DO WE PROVIDE ENOUGH NUTRITION IN GERIATRIC PATIENTS WITH PERCUTAN ENDOSCOPIC GASTROSTOMY?

PERKÜTAN ENDOSKOPİK GASTROSTOMİ İLE GERİATRİ HASTALARINDA YETERLİ BESLENME SAĞLAYABİLİYOR MUYUZ?

NUTRITION IN GERIATRIC PATIENTS WITH PEG

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Öz

Amaç: Oral yoldan beslenemeyen ancak gastrointestinal sistem fonksiyonları normal olan yaşlı hastalarda beslenme sağlanması amaçlı perkütan endoskopik gastrostomi (PEG) işlemi güvenilir olarak sıklıkla kullanılmaktadır.Bu çalışmada amacımız 65 yaş üzerinde PEG takılan hastaların beslenme desteğinin yeterliliğini değerlendirmektir. Gereç ve Yöntem: 2012 Nisan ve 2016 Ocak ayları arasında çekme yöntemi ile yüzeyel anestezi altında PEG yerleştirilen, 65 yaşın üstündeki 97 hastanın; işlem günü, 3. ay ve 6. ay hemogram ve prealbumin değerleri ile antropometrik ölçümleri retrospektif olarak incelendi. PEG endikasyonu 60 olguda serebrovasküler hastalıklar, 21 olguda demans ve 16 olguda diğer nörolojik hastalıklardı. Bulgular: Çalışmamıza 51'i kadın, 46'sı erkek toplam 97 hasta alındı. Yaş ortalaması erkeklerde 76,6(±6,4) yıl ve kadınlarda 74,4 (±8,8) yıl idi. Toplam 10 hastada minör komplikasyon (8 olguda yara enfeksiyonu, 2 olguda hafif sızdırma) görüldü. Hastaların takibinde bazal protein: 6,64 mg/dl, albümin: 2,96 mg/dl, prealbumine: 0,08 mg/dl, hemoglobin: 9,2 mg/dl iken 3. ayda ve 6 ayda bu değerlerde anlamlı değişiklik saptanmamıştır. Erkek hastalarda geliş kol çevresi 26,52 cm ve baldır çevresi 36,9 cm ; kadın hastalarda geliş kol çevresi 25,48 ve baldır çevresi 33,9 cm saptanmıştır. İki grupta da bu değerlerde 3. ayda ve 6. ayda kontrollerde anlamlı değişiklik gözlenmemiştir. Hastaların takip süresi 442 (242- 1102) gün olup işleme ait mortalite saptanmamıştır. Tartışma: PEG, çeşitli nedenlerle oral yoldan beslenemeyen geriatrik olgularda uzun süreli beslenme desteği sağlayan güvenli bir yöntemdir. Hastaların gerekli kalori desteğini alabilmeleri hayat kalitesi açısından önemlidir. Çalışmamıza alınan hastaların zaten bir protein enerji malnutrisyonu mevcuttu ve verilen beslenmenin yeterli desteği sağlayamadığını görmekteyiz. Hastalarımızın kalorisi ve proteini daha yüksek beslenme ürününe ihtiyaç duyduklarını düşünmekteyiz.

Anahtar Kelimeler

Enteral Beslenme; Gastrostomi; Geriatri; Endoskopi; Peruktan Endoskopik Gastrostomi

Abstract

Aim: Percutaneous endoscopic gastrostomy (PEG) is safely and regularly used in elderly patients who have problems with feeding orally but have normal functioning gastrointestinal systems. The aim of this study is to evaluate the nutritional efficiency of PEG in patients over 65 years old. Material and Method: Study was performed between April 2012-January 2016 with 97 patients (51female, 46male). PEG was placed under superficial anesthesia and anthropometric measurements, hemograms and prealbumin levels on the procedure day, at the 3rd month and 6th month were retrospectively analyzed. PEG indications included cerebrovascular disease in 60 patients, dementia in 21 patients and other neurological disorders in 16 patients. Results: Total of 97 patients (51 female, 46 male) were included in the study. Mean age was 76,6(±6,4) for men and 74,4 (±8,8) for women. Minor complications were seen in 10 patients(8 wound infection and 2 slight leakages). Patients mean baseline protein levels were; 6,64 mg / dl, albumin: 2,96 mg / dl, prealbumin: 0,08 mg / dl, hemoglobin: 9,2 mg / dl and there were no significant changes in baseline protein levels of the patients during follow-up at 3 months and 6 months. In male patients, the baseline circumference of the arm was measured 26.52 cm and the baseline circumference of the thigh was measured 36.9 cm and in female patients, the baseline arm circumference was found to be 25.48 and the baseline thigh circumference was found to be 33.9 cm. There were no significant changes during the follow-up period in both groups. The follow-up period of the patients was 442 (242-1102) days and there was no mortality related to the procedure. Discussion: PEG is a safe method of providing long-term nutritional support in geriatric cases that can not be fed orally for various reasons. It is important for quality of life that patients can get the necessary calorie support. Patients included in the study already had a protein energy malnutrition and we can see that provided nutrition did not provide adequate support. We think that our patients need higher calorie and protein products.

Keywords

Gastrostomy; Geriatrics; Endoscopy; Enteral Nutrition; Peruktan Endoskopik Gastrostomi

DOI: 10.4328/JCAM.4981 Received: 18.04.2017 Accepted: 06.06.2017 Published Online: 09.06.2017
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Introduction

Ages over 65 are considered as old age and old age is beginning to form a larger part of the population in our country just like rest of the world. One of the effective factors in maintaining health and improving the quality of life is an adequate and balanced diet [1]. In addition to age progression, there are also increasing conditions, mostly neurological, in which oral intake is disturbed.

Nutritional support is often necessary to provide a quality life for such diseases. Nasogastric catheterization, gastrostomy or PEG feeding is performed in patients where oral intake is not possible. The most commonly used method for nutritional status monitoring is body mass index (BMI) measurement based on weight and height. Age-related shortening of the bone height and kyphosis do not have a right assessment technique. Weight measurement can also be difficult in this patient group. The elderly can sit, but if they can not stand, the weight can be measured with portable bed scales or a mobile wheelchair. For bedridden patients, beds with weighing capability are available, but not easily accessible. In these patients, body weight can be calculated as 95% confidence interval using thigh circumference, knee length, arm circumference and subscapular skin layer thickness. While this is not an ideal solution, it can give acceptable results in patients who can not move or be moved. Anthropometry is one of the most important methods for monitoring the health of the elderly [2]. It involves the systematic measurement of the physical parameters of the body, primarily dimensional descriptors of body size and shape, not only in the elderly but across all age groups. The parameters are then compared with the reference values for that age and sex to determine the nutritional and health status.

Another method for monitoring the nutrition is monitoring of blood proteins. Serum albumin level in healthy individuals should be above 4 mg/dl. Albumin is the most common protein found in blood plasma of humans and other mammals. It constitutes 60% of the proteins found in blood and 30-40% of the total albumin in the body is in the blood. Albumin has a half-life of 18-21days. Albumin has proven to be a prognostic factor (1 g / dl increase leads to a 6% reduction in mortality) but there are limiting factors in the use such as; long half-life span, influence from the body fluid state and acute phase reactivity [3]. Prealbuminine has a half-life of 2-3 days and synthesis and degradation are faster than albumin. Therefore, the fall in plasma prealbumin levels (falling below 15 mg / dL) reflects malnutrition and it is a more reliable and sensitive parameter for following the Nutritional support program. In addition, if sufficient nutrition is available, it returns to normal values in a short time (three days). However, prealbumin is affected by inflammatory reactions [4].

Percutaneous endoscopic gastrostomy (PEG) is an alternative method of surgical gastrostomy developed in 1980 for continuing enteral feeding in patients who can not be fed orally for longer than 4 weeks due to underlying diseases [5]. In 1980 and 1981, Gauderer and Ponsky used this method for the first time, respectively. Whatever the underlying disease is, it is an enteral feeding route that can be used for sustained or transient long-term nutrition when the patient has no gastrointestinal disturbance [6]. Often applied to neurological patients who are not able to receive oral nutrition after cerebrovascular accident, it is also applied to patients with severe dysphagia secondary to operations, high risk of aspiration pneumonia, long-term intubation and external or internal esophagus compresssşions which can not provide food passage.

Operation related major complications are; peritonitis, organ perforation, hemorrhage, gastrocolic fistula, aspiration pneumonia, buried buffer syndrome and minor complications are; infection, leakage and transient vomiting. Surgical gastrostomy, which is an alternative to PEG, has higher mortality and morbidity compared with PEG due to the need for general anesthesia, difficulty in care and increased risk of leakage. Therefore, PEG is now a safer gastrostomic method for patients with nutritional problems of all ages [7]. In this study, we aimed to evaluate whether we can give enough calories to provide adequate nutrition by PEG in elderly patients with normal gastrointestinal system function who can not be fed orally.

Material and Method

This study was conducted between April 2012 and January 2016. Informed consent was obtained from all patients. 97 cases who received PEG were enrolled in our study above the age of 65 who had a life expectancy of 6 months and predicted to not be able to be fed orally due to underlying diseases for a period of 4 weeks. Patients with severe infection and a catabolic disease such as underlying malignancy were not included in the study. In addition, lesion on the anterior wall of the abdomen and epigastrium, past operation, gastro-duodenal ulcer which is not suitable for endoscopy, intestinal obstruction or ascites were judged to be contraindicated for PEG and they didn't receive PEG. Preoperative coagulation tests, hemoglobin and platelet counts were evaluated in all patients. The procedure was not performed in patients with bleeding and coagulation disorders. All patients, except patients taking antibiotics for their underlying disease, were treated with 2 g of Cephazolin sodium prophylactic antibiotic intravenously 2 hours before the procedure. Patients' oxygen saturation measurements and cardiac monitoring were performed during all PEG procedures. All patients were sedated with midazolam. The endoscopic and percutaneous intervention of all patients was performed by the same physician. Diagnostic gastroscopy was performed with the aim of eliminating any condition that could prevent PEG insertion in all patients before the procedure. Gastrostomy tubes were implanted using abdominal PEG kit (Shocare-PEG set 18 CH, Nutricia Healthcare S.A. CH-1618 Chatel-St-Denis, Switzerland) with the help of gastroscopy light. All procedures were performed in the endoscopy unit in conjunction with the Fujinon EG 450 WL5 and Pentax EG-2980 K video gastroscopy devices with a pull method following a 12-hour fasting. After checking that there was no leakage from the edge of the PEG catheter by 20-30 cc of water, the liquid food was fed by increasing the amount as the patient could tolerate 2 hours after the procedure.

Hemogram, total protein, albumin and prealbumin values of the patients before and 3 to 6 months after PEG insertion were retrospectively found in the hospital archive or home care unit. Arm circumference and thigh circumference measurements on the first day and in the 3rd and 6th month were also obtained

from the records. The patient was turned from the supine position to the right or left side, with palms facing upwards and both arms extended on the body. Patients elbow was supported and the midpoint between the elbow and shoulder ledge was marked and the arm circumference measured at that the level of the mark. In the measurement of the thigh circumference of patients using a wheelchair, an angle of 90 ° C is provided for the ankle and the knee to support the leg and in bedridden patients, the leg is bent 90 ° C from the knee and the foot is pressed on a hard and flat floor. The widest part of the thigh was measured. As the patients with PEG do not have the ability to move too much, daily nutrient intake is calculated as 1500-2000 kcal, 60-80 grams of protein, 50-68 grams of fat.

Statistical analyses were performed using the SPSS 21.0 program (version 14.0; SPSS Inc., Chicago, IL).Data on demographic and clinical characteristics of the patients are presented as mean ± standard deviation (SD) or median and frequency (%) values. Parametric data were analyzed using the Student's t-test and nonparametric data using the Mann-Whitney U test. P< 0.05 was considered statistically significant. The study protocol was conducted in accordance with the ethical principle stated in the Declaration of Helsinki and was approved by the local Research Institutional Ethics Committee (no, 75/5, 10/03/2016).

Results

In our study, 51 patients (52.6%) were female and 46 patients (47.4%) were male. The mean age was 76.6 (± 6.4) in males and 74.4 (± 8.8) in females. Cerebrovascular diseases were detected in 60 (61.5%), dementia in 16 (16.5%) and other neurological diseases in 21 (22%) cases as PEG indications (Table 1). The mean duration of the procedure was measured as 8,6 (± 1,6) minutes. The follow-up period of the patients was 442 (242-1102) days and there was no mortality related to the procedure. In our series 8 (8,2%) cases of wound infection requiring antibiotic treatment and 2 (2.1%) cases showed slight leakage from the edge of the catheter. 49 (50.5%) cases were followed by 224 (68- 660) days of follow-up as of the end of the study (January 2016).

Table 1. Demographics of the Patients

	Male	Female	Total
Age years (mean± SD)	76,6 ± 6,4	74,4 ± 8,8	
Number	46	51	91
Type of Neurological Disorder	Number	Percent (%)	
Ischemic cerebrovascular disease	60	61,5	
Dementia	21	22	
Parkinson's disease	7	7,5	
Others	9	9,2	
Total	97	100	
Follow-up period	442 (242- 1102) day		

Blood glucose, albumin, prealbumin values and upper arm, thigh circumference measurements during hospitalization were not statistically different when compared to 3rd and 6th months controls. The baseline protein value was 8,1 ± 1,12 mg/dl, albumin level was 2,96 ± 0,70 mg/dl and hemoglobin was 9,2 ± 1,02 mg/dl at the time of hospitalization and no significant change was detected in these values at 3 months and 6 months controls (Table 2). In male patients, the basal arm circumference was 26.52 ± 4.02 cm and the thigh circumference was 36.9 ± 5.7 cm and in female patients, the arm circumference was 25.48 ± 4.4 cm and the thigh circumference was 33.9 ± 6.42 cm. There was no significant change in controls in both groups (Table 3).

The total minor complication rate was determined as 10.2%, but no major complication and procedural mortality were observed. No patients PEG catheter was removed for oral feeding during the follow-up period.

Table 2. Results of analysis with biochemical analysis

	Total protein g/dl	Albumin g/dl	Hemoglobin mg/dl
During PEG procedure	6,64 ±1,12 (6,2-7,6)	2,96±0,70 (1,9-4,4)	9,2 ± 1,02 (7,6-10,4)
3. month	6,98 ±1,09 (6,4-8)	3,06±0,64 (2,1-4,7)	10,2 ± 1,12 (8,3-11,4)
6. month	7,04 ±1,1 (6,4-8,1)	3,1±0,68 (2,3-4,8)	11,4 ± 1,2 (9,6-12,6)

p > 0,05: there were no significant changes in these values.

Table 3. Anthropometric measurements in elderly patients

	Arm circumference (cm)		Thigh circumference (cm)	
	Male	Female	Male	Female
During PEG procedure	26,5	25,4	36,9	33,9
3. month	26,6	25,7	37,0	34,1
6. month	27,0	26,0	37,1	34,0

Discussion

Although institutional practices may vary in different centers, PEG is generally used to continue enteral feeding in patients who have normal digestive function and a minimum life expectancy of 3-6 months. Such patients often belong to the geriatric age group. This approach is often considered acceptable by patients who are unable to feed orally, especially due to neurological diseases, but who are able to continue an active life [8]. It is preferred instead of feeding with nasogastric tube because it has lower risk of aspiration, patient and relative compliance is better and the possibility of occlusion and displacement is less. Compared to total parenteral nutrition, it is an important advantage that general infection complications are low, central venous route is not required, it is cheaper and patient compliance is better [9-10]. Although it is mostly used in patients with neurological impaired ability for oral intake, it is equally applicable to patients with physical obstruction to passage of food (e.g., cancer), prolonged intubation and those at high risk of aspiration pneumonia [11]. All our patients had neurological disorders.

41.2% of our patients were in intensive care unit when PEG was attached. Some of these patients were on prolonged ventilation and the majority were cerebral ischemia or hemorrhage. The proportion of patients in need of home-based care was reported to be 40% and most of these patients were with neurological problems in accordance with the literature. In some of the studies performed, the mean duration of the procedure was 34 minutes from the beginning of the anesthesia, whereas the

mean duration of the procedure in our study was calculated as 8,6 ± 1,6 minutes (6-13 minutes).

Complications associated with the PEG procedure during or after the procedure can be seen. These may develop due to many factors such as age, underlying disease, obesity, size and material of the PEG catheter, and experience of the performing team. Complications that may occur during the procedure are abdominal wall hemorrhage, pneumoperitoneum, colon or small bowel injury, liver or spleen laceration, intra or retroperitoneal hemorrhage. None of these complications seen as major complications developed in our cases. Complications following the procedure are peristomal pain, wound infection (which may require catheter removal), aspiration and diarrhea. These are seen as major complications and most common ones are wound infections and catheter leakage. In our study, infection is the most common complication. In our study 2 (2.1%) patients had leakage from the side of the tube and 8 (8.2%) patients had local wound infection which was controlled by simple antibiotic treatment.

A prospective study of antibiotic prophylaxis revealed 33.6% of peristomal infections occurred when no prophylaxis was performed [11]. We applied antibiotic prophylaxis with 2 g Cefazolin 2 hours before the procedure to each patient who did not receive antibiotic treatment in the clinic. In patients with leaking, the edge of the PEG catheter was fixed with a suture and after the procedure leakage stopped in both patients.

Anthropometric measurements are often used to assess nutritional status. For this purpose, absolute weight (body weight) and BMI are the most commonly used measures. Due to osteoporosis-related short stature in the elderly, it can lead to high BMI results even in patients whose weight is below normal [12, 13]. It is also very difficult to measure height and weight in elderly and bedridden patients. For these reasons, other measures that can give more accurate results in the elderly are; arm circumference, thigh circumference and triceps skin thickness (subjective and high error margin) are used. Measurement of the thigh circumference is a more sensitive and valid method of measurement of muscle mass than the circumference of the arm. The reason is that it points to change in the lean muscle mass and the decrease in activity with age [14]. We evaluated arm and thigh circumference measurements in our patients, which are more objective indicators. The measurement of triceps skin thickness was not made because of high error margin and subjective. Arm and thigh circumference values of our patients at the time of PEG insertion and at 3 and 6 months were compared based on the baseline and initial values. Although there was an increase in the baseline value and the 6th month value, it was not statistically significant. According to these results, we think that we can not protect our patient's muscle mass and we can not provide enough calories and protein support. However, considering that the majority of our patients were bedridden, we evaluated our bedridden and non-bedridden patients separately. In the bedridden group, 1500 kcal, 60 grams of protein, 50 grams of fat were given daily. In the non-bedridden group 2000 kcal, 80 grams of protein and 68 grams of fat was provided.

Perhaps this nutritional insufficiency may be overlooked since patients with PEGs are in fact a group of patients with very limited activity and often only able to maintain their vital functions. However, sufficient protein support in the elderly in the geriatric group prolongs life and provides cognitive function stability.

Serum protein levels are also significant in evaluating nutritional status. An ideal protein indicator is required to have a short half-life, be rapidly affected by the protein deficiency in the diet, resulting in a decrease in blood levels, a low reserve, a rapid synthesis, a very stable metabolic rate, and sensitivity to protein and energy restriction only [14]. We are deprived of the indicators that contain all these ideal conditions. Protein markers commonly used in clinical chemistry are total protein, albumin, transferrin, prealbumin and retinol-binding protein.

Albumin is a complex, high molecular weighted protein produced in the liver. Due to its long half-life (18-21 days) the deposition of albumin deposits may be about 2 weeks. It is often used in nutritional assessment as it can be easily and widely measured. Decreased albumin levels have been shown to be associated with increased morbidity and mortality in hospitalized patients. For this reason, it is frequently used as a prognostic indicator. Although the albumin is referred to as an indicator of nutritional assessment, there are serious doubts about its sensitivity. Serum albumin level does not response to or respond poorly to nutritional support in sepsis or stress. If there is no significant stress effect on the presence of protein malnutrition, nutritional support may provide rapid response. However, hypoalbuminemia is not specific for malnutrition and can be observed in many diseases in inflammatory conditions, independent of nutritional status. In the elderly living in their own community hypoalbuminemia may be indicative of protein energy malnutrition. However, changes in serum protein levels in the elderly in the hospital are thought to be indicative of acute-phase reaction and inflammation other than malnutrition. The decrease in serum albumin level is also seen in congestive heart failure or in renal diseases with increased plasma volume. In addition, advanced liver failure, enteropathy leading to protein loss and advanced renal failure causes severe albumin loss, limiting the use of albumin in the evaluation of malnutrition [15]. Given this situation, we also did not include patients with enteropathy, infection or malignancy, advanced heart failure and renal insufficiency within the patient group of choice. In our study, we did our follow-ups at 3rd and 6th months to exceed the least 2 weeks required to fill the deposits, due to the long half-life of albumin, eliminates the limitations of the albumin use.

In the follow-up of our patients, liver or chronic kidney disease did not occur. There was no statistically significant change in our patient's baseline total protein, albumin and prealbumin values measured on the first day of PEG insertion compared to the 3rd and 6th months ($p > 0.05$). Our patients were malnourished as of the first day but serum albumin and prealbumin values were not changed after nutritional support. Nutritional support does not provide for laboratory improvement that's why we need to give a higher calorie and protein supplement.

In conclusion, PEG is a reliable feeding method that can be applied in a short time and provide long-term and optimal nutritional support in cases that can not be fed orally for various reasons. Daily intake of sufficient calories and protein is especially important during childhood and geriatric age. It is difficult

to detect nutritional deficiency in the elderly. There is no gold standard method for clinical evaluation, so it is not ideal to use single measurements. It should not be forgotten that early detection of malnutrition will ensure successful intervention. Daily food supplementation is often inadequate in the elderly. It is recommended to carry out researches to develop nutritional assessment tools to detect specific malnutrition risks on elderly individuals.

Animal and Human Rights

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Funding

The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript."

Conflict of Interest

The authors declare that they have no conflict of interests.

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How to cite this article:
Baş BÖ, Oymacı E. Do We Provide Enough Nutrition in Geriatric Patients with Percutan Endoscopic Gastrostomy? J Clin Anal Med 2017; DOI: 10.4328/JCAM.4981.