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ARAŞTIRMA / RESEARCH

Percutaneous endoscopic gastrostomy experience in children and family satisfaction

Çocuklarda perkütan endoskopik gastrostomi deneyimi ve aile memnuniyeti

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Abstract

Purpose: The aim of this study was to evaluate the demographic data, complication rates of children who underwent percutaneous endoscopic gastrostomy (PEG) and to question family satisfaction.

Materials and Methods: Demographic information, underlying diseases, anthropometric measurements before and after PEG and z scores advanced complications due to processing and follow-up periods were obtained from patient files.

Results: In three years, 21 patients underwent PEG procedures. The median age of the patients was 74 months. The majority of the cases consisted of children with neurological, oncological and metabolic diseases (71.4%, 14.3% and 14.3%, respectively). There was a statistically significant increase between baseline and 6th month and between baseline and 12th month of the all antropometric measures z scores. But no significant difference was observed between 6th month and 12th month of the median weight and height z scores. Parents' opinions about PEG were positive. After the procedure, one patient had ostomy leakage and three patients had local stoma infection.

Conclusion: Percutaneous endoscopic gastrostomy is a very successful and reliable method in children and adolescents as well as in infants. Families' opinions on PEG after the procedure were positive.

Keywords: Parental satisfaction, children, complication, percutaneous endoscopic gastrostomy, malnutrition

Öz

Amaç: Bu çalışmada perkütan endoskopik gastrostomi (PEG) işlemi uygulanmış çocukların demografik verilerinin, komplikasyon oranlarının irdelenmesi ve aile memnuniyetinin sorgulanması amaçlanmıştır.

Gereç ve Yöntem: Hasta dökümanlarından demografik bilgiler, altta yatan hastalık, PEG öncesi ve sonrası antropometrik ölçümler ve z skorları, PEG'e bağlı komplikasyonlar ile izlem süresi kaydedildi.

Bulgular: Üç yıl içinde 21 hastaya PEG işlemi gerçekleştirilmişti. Olguların ortanca yaşı 74 ay idi. Olguların çoğunluğunu nörolojik, onkolojik ve metabolik hastalığı olan çocuklar oluşturmaktaydı (sırasıyla %71.4, %14.3 ve %14.3). Hastaların başlangıç ile 6.ay, 6-12. ay ve başlangıç ile 12.ay arasındaki tüm antropometrik ölçümlerinde istatistiksel olarak anlamlı artışı bulundu. Ancak 6-12.ay arasında boy ve kilo ortanca z skorları karşılaştırıldığında anlamlı yükseklik gözlenmedi). Ebeveynlerin işlem sonrası PEG ile ilgili görüşleri olumlu idi. İşlem sonrasında bir hastada ostomi sızıntısı ve üç hastada yerel stoma enfeksiyonu geliştiği tesbit edildi.

Sonuç: Perkütan endoskopik gastrostomi, çocuklarda ve ergenlerde olduğu gibi, süt çocuklarında da oldukça başarılı ve güvenilir bir yöntemdir. Ailelerin işlem sonrası perkütan endoskopik gastrostomi ile ilgili görüşleri olumludur.

Anahtar kelimeler: Aile memnuniyeti, çocuk, komplikasyon, perkütan endoskopik gastrostomi, malnütrisyon

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INTRODUCTION

Nutrition plays an important role in the follow-up and treatment of chronic diseases, and even in some cases malnutrition may lead to further worsening of the disease[1]. Nutritional methods such as nasogastric, nasoenteric, gastrostomy and enterostomy are applied in patients with or without oral intake. Percutaneous endoscopic gastrostomy (PEG), which is one of the most common methods in the last 10 years, is frequently used in children and has replaced surgical gastrostomy with a higher risk of complications[2,3]. PEG is easy to administer and is used in the treatment of anatomical and functional disorders of the upper digestive tract as well as neurological, metabolic, oncological diseases[4]. PEG is a safe and effective method for the protection of children from long-term malnutrition and the comfort of their lives[3]. In this study, it was aimed to investigate the contribution of the demographic data of children who had undergone PEG procedure, their contribution to growth, the comfort and complication rates they added to their daily life and question the family satisfaction.

MATERIALS AND METHODS

In this study, a total of 21 pediatric patients data of the patients who underwent PEG procedure in Baskent University Adana Hospital from June 2014 to September 2017 were analyzed retrospectively. Demographic information, underlying diseases, anthropometric measurements before and after PEG and z scores (according to world health organization data), advanced complications due to processing and follow-up periods were obtained from patient files. PEG indications were mostly children with neurological problems, other less common ones included children with oncological, metabolic, nephrological and genetic problems. PEG approval was obtained from all patient families. Percutaneous endoscopic gastrostomy procedure was performed under pediatric endoscopy (Pentax EG 3430K, video gastrocopy) and general anesthesia after eight hours of fasting with protective antibiotics. The procedure was carried out by the same physician. The procedure was performed from the epigastric region, where indentation was performed according to the sterilization rules. Standard PEG set (Nutricia, Flocare PEG seti; No: 10 ve 14) is installed in all cases. Our cases were evaluated with clinical, endoscopic or upper gastrointestinal tract radiography with barium in terms of gastro-eosophageal reflux. The cases with severe reflux were excluded from the study by upper gastrointestinal system endoscopy.

The height, weight, upper middle arm circumference (UMAC) (olecranon and acromion point pointing were held to form a right angle to the arm and the soft tissue was measured without pressure) and triceps skinfold thickness (TST) (applied three times and average accepted with caliper device) measurements and according to their age z scores were recorded by the same person before and after (6-12th month) PEG. The anthropometric measurements were compared between baseline and 6th month, baseline and 12th month, and 6th month to 12th month at three periods.

While the height and weight measurement could not be optimally made in 6 children (28%) with neurological and genetic problems, only the UMAC and TST measurements were also optimally recorded at baseline, 6th month, and 12th month. Therefore, the TST and UMAC accurate measurement was performed in all patients.

In order to measure the contribution of PEG to the comfort of the patients at the end of the first year, by the nursing nurses who do the home monitoring or the doctor in the polyclinic controls were filled PEG satisfaction survey in accordance with the 5-point Likert scale (1 = not at all satisfied, 2 = not satisfied, 3 = undecided , 4 = satisfied 5 = very satisfied). Interrogated symptoms after PEG included vomiting, constipation, abdominal pain, night sleeplessness, inability to take drugs, long feeding times, weight gain, and respiratory distress. Those with a score of 4 and above were recorded as satisfaction.

PEG catheter-embedded pushbuttons, catheter replacement, ostomy leakage, or the presence of redness and fever around it were recorded.

This study was approved by the Ethics Committee of Başkent University Faculty of Medicine (12/07/2018-135).

Statistical analysis

Statistical analysis was performed using the statistical package *SPSS software* (Version 24.0, SPSS Inc., Chicago, IL, USA). If continuous variables were

normal, they were describle as the mean±standard deviation [p>0.05 in Shapira-Wilk (n<30)], and if the continuous variables were not normal, they were described as the median. Pre-post measure datas were analysing by Wilcoxson test. Values of $p < 0.05$ were considered statistically.

RESULTS

In three years, 21 patients underwent PEG procedures. Ten patients (48%) were female. The median age of the patients was 74 months ± 65.8 (11-204), median weight 16.3±11.4 kg (4-47), height 114±34 cm (60-164), UMAC 11.8±1.75 cm (7.5-14.5) and TST 5.7±0.92 mm (4-8) were founded before PEG.

The median z scores of the weight, height, UMAC and TST at during PEG procedure were detected -2,4±0.9 (-3-0), -1.7±1.3 (-3-1), -2.8±0.6 [-3-(-1)] and -2,7±0,6 [-3-(-1)], respectively (Table-1). The number of patients under two years of age was 8 (38%). The majority of the cases were children with neurological problems (71.4%) and 76% had malnutrition initially (Table-2).

Table 1. Weight, Height, UMAC and TST-for-median z scores comparison by periods at 1-year follow-up of the patients

	Baseline	6th month	12th month	p value as per periods
Weight z scores (median ±SD)	-2.47±0.91	-1.7±1.38	-1.8±1.45	Baseline-6th month p=0.02 Baseline-12th month p=0.06 6-12th month p=0.223
Height z scores (median ±SD)	-1.7±1.33	-1.3±1.55	-1±1.57	Baseline-6th month p=0.05 Baseline-12th month p=0.01 6-12th month p=0.052
UMAC z scores (median ±SD)	-2.8±0.62	-2±0.74	-1.4±0.82	Baseline-6th month p=0.01 Baseline-12th month p=0.01 6-12th month p=0.01
TST z scores (median ±SD)	-2.7±0.61	-2±0.66	-1.4±0.54	Baseline-6th month p=0.01 Baseline-12th month p=0.01 6-12th month p=0.01

UMAC: Upper middle arm circumference; **TST:** Tricseps skinfold thickness

There was a statistically significant increase between baseline and 6th month and between baseline and 12th month of the all antropometric measures z scores ($p < 0.05$). However no significant difference was observed between 6 and 12th month of the weight and height z scores ($p > 0.05$). Only the UMAC and TST z scores showed a statistically significant increase between 6 and 12th month ($p < 0.05$) (table-1). The mean follow-up period was 15.5 ± 5.3 months (12-32 months). During this period, 2 (1%) patients were lost in 14 and 17 months of follow-up due to underlying diseases.

Table 2. Principal diagnosis for patients undergoing percutaneous endoscopic gastrostomy

Diagnosis	Patients n (%)
Neurological diseases	15 (71.4)
Cerabral palsy	12
Spinal muscular atrophy type 1	1
Pierre-Rubin syndrome-Corpus callosum agenesis	1
Swallowing dysfunction	1
Oncological diseases	3 (14.3)
Brain malign tumor	2
Head neck tumor (preemptive)	1
Metabolic diseases	3 (14.3)
Batter syndrome	1
Primar hyperoxaluria type 1	1
Sandoff syndrome	1

Table 3. PEG Satisfaction Questionnaire

Complaint	Total (n)	Improved (n)	Satisfaction (%)
Vomiting	18	13	72
Constipation	15	10	66.6
Abdominal colic	16	9	56
Night sleep disorders	17	11	65
Inability to take drugs	15	9	60
Long nutrition time	19	12	63
Weight loss	16	12	75
Drowning while feeding	12	8	67

According to the PEG satisfaction questionnaire performed in the first year after PEG, decline vomiting in 13 patients (72%), constipation improved in 10 patients (66.6%), abdominal pain healing in 9 patients (56%), night sleep disorders improvement in 11 patients (%65), inabilitiy to take drugs diminish in 9 patients (%60), shortening of long feeding time in 12 patients (%63), getting fat in 12 patients (%75) and drowning while feding decline in 8 patients (%67) were detected (table-3). According to these results, parents were generally satisfied with PEG. Stoma leakage was detected in one patient and local stoma infection was found in 3 patients (8.8%). The use of regional antibiotics was sufficient in the treatment. Percutaneous endoscopic gastrostomy catheter replacement was performed in 2 cases because of catheter obstruction and not functioning optimally. No PEG catheter was removed. Major PEG complications were not observed.

DISCUSSION

Long-term enteral nutrition is generally applied to patients who have a long life expectancy but do not have a good chance of oral feeding for a long time (4-6 weeks)[1]. Adequate nutrition of growing and developing children is extremely important for their development and growth processes in accordance with their genetic potential. Physical, functional and social deficiencies caused by the lack of nutrition at a young age are difficult to remove later. Therefore, enteral feeding, which is the closest path to natural feeding, should be started without losing time[3]. In a few studies investigating PEG insertion in infants, the body weight for PEG implantation was reported to be approximately 10 kg[4,5]. Today, some researchers recommend the use of laparoscopic video-assisted technique to place a gastrostomy catheter in small infants. Our smallest case who had Batter syndrome diagnosis was a 11-month-old girl and 4-kg-weight. No complication developed in this patient and she had reached her third age without any problems.

Children with difficulty in swallowing usually have neurological disorders. When the distribution of 21 patients in this study was examined, it was seen that the patients with neurological problems (n=15, 71.4%) were in the first place. This situation is compatible with the large series published in the world[6,7]. In a study conducted in our country, it has been reported that children with neurological diseases take the first place among the patients with PEG in the childhood age group[4]. In our study, the second order was metabolic (n=3, 14.3%) and oncology diseases (n=3, 14.3%). Fortunato et al[8], 322 (7%) of 760 cases who underwent PEG were reported to be children with neurological problems and 96 (10%) were metabolic / genetic syndromic children. When compared with our study group, the ratio of patients who underwent PEG due to metabolic disease (14%) showed partial elevation. This may be due to the fact that genetic and metabolic diseases are more common in our country due to consanguineous marriages. The reason for insertion of PEG in 3 patients with metabolic disease was the lack of appetite and low caloric intake due to the difficulty in swallowing and metabolic instability due to neurological sequela in the disease process.

Previous studies have shown that improved nutritional status of patients after PEG. There are a limited number of studies investigating the effect of enteral nutrition on height gain[9]. One of the reasons for this is that there are difficulties with the measurement of height due to neuromuscular and genetic disorders present in the majority of children

undergoing PEG. It has been reported that measurements such as UMAC and TST provide more accurate information in the growth monitoring of these patients[10,11]. We also used TST and UMAC measurements besides standard measurements in this patient group. The patient's UMAC and TST z scores were significant higher in the 6-12th month, while the height and weight z scores were not statistically significant higher in tha same period. These suggests support the literature that UMAC and TST measurements give more valuable and accurate information to this patient group.

Although PEG is effective and reliable, complications can be seen during or after the procedure[12]. The most common complication is superficial infection around the ostomy. It is usually heal quickly with oral and intravenous antibiotic therapy. Van Els et al[13] found that the major complication rate was 5.4% and minor complication rate was 17.8% in 129 infants and children with PEG and the most common detected peristomal infection (10%). In the same study, when compared to those who received antibiotics and those who did not receive antibiotics, they found less infection in the group that did not take antibiotics and showed that prophylactic antibiotics did not reduce infectious complications[13]. However, the use of protective antibiotics is recommended in recent guidelines[14]. We applied prophylactic antibiotics to all patients before the procedure and we observed the most common peristoma infection (14.3%) in accordance with the literature.

A few studies have been conducted to investigate the acceptability of nutrition by PEG[15,16]. Avitstland et al[3] reported that 98% of the parents of 121 children with PEG catheters could re-select PEG catheter insertion. According to the PEG satisfaction questionnaire, 56 -75% of our pateint's complaints decreased or complete improvement was observed in this paper. As a result, it can be said that our parents have high PEG satisfaction.

The greatest limitations in this study were included small number of patients and other anthropometric measurements that demonstrated effectiveness with other studies (ratio weight/height, body mass index-age-z score and serum albumin level e.g) were not applied [10,11].

As a result, PEG is a very successful and reliable method in infants and children. Major complication rate is low. Parents' views on PEG after the procedure were positive. It is an extremely effective application that should be considered for children who need support or continuous enteral feeding for various reasons. It should be kept in mind that measurements such as TST and UMAC will give more accurate information in the follow-up of patients with neurometabolic and genetic diseases.

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