship between choosing the correct answer and the position rank, $X^2=4.9$, $P=0.09$ (Table 1). In question 4, ninety-four (88.7%) participants think that GTs, when indicated, would improve the quality of life of both patients and caregivers. and the majority 94 (88.7%) has agreed on that. In question 5, a total of 103 (97.2%) of participants think that GT would help patients receive the required daily caloric intake.

Gastrostomy tube insertion, postoperative care, and complications

In question 6, participants were asked to what extent they could explain the GT insertion procedure to parents and 18 (17%) of participants answered that they comfortably explain the procedure, while 16 (15.1%) felt they have no knowledge of the procedural details. The remaining group had variable degrees of knowledge about the procedure (Table 1). There was no significant relationship between being able to comfortably explain the procedural details and the position rank, $X^2=2.4$, $P=0.30$. When participants were asked about the most common technique used for gastrostomy tube insertion in question 7, 66 (62.3%) answered laparoscopic assisted

Table 1: Survey answers for questions 3 and 6.

Question 3: A 2-year-old boy who is known to have Cerebral Palsy with multiple admissions because of aspiration pneumonia. He is currently orally fed with spoon by his parents and was found to have poor swallowing after assessment. How would you manage his feeding?

Responses	Trainees	Specialists	Consultants	Total
A) Follow-up with swallowing team for further training	12 (18.8%)	0	3 (9.4%)	15 (14.2%)
B) Refer to gastroenterology team for evaluation of gastroesophageal reflux disease	6 (9.4%)	0	8 (25%)	14 (13.2%)
C) Insert a nasogastric tube and refer to surgery for GT consideration	43 (67.2%)	9 (90%)	17 (53.1%)	69 (65.1%)
D) Continue observing this child with follow up	1 (1.8%)	0	0	1 (0.9%)
E) Other	2 (1.14%)	1 (10%)	4 (12.5%)	6 (6.4%)

Question 6: To what extent can you explain the procedure of gastrostomy tube insertion for the parents?

Responses	Trainees	Specialists	Consultants	Total
A) I have no knowledge and would refer to surgery	15 (23.4%)	1 (10%)	0	16 (15.1%)
B) I can explain part of the details (<20%)	33 (51.6%)	4 (40%)	6 (18.8%)	43 (40.6%)
C) I can explain up to 70%	8 (12.5%)	3 (30%)	18 (56.3%)	29 (27.4%)
D) I can comfortably explain the procedure	8 (12.5%)	2 (20%)	8 (25%)	18 (17%)

Table 2: Survey answers for questions 9 and 10.

Question 9: Parents want to know more about common complications of gastrostomy tube insertion; what would you mention?				
Responses	Trainees	Specialists	Consultants	Total
A) Moderate-risk with potential major complications such as gastric perforation or bowel injury	10 (15.6%)	0	8 (25%)	18 (17%)
B) Low-risk procedure with minor complications such as skin irritation or granuloma formation	37 (57.8%)	6 (60%)	23 (71.9%)	66 (62.3%)
C) I am not aware about the possible complications	17 (26.6%)	4 (40%)	1 (3.1%)	22 (20.8%)
Question 10: What do you think are the most common long-term complaints after insertion?				
Responses	Trainees	Specialists	Consultants	Total
A) Skin irritations due to leakage of gastric content	36 (56.3%)	5 (50%)	21 (65.6%)	62 (58.5%)
B) Recurrent gastrostomy tube infections	1 (1.6%)	2 (20%)	0	3 (2.8%)
C) Gastrostomy tube accidental dislodgment or malfunction	25 (39%)	3 (30%)	11 (34.4%)	39 (36.8%)
D) Bowel obstruction	2 (3.1%)	0	0	2 (1.9%)

Table 3: Survey answers for question 12.

Question 12: In your opinion, why is surgical referral for gastrostomy tube insertion commonly delayed for patients with long-term nasogastric tube usage?				
Responses	Trainees	Specialists	Consultants	Total
A) Parental resistance for referral	43 (67.2%)	8 (80%)	24 (75%)	75 (70.8%)
B) There is no major benefit from gastrostomy tubes	1 (1.6%)	0	0	1 (0.9%)
C) Resistance from surgeons to accept such cases	11 (17.2%)	1 (10%)	5 (15.6%)	17 (16%)
D) They might limit swallowing improvement among some patients	9 (14.1%)	1 (10%)	3 (9.4%)	13 (12.3%)

technique, 16 (15.1%) answered a radiologically guided insertion, 15 (14.2%) answered endoscopic gastrostomy, and 9 (8.5%) chose limited laparotomy. When assessing the knowledge of participants about postoperative length of stay after GT insertion in question 8, 67 (63.2%) answered 2 to 5 days, 31 (29.2%) thought it was a day-surgery procedure, and 8 (7.5%) answered that hospitalization of >5 days was required. In question 9, participants were asked about their knowledge of the complication profile of GT insertion procedure and the correct answer was (low risk procedure with minor complications such as skin irritation or granuloma formation). Of the participants, 66 (62.3%) correctly answered the question, 22 (20.8%) were not aware about the possible complications, and 18 (17%) thought the procedure is a moderate-risk one with potential major complications such as gastric perforation or bowel injury. When looking at each participant group, 23 (71.9%) of consultants, 6 (60%) of specialists, and 37 (57.8%) of trainees answered the question correctly. There was no significant relationship between knowing the correct complication profile and the participants' position rank, $X^2=1.8$, $P=0.40$ (Table 2). In question 10, participants were asked about the most common parental complaints after GT insertion and the correct answer was (skin irritation due to leakage of gastric content). Sixty-two (58.5%) of participating physicians responded correctly. The correct answer was chosen by 65.6% of consultants, 56.2% of trainees, and 50% of specialists. There was no significant relationship between knowing the most common parental complaint and the participants' position rank, $X^2=1.1$, $P=0.58$ (Table 2).

Gastrostomy tube and oral intake

In regards to the ability of patients to orally feed after GT insertion in case their swallowing improved, the physicians were asked in question 11 if they think this would be allowed. Only 83 (78.3%) believed that patients would be allowed to do so once their swallowing function improved. This was the answer of 93.8% of consultants, 75% of trainees, and 40% of specialists.

Delayed referrals

In question 12, participants were asked about the reasons behind delaying referral of patients, who may need GTs, to surgery. Seventy-five (70.8%) participants felt that it was due to parental resistance to undergoing GT insertion, 17 (16%) stated the delay was due to resistance from surgeons to accept such cases, 13 (12.3%) chose not to refer because they believed GTs might limit swallowing improvement in these patients (Table 3).

Gastrostomy tube care

In question 13, participants were asked about their confidence in handling local care of GTs. 49 (46.2%) believed they are very comfortable with routine GT care. This was the answer of 62.5% of consultants, 50% of specialists, and 37% of trainees. In contrast, 57 (53.8%) of participants felt that they are not comfortable in managing GT care and they would ask for help from nurses or surgeons. Most of the trainees were in that category 40 (62.5%).

Gastrostomy tube education

In question 14, participants were asked if they require more educational sessions to enhance their knowledge and experience about management of GTs. 85 (80.2%) of participating physicians believed that it is absolutely necessary to have educational sessions about GTs. However, 19 (17.9%) believed it would only add some value, but it is not a priority. Only 2 (1.9%) believed it would not change their current practice.

Discussion

Short-term Nasogastric (NGT) or nasojejunal tube feeding are commonly utilized methods for feeding hospitalized pediatric patients [1]. Discontinuation of tube-mediated feeding is often unpredictable and some patients may need to continue tube feeding at home after their hospitalization. Parents will have to use and care for feeding tubes at home and may need to re-insert the tube if

required often with limited professional guidance. Prolonged home NGT use is often associated with repetitive accidental removals, airway misplacement, nasal trauma, or cosmetic concerns [10]. In one study of patients with home NGT feeding, up to 13% of parents discontinued NGT feeding mainly because the child could not tolerate the feeding tube [11]. The process of re-inserting NGT at home after accidental removal can be challenging especially in young children [10,12]. Ricciuto et al. showed that more than 3-month use of NGT was associated with more food refusal, parental dissatisfaction, and less favorable anthropometric outcomes compared to patients who had gastrostomy tubes [13]. Although early insertion of gastrostomy tubes seems appropriate for patients who are expected to require long-term tube feeding, there is still no evidence-based guidelines for the transition between short to long-term enteral access devices such as gastrostomy tubes [8].

In our practice, we have noticed some pediatric patients, mostly are neurologically impaired, continue to use NGT feeding for years. Some of them have never been offered a gastrostomy tube or were offered by their treating pediatrician but the parents declined. We have also noted increased level of parental satisfaction after GTs insertion, indicating that some families may not have not been properly counselled about GTs by their primary pediatrician. In order to investigate these repetitive observations, we conducted this study in order to assess the knowledge and practice pattern of pediatricians regarding gastrostomy tubes.

In our survey, participants had different levels of experience including consultants' pediatricians (60.4%), pediatric specialists (9.4%), and pediatric trainees (60.4%). We believe that involving participants from different levels allowed to identify the knowledge gaps of each level which can therefore be appropriately addressed. As expected, the majority of participants (85%) indicated that the primary pediatricians are responsible for initiating the discussion about GT insertion with the parents. Furthermore, when given a scenario of a patient who needs a GT insertion, only 65.1% of participants chose to refer the patient for surgery. Although the majority of trainees (67.2%) chose to refer, there was no statistically significant difference of approach between different experience levels. The exact reasons behind the reluctance to refer the patient in the scenario to surgery were not explored in the questionnaire. This variation in clinical approach seems to be similar to the results of a survey conducted by the American Society for Parenteral and Enteral Nutrition (APEN) [8]. When asked about the long-term outcomes of GT insertion, 97.2% of participants thought GTs would help improve the daily nutritional intake, and 88.7% thought GTs would improve the quality of life of patients. In other comparative studies, it has been demonstrated that GTs resulted in significant benefits to children with regards to their nutritional intake, weight gain, quality of life, and parental satisfaction [9,13-16].

When examining the level of knowledge of participating pediatricians about GT insertion techniques and associated complications, only 17% of participants felt they could explain the procedure comfortably to the family, whereas 15.1% felt they had no knowledge of the procedure. With regards to the GT insertion technique, 62.3% answered correctly, 63.2% knew the correct expected length of hospital stay following GT insertion. When asked about complications, 62.3% knew the most common complications associated with the procedure and 58.5% knew the most common long-term complaint about GTs with no difference between various

experience levels. Surprisingly, approximately 21.6% thought that patients would not be allowed to orally feed once GT is inserted even when his/her swallowing improves. When asked about their comfort level with the routine care of the GT, 53.8% of participants (mostly trainees) felt they are not comfortable providing routine GT care if needed. As far as the reasons behind delaying referral for GT insertion, 70.8% of participants thought parental resistance toward GT was the main factor. This part of the questionnaire highlighted a significant knowledge gap that might explain reasons behind delaying the patients transitioning to GT. Interestingly, 80.2% of participants agreed they need more educational sessions in order to enhance their knowledge and experience about GTs.

In order for parents to make an informed decision about GT insertion, we believe they must have clear and detailed information by an experienced physician. Moreover, they should be able to discuss the procedure as well as its complications and understand the challenges of long-term NGT feeding. A physician who lacks the detailed knowledge about GTs will likely be faced with parental refusal to consider GT insertion for a child in need. Many experts have emphasized the need for a multi-disciplinary team approach to assist the families in order to make the appropriate decision [8,17,18].

Our study has several limitations. First, it has low response rate from participants. Second, our questionnaire was designed by an experienced surgeon after several discussions with pediatricians, however, it has not been validated or tested for reliability. Third, the survey might not have explored the delay of referral in details with different possible scenarios in order to avoid making the survey too long. Fourth, the survey was sent to all pediatricians from different specialties, some of whom with limited experience with GTs thus affecting the reliability of the data. Fifth, we have not interviewed the parents to whom GT was offered in order to investigate their perception. We have assumed that most of the parental refusal, at least from our experience, was due to lack of sufficient and accurate information presented to them by their primary pediatrician. However, that assumption was not tested in our present study.

After the knowledge gap was identified and, in an attempt, to bridge that gap, we have initiated teaching sessions and grand round lectures to further enhance the knowledge and increase the comfort level of our pediatricians with regards to GTs.

Conclusion

Our survey has identified several gaps in knowledge and approach of participating pediatricians which might be one of the main reasons behind the delay of transitioning patients from short to long-term feeding tube. We believe addressing those gaps will likely improve parental interest and consequently patients' access to the benefit of GTs.

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