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ENTERAL NUTRITION OF PATIENTS WITH PERCUTANEOUS ENDOSCOPIC GASTROSTOMY

Natalija Uršulin-Trstenjak[1*], Marija Korpar[2], Nives Kosalec[3], Bojan Šarkanj[4]

[1]University North, 104 brigade 3, 42000 Varaždin, Croatia
[2]General Hospital Varaždin, Department of gastroenterology, I. Meštrovića 1, 42000 Varaždin, Croatia
[3]Health Centre Čakovec, I. G. Kovačića 1E, 40000 Čakovec, Croatia
[4]University North,Trg dr. Žarka Dolinara 1, 48000 Koprivnica, Croatia

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Summary

Nutrition and the intake of necessary nutrients is the basic need of every organism and indispensable for normal functioning of every living creature. The problem arises if there are constraints or inability to adequately take in food to meet all the nutritive needs of the organism and thus the risk of the development of malnutrition. In such situations, enteral nutrition practices are often used as an artificial feeding method, and if the need for such nutritional support is longer-lasting, it is advisable to set an indication for placement of percutaneous endoscopic gastrostomy (PEG) as one of the most effective ways of enteral nutrition. This is the procedure where a specially adapted probe is placed through the abdominal wall directly into the stomach. Applications are numerous, and given that this is a long-term artificial nutrition method, it is most often used in chronic, neurological or oncological patients. The aim of this paper is to demonstrate the importance of adequate enteral nutrition as the main segment in prevention and treating malnutrition. In particular, specificities of enteral diet via PEG are presented as the most effective and safest method of artificial nutrition, which is accompanied by the results of the monthly monitoring of the nutritional status and the manner of feeding, as well as the clinical status of the person with PEG. In this case report results were compared before and after implantation of PEG.

Keywords: enteral nutrition, malnutrition, percutaneous endoscopic gastrostomy

Introduction

The importance of optimal nutrition has been declared since the time of the Hippocrates, who said that "medical science would not have been discovered or found and would not become the subject of research if the same dish and drink were appropriate to a sick and healthy man" (Živković, 2002). In patients who cannot eat enough or at all orally to satisfy all the nutritional needs of the organism for macronutrients and micronutrients, we turn to enteral diet, as you can see in Fig. 1 (De Bruyne et al., 2008).

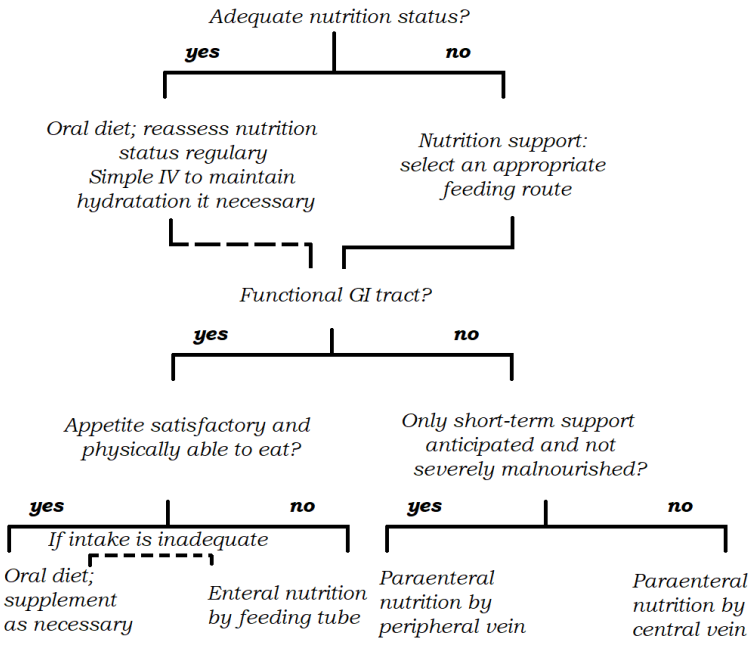

Fig. 1. The feeding options depending on nutrition status of patient, scheme (De Bruyne et al., 2008)

*Corresponding author: natalija.ursulin-trstenjak@unin.hr

This enteral diet involves the intake of food and/or commercial nutrient supplement using nutritional probes in stomach, duodenum or jejunum. In Fig. 2 and Fig. 3 the percutaneous endoscopic gastrostomy on patient and the feeding procedure is documented.

Fig. 2. Thepercutaneous endoscopic gastrostomy on patient (author, 2018)

Fig. 3. Feeding by percutaneous endoscopic gastrostomy (author, 2018)

There is a possibility of parenteral nutrition for these patients, but almost always when it is possible, the advantage is in the enteral feeding mode. The main precondition is structurally (at least 100 cm of small intestine) and a functional digestive system (Krznarić, 2006), and the main postulate of clinical nutrition today is: "If the intestine is in function, use it (Štimac et al., 2014)". Today, a wide range of finished enteral preparations is available, which can be used by oral intake, but also can be applied by different types nazoenteral tubes via percutaneous endoscopic gastrostoma (PEG) (Blumenstein et al., 2014). Numerous studies that validated enteral nutrition by nasogastric probes and PEG, gave PEG superiority, as it provides greater nutrition energy utilization and preserving albumin levels a longer period of time (Zalar et al., 2004; Kumagai et al., 2012; Cristian et al., 2015). PEG is a safe method with a lower risk of aspiration and aspiration pneumonia and is associated with a higher survival rate (Kumagai et al., 2012). The use of nasogastric probe is associated with a greater number of complications and greater need for re-insertion of the probe (Blumenstein et al., 2014). One of the studies,

comparing the patients with nasogastric probe and patients with PEG, shows that there is three times the probability of aspiration pneumonia in patients with nasogastric probe (Azzopardi and Ellul, 2013). Older age, neurological disorders and cerebrovascular diseases also increase the risk of aspiration pneumonia (Patel and Thomas, 1990). Except from hospitalized patients, PEG can be applied at home – Home Enteral Tube Feeding (HETF), which has been steadily increasing over the past few years (Ojo, 2012; Madigan et al., 2002). One of the most common reasons for introducing enteral nutrition is malnutrition, which is defined as a nutritional status disorder due to reduced or excessive intake of nutrients (Cederholm et al., 2019; Živković, 2002). The first step in evaluation of nutritional status of patients and detect individuals with a tendency to develop nutritional deficit / malnutrition is malnutrition risk screening. It is a simple and fast procedure using the one of a validated screening tool known as Nutritional Risk Screening (NRS, 2002) (Kondrup et al., 2003). The final diagnosis of malnutrition is defined by clinical examination according to the Cederholm et al. (2019), anamnestic and heteroanamnestic data of the patient and several diagnostic criteria such as unintended weight loss, low BMI, inadequate food intake, loss of muscle mass and low FFMI (Fat Free Mass Index). Calculation of BMI is based on body mass and body height; BMI is the body mass ratio in kilograms and body height in meters and it is the indicator of the degree of nutrition. (WHO, 2019) Values of recommended BMI are the same for both sexes, ranging from 18.5 to 24.9 kg / m2 according to the World Health Organization's Classification for the European Population.

Any unintended change in body mass is important and the cause must be determined. Loss of 5% of body weight indicates a mild, and more than 10% of a serious nutritional and health problem (Štimac et al., 2014). If an enteral diet is planned for more than three weeks or if there are conditions in the patient status that include disabled swallowing and food intake due to oropharyngeal and esophagus dysfunction / stenosis / obstruction, PEG insertion is the main priority. If there is no local tissue reaction, such as redness, swelling or nausea, diarrhea, vomiting, abdominal pain and cramps, after localization of PEG, the planned dietary enteral diet can be started after 24 hours after the PEG implementation. In hospitals and clinics, patients are educated about care of PEG, feeding by PEG and other relevant data. After they go home, the multidisciplinary team of primary health care provides necessary support, although the necessary clinical control and evaluation of PEG (Madigan et al., 2002).

Methods

In this paper it is used the case study method. It is used the analysis of documents, interviews of medical staff and observation. Since it was a person with mental disabilities, the informative written consent to the study and the publication of the work was given by the legal guardian of the patient. In the end results before and after were compered.

Case study

N.N. is female, 54 years old, lives in Home for persons with physical, intellectual or sensory disability. Her diagnoses are psychomotor retardation, secondary epilepsy and secondary dysphagia with implanted percutaneous endoscopic gastro stoma on October 13, 2016. She has a history of hypothyroidism, osteoarthritis, and thoracolumbar scoliosis.

Status (November 2017)

In consciousness, partially oriented, poor verbal contact according to the nature of the illness (provides only basic information about herself, whether yes or not), immobile, all physiological needs are performed in bed with the maximum help of medical staff, slowed down, the muscular strength of both arms reduced. Body height 174 cm, body weight 62.7 kg. In the previous months there was a constant decrease in body weight (Fig. 4). From heteroanamnestic data of a nurse from her home, it is known that the person is otherwise calm, cooperative, occasionally has epilepsy attack and because of these she has been hospitalized several times at University Hospital Centre where she takes regularly control at the Center for Epilepsy.

Clinical status and course of treatment

From her medical documentation (March, 2015) she was hospitalized several times in the General Hospital due to repeating aspiration pneumonia with acute respiratory insufficiency, poorly general condition and somnolence. She was mainly fed *per os* with the porridges and hydrated by tea or water. During hospitalization she was fed by a nasogastric probe. This method is continued by releasing home until the satisfactory oral intake. The tube was occasionally placed during noncooperation and food rejection. In diet are introduced enteral supplements (4 x 200 mL = 1000 kcal) plus hydration / water / tea / juice (1000 mL) by using a bolus feeding method.

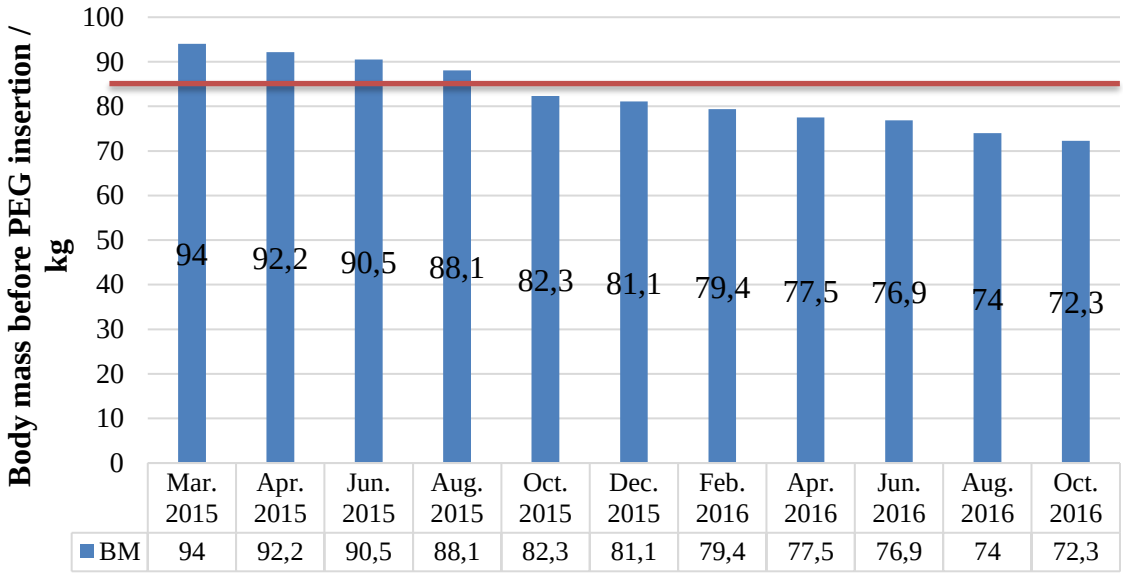

Fig. 4. Body mass (BM) tracking from 3/2015 to 10/ 2016, the red line indicates loss of 10 % of body weight (author, 2018)

When she was placed to Homefor persons with physical, intellectual or sensory disability, her body weight at the beginning of March 2015 was 97.6 kg (BMI 32.2 kg/m^2 - 1st degree of obesity) and after first hospitalization at the end of March was 94 kg (BMI 31 kg/m^2 - 1st degree of obesity). Further data on body mass were obtained from a home monitoring list whose measurements were carried out every two months according to their own regular protocol. According to the Fig. 4 from March 2015 to September 2016, there is a permanent loss in body weight. The total weight loss in the 19-month period was 25.3 kg, which is a loss of almost 26% of the total body mass. The patient was predominantly fed *per os* with porridges and by nasogastric probe performed by nurse. According to body weight monitoring results, such an intake did not satisfy the nutritional needs of the body. Visible continuous loss of body mass, risk of continuity of the same and development of protein energy malnutrition (PEM), relapses of aspiration pneumonia, increasingly severe oral deficiency, to a person for the purpose of ensuring long-term enteral intake, on October 13, 2016 was implanted percutaneous endoscopic gastrostoma, Freka PEG 20 Fr, and on February 9, 2018, a person receives a transmissible pump for enteral nutrition with associated enteral systems. Home porridges were replaced by the factory enteral formulation.

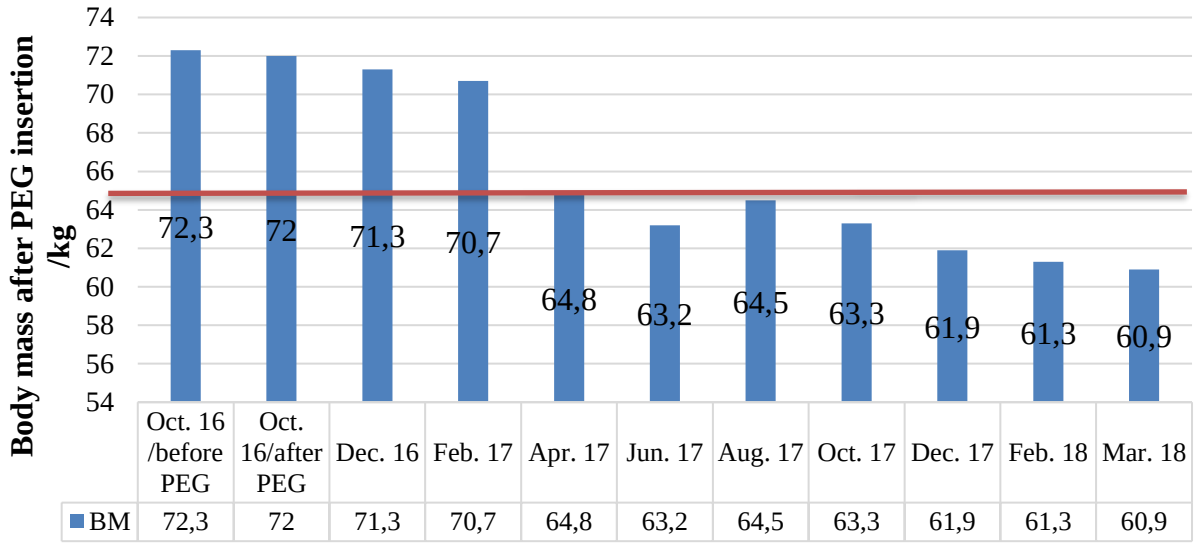

Fig. 5. Body mass tracking by PEG insertion until March 2018, the redline indicates loss of 10 % of body weight (author, 2018)

Body mass in October 2016 was 72.3 kg. After the PEG implantation and patient return from hospital on October 14, 2016, the body weight was 72 kg (BMI 23.8 kg/m^2 - normal body weight). The total weight loss from PEG implantation up to March 2018, for 17 months, was 11.4 kg, which is 15.7 % of total body mass (Fig. 5).

Discussion and conclusion

According to Fig. 6 and Fig. 7, there is a continuous body mass deficiency, but comparing the figures it is important to point out the difference in body mass loss that significantly deviates. Before the PEG implantation, a person lost 25.3 kg (26%) in the 19-month period. The weight loss ranged from 0.6 kg to 5.8 kg with the highest losses after hospitalization with an average loss of 2.3 kg. After PEG implantation, there is still a noticeable decrease in body weight although for a shorter period of time, namely 17 months, but a significantly smaller one. The weight loss was 11.4 kg or 15.7%. The weight loss range was from 0.3 kg to 5.9 kg with an average loss of 1.3 kg but also with one positive result of +1.3 kg. The biggest loss of 5.9 kg was recorded in April 2017 due to the lack of adequate nutritional support regarding the clinical condition of a person - she had consecutive grand mal attacks a few days in row. By providing adequate nutritional support via PEG, loss of body weight was reduced and decreased, risk of dehydration decreased and she was not hospitalized by aspiration pneumonia or respiratory insufficiency as it was the case when she was fed *per os* or by nasogastric probe. The greatest body weight loss is visible due to hospitalization which has been reduced after the PEG has been set up. This body weight differences is not strange since it has also been proven in research that include amyotrophic lateral sclerosis patients who were fed by PEG (Mazzini et al., 1995).

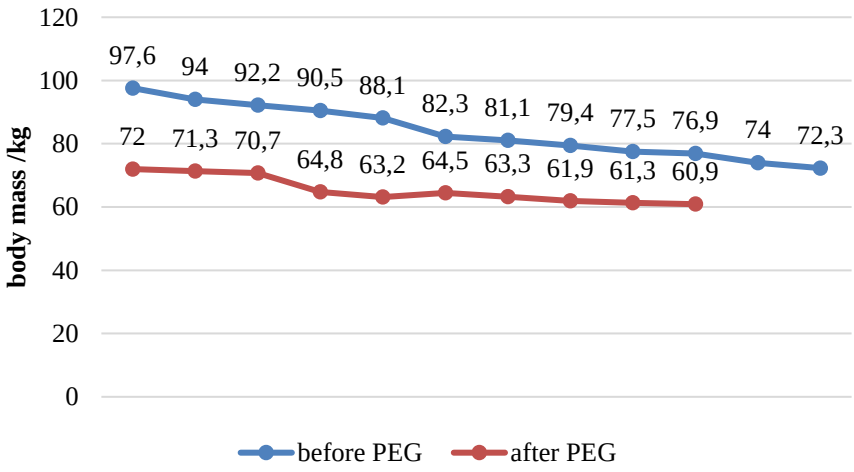

Fig. 6. Comparison between body mass tracking before and after the implementation of PEG (author, 2018)

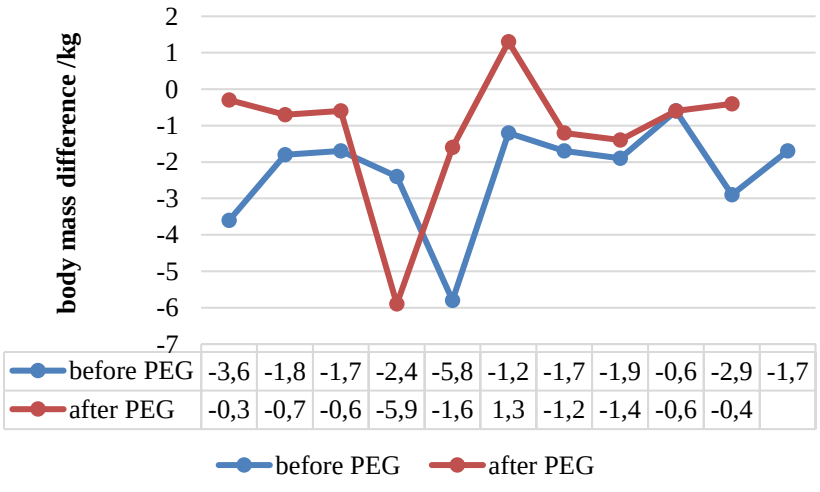

Fig. 7. Comparison between body weight differences before and after the implementation of PEG (author, 2018)

The importance of adequate accommodation in the home, adequate health care and care by an expert, educated staff, as well as adequate, individual access, personalized communication with a person with an existing cognitive deficit provided by nurses has to be prioritized to sustain health in the patient.

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