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Oral feeding therapy in healthy children qualified to enteral nutrition by nasogastric tube due to nonorganic feeding disorders – own experience

Nauka karmienia doustnego u zdrowych dzieci zakwalifikowanych do żywienia przez sondę nosowo-żołądkową z powodu zaburzeń karmienia na tle zaburzeń zachowania – doświadczenia własne

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Keywords

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Słowa kluczowe

zaburzenia karmienia, żywienie enteralne, karmienie doustne

Summary

Introduction. Feeding disorders occur in infancy or early childhood and present as a food refusal, food selectivity or lower amount of food intake than appropriate for age due to psychological or medical conditions. The treatment of nonorganic feeding disorders consists mainly on cognitive-behavioral interventions. In some cases, especially when severe nutritional status disturbance or its high risk is present, the enteral nutrition by nasogastric tube may be necessary. In this study we described the own experience of our multidisciplinary feeding team in tube weaning of children with behavioral feeding disorders.

Aim. Retrospective evaluation of hunger provocation oral feeding therapy in infants and young children with behavioral feeding disorders and full or partial enteral nutrition.

Material and methods. We analyzed the data of 10 patients (6 female, 4 male) with the age range from 5 months to 4 years who were hospitalized in our clinic between December 2012 and August 2017. All of them were fed by nasogastric tube due to behavioral feeding disorders and inability to meet their nutritional requirements via the oral route. Patients with feeding disorders due to organic diseases were excluded from the analysis. All of them were hospitalized in our clinic in order to oral feeding therapy leaded by multidisciplinary team. Two methods of gradually tube weaning were used: reduction the volume of every enteral fed by 1/3 or the limitation of the number of meals given by nasogastric tube day by day within 3-5 days. The common reason for introduction enteral feeding by nasogastric tube in observed group was a poor nutritional status.

Results. In 8 patients tube weaning was successful during the first hospitalization. Among them the mean duration of enteral nutrition preceding the feeding disorders therapy was 3.6 ± 0.74 months with the range of 2-4 months. In all these children the full oral feeding was achieved approximately after the 13 days of hospitalization (range 9-17 days). In the remaining 2 patients the tube weaning was obtained during the second try after 11 and 24 months of enteral feeding, respectively. Successful hospitalizations lasted 14 days in one and 15 days in the other case. Initial failure of therapy in these patients could be due to the strong food sensory aversion and both unclear medical history (exactly the suspicion of genetic disease) in the first patient and the length of enteral feeding that lasted 1year before the hospitalization in second child.

Conclusions. The hunger-provocation therapy leaded under the care of multidisciplinary feeding disorders team seems to be a promising method to promote tube weaning in healthy young children with behavioral feeding disorders.

Conflict of interest
Konflikt interesów

None
Brak konfliktu interesów

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Streszczenia

Wstęp. Zaburzenia karmienia występują u niemowląt lub małych dzieci i objawiają się: odmową jedzenia, wybiórczą dietą lub zmniejszoną ilością przyjmowanych pokarmów niepokrywającą zapotrzebowania dziecka. Przyczyną ich występowania mogą być czynniki psychologiczne i/lub organiczne. Terapia nieorganicznych zaburzeń karmienia polega głównie na interwencjach poznawczo-behawioralnych. W niektórych przypadkach, szcze-

gólnie gdy dziecko jest niedożywione, konieczne jest włączenie do terapii okresowego żywienia dojelitowego przez sondę nosowo-żołądkową. Poniższa praca prezentuje własne doświadczenia wielodyscyplinarnego zespołu zaburzeń karmienia w terapii nauki karmienia doustnego po przejściowym żywieniu enteralnym przez sondę nosowo-żołądkową u dzieci z zaburzeniami karmienia na tle behawioralnym.

Cel pracy. Retrospektywna ocena efektów terapii nauki karmienia doustnego, odwołującej się do prawidłowej kontroli uczucia głodu i sytości u niemowląt i małych dzieci z behawioralnymi zaburzeniami karmienia oraz pełnym lub częściowym żywieniem dojelitowym

Materiał i metody. Przeanalizowaliśmy dane 10 pacjentów (6 dziewcząt, 4 chłopców) w przedziale wiekowym od 5 miesięcy do 4 lat hospitalizowanych w naszej klinice od grudnia 2012 do sierpnia 2017 roku. Wszyscy pacjenci byli dokarmiani przez sondę nosowo-żołądkową z powodu behawioralnych zaburzeń oraz braku możliwości pokrycia zapotrzebowania na składniki odżywcze drogą doustną i nieprawidłowego stanu odżywienia. Pacjenci z zaburzeniami karmienia wynikającymi z choroby organicznej zostali wyłączeni z analizy. Wszyscy pacjenci przebywali na oddziale w naszej klinice w celu przeprowadzenia terapii nauki karmienia pod nadzorem multidyscyplinarnego zespołu. W obserwowanej grupie zastosowano dwie metody odstawienia od sondy nosowo-żołądkowej: zmniejszenie objętości każdej porcji podawanej enteralnie o 1/3 lub ograniczenie liczby posiłków podawanych przez zgłębnik nosowo-żołądkowy dzień po dniu w ciągu 3-5 dni.

Wyniki. W przypadku 8 pacjentów terapia odstawienia od sondy nosowo-żołądkowej zakończyła się sukcesem podczas pierwszej hospitalizacji. Wśród nich średni czas żywienia dojelitowego poprzedzającego terapię zaburzeń karmienia wynosił 3,6 ± 0,74 miesiąca (zakres od 2 do 4 miesięcy). U wszystkich tych dzieci pełne karmienie doustne osiągnięto średnio po 13 dniach hospitalizacji (zakres 9-17 dni). U pozostałych 2 pacjentów odstawienie od sondy nosowo-żołądkowej uzyskano podczas drugiej hospitalizacji po odpowiednio 11 i 24 miesiącach żywienia dojelitowego. Pomyślne hospitalizacje trwały 14 dni w jednym i 15 dni w drugim przypadku. Początkowa nieskuteczność terapii u tych pacjentów mogła być spowodowana silną niechęcią do jedzenia, niejasnym wywiadem medycznym (podejrzenie choroby genetycznej) u pierwszego pacjenta oraz długością żywienia dojelitowego, które trwało rok przed hospitalizacją w przypadku drugiego dziecka.

Wnioski. Terapia nauki karmienia oparta na nauce prawidłowej kontroli uczucia głodu i sytości prowadzona pod opieką wielodyscyplinarnego zespołu ds. zaburzeń karmienia wydaje się być obiecującą metodą odstawienia od żywienia enteralnego u dzieci z nieorganicznymi zaburzeniami karmienia.

INTRODUCTION

Parents of young children worldwide are concerned about feeding difficulties. This problem occurs in about 20 to 30% of children before the end of 3 year of life. According to etiology feeding difficulties are considered as organic or nonorganic disorders. Taking into account the way of manifestation they are categorized under the 3 principal children's eating behaviors, including limited appetite, selective intake or fear of feeding. Each category includes a range from normal (misperceived) child's behavioral that are incorrectly interpreted by parents to severe both behavioral and organic problems. The strongest feeding difficulties are referred as feeding disorders. Independently from etiology they may lead to severe undernutrition and due to that to the necessity of enteral feeding (1).

To determine the appropriate therapy it is extremely important to find difference between organic and nonorganic causes of feeding disorders (2). The organic ones should be properly recognized and treated according to the basic diagnosis. The most critical symptoms are both dysphagia and food aspiration into the respiratory tract that reveals with coughing, choking or lung infections (3). Nonorganic feeding disorders are characterised by incorrect feeding behaviours such as selective diet, harmful feeding, fear of feeding or food refusal without underlying organic disease. These problems are usually associated with behavioral disorders of child or parents (4). Due to the wide range of symptoms the assessment and treatment of feeding disorders should be done by a multidisciplinary team that includes pediatrician/gastroenterologist, dietitian, psychologist and speech-language therapist. In case of nonorganic feeding disorders, behavioral interventions are usually sufficient (5, 6). However, in children with strong behavioral disorders due to permanently refuse of eating the most common complication is the loss of weight and undernutrition. In such cases the first step of feeding disorders therapy should be the improvement of impaired nutritional status as well as calming down the negative emotions associated with feeding, for example with forceful feeding. The best way to achieve these goals is periodically partial/full tube enteral nutrition. Only after the nutritional status is satisfactory improved and the positive child's reaction to oral feeding are observed it is time to take the trial of tube weaning.

Hunger results from the complex interaction of a variety of sensory input, limbic and cortical modulators, visceral feedback, and hormonal effects. The appetite control center resides in the hypothalamus. Reduction of energy intake stimulates appetite and induces eating (7). We described the own experiences of our multidyscyplinary team in tube weaning of healthy children

with behavioral feeding disorders on the way of hunger-provocated oral feeding therapy.

AIM

The aim of study was the retrospective evaluation of short-term hunger-provocated oral feeding therapy in infants and young children with behavioral feeding disorders and full or partial enteral feeding.

MATERIAL AND METHODS

The treatment of nonorganic feeding disorders consists mainly on cognitive-behavioral interventions. Unfortunately, there are cases in which only this kind of therapy is insufficient. Negative emotions accompanying feeding (such as forceful or persecutory feeding) can lead to the long-term refusal to eat and consequently to malnutrition. A child who don't accept the oral feeding loses the ability to associate eating with satisfying hunger. This interferes with the reintroduction of oral feeding and can result in severe behavioral problems and persistent food refusal. In such situation it is indicated to periodically include the feeding by nasogastric tube to improve nutritional status and to suppress the negative emotions associated with feeding (2).

Feeding by the tube was introduced for a period of minimum 2 months in studied group due to behavioral feeding disorders and inability to meet their nutritional requirements via the oral route. Patients with feeding disorders due to organic diseases were excluded from the analysis. Enteral nutrition was determined by the dietician individually to each patient's needs. Depending on the tolerance or the grade of malnutrition, the child received to the nasogastric tube a standard mixed diet or an industrial formula. Before the each enteral bolus given by the tube, the parents offered to child the normal meals to promote the oral feeding acceptance. In all cases the crucial point of therapy was to follow by established feeding plan. The most important rules of the feeding scheme are presented in table 1. These recommendations are designed to prepare parents and children to re-learn the oral feeding.

Tab. 1. The most important rules of the feeding scheme

1. Fixed meal times.
2. The meal lasts up to 30 minutes. If the child is not interested in eating the meal we finish it earlier.
3. Without persuading and forcing child to eat.
4. Without entertaining child while feeding.
5. The meals should be served in a calm atmosphere.
6. Between meals the child does not get snacks or sweet liquids.
7. Allow your child to mess up and have fun with food.

While weaning tube hospitalization we used short-term clinical hunger provocation for the resumption of fully oral feeding. Reduction of tube feeds is a highly specialized procedure that must be tailored to each child's individual needs – based on different variables, such as medical history, growth and oral feeding development. Two methods of tube feeding, developed by our team was used in studied group:

1. Reduce the volume of the each enteral feeds by 1/3 day by day within 3-5 days.
2. Limit the number of meals supplemented to the nasogastric tube day by day within 3-5 days.

Both methods were represented by two equivocal patient groups.

RESULTS

Over the past 5 years (from 17.12.2012 to 1.08.2017), in the Department of Gastroenterology, Hepatology, Feeding Disorders and Pediatrics of the Children's Memorial Health Institute, our multidisciplinary feeding disorders team, including gastroenterologist/pediatrician, psychologist, dietitian and speech-language pathologist, has performed the tube weaning in 10 healthy children (6 girls) with behavioral feeding disorders. The mean age was 11 months with the range from 5 months to 4 years. 4/10 children were premature and were born averagely at 35 ± 2 weeks of pregnancy. According to parents' report in both group the feeding problems have occurred since birth. The main feeding difficulties which were the reason to attend therapy in our center are shown on figure 1.

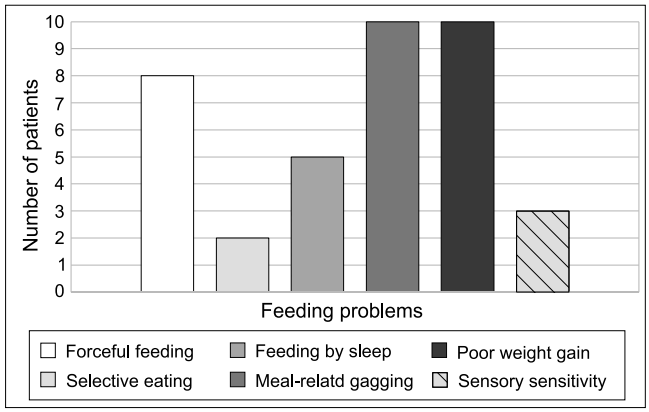

Fig. 1. Characteristic of feeding problems among studied group

The underlying reason for inclusion enteral feeding by nasogastric tube in observed group was a poor nutritional status. Enteral feeding was enrolled approximately for 4 months. The exact enteral nutrition duration proceeding the hospitalization is given on figure 2. Five patients received an industrial diet and the rest of them received infant formula or mixed standard diet. Diet and energy requirements were determined by the dietician according to patient's age, nutritional status and tolerance. In all cases most of the caloric needs were covered by enteral nutrition and the role of oral feeding was only to familiarize with the food. In children with sensory food aversion, sensory integration therapy, play with food and repeated food exposure to widening the range of food acceptance have been also recommended.

In most (6) cases after about 4 months, patients returned to our center for tube weaning under the care

multidisciplinary team (fig. 2). According to medical history after that time the improvement in nutritional status was stated in all patients.

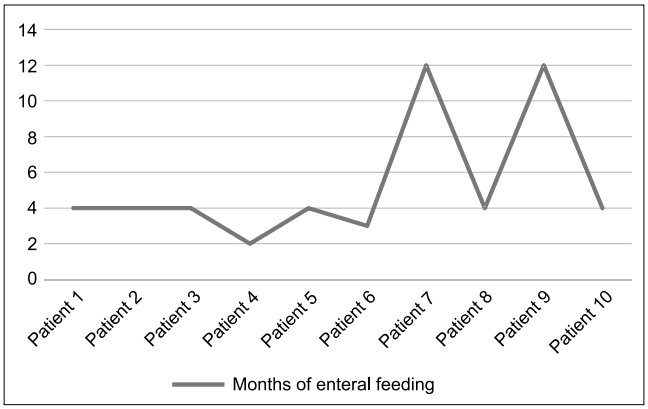

Fig. 2. Length of enteral feeding in each patient proceeding hospitalization

Leading therapy consist on enteral feeding and familiarize with oral feeding at home improved not only the nutritional status but also children's behavior and parent-child relationship. Release the parents from obsessive thinking about the necessity of oral feeding allowed for a positive parent-child relationship during feeding what was found after an interview with parents. During hospitalization the reduction of tube feeding had been supervised and closely monitored by specialists in order to guarantee the basic caloric requirements and hydration of the child. Meals offered orally were matched to the child's age and skills. According to medical documentation in all patients undergoing the tube weaning therapy the loss of weight was observed. In 8 patients, weaning tube was successful during 1 hospitalization. Among these patients withdrawal from nasogastric tube to oral feeding lasted approximately 13 days (range 9-17 days). In the remaining 2 patients complete oral nutrition was obtained during second hospitalization after 11 and 24 months of enteral feeding, respectively. Initial failure of therapy in these patients could be due to the strong food sensory aversion and both unclear medical history (exactly the suspicion of genetic disease) in the first patient and the length of enteral feeding lasted 24 months before the hospitalization in the second child. Based on medical documentation at follow-up after about 1-2 months patients who had successful intervention (8/10) were eating adequately according to age and current needs and in all of them the satisfactory gaining weight was stated. In the remaining 2 patients, these effects were achieved after the second hospitalizations.

DISCUSSION

The analysis was based on the group of patients referred to the Department of Gastroenterology, Hepatology, Eating Disorders and Pediatrics of The Children's Memorial Health Institute. The results should be regarded as a presentation of therapeutic method for treatment of severe behavioral feeding disorders. In previous studies this kind of therapy was discussed among children with congenital malformations, mental retardation and complex early medical history who were fed enterally because of underlying diagnosis. Our experiences are consistent with the outcomes of the study performed by Hartdorff et al. (8) who also shown the success of a short-term oral feeding therapy leaded by multidisciplinary team in tube feeding – dependent children. They studied 22 patients aged 11-26 months who were fed by tube for at least 3 months. All of the them (exept 1) had a complicated medical history (for example cardiological problem, genetic disease, psychomotor retardation). In 18 from 21 children the tube weaning therapy was successful. Among them the different ways to re-introduction of full oral eating were used and in all of children the treatment goal was achieved faster – within 1 week after the start of treatment – than in studied group. Similar results to ours were obtained by Kindermann et al. (9). They followed a multidisciplinary hunger provocation program among 10 children aged 9-21 months with chronic conditions (for example congenital heart disorder, prematurity, esophageal atresia, congenital stenosis of cricoids, genetic disorders) requiring prolonged tube feeding (7 to 19 months). All children except 1 remained in clinically stable condition and started to eat within 1 week. The mean duration of hospitalization was 17 days with the range from 9 to 33 days. In 1 child, the program was discontinued because of excessive weight loss.

In a healthy pediatric population, reduction of energy intake stimulates appetite and induces eating within a few hours. Rapid weaning promotes the experience of hunger, which is imperative to overcome oral feeding aversion. Creating and stimulating hunger is the way to start eating (10). However, therapy can only be successful in hospital condition, where children receive more professional attention by multidisciplinary team. Based on our experience it has beneficial effect on the overall outcome and results in positive changes in parents' confidence, thought, and feeding performance, and a significant increase in a child's oral skills on the contrary.

The limitation of our study is relatively small number of patient group. Nonetheless, according to our knowledge it is the first analysis described both the characteristic of group of children with behavioral feeding disorders who need periodical tube feeding and the experiences in tube weaning in such patients. What is more above results show that multidisciplinary hunger provocation program can be used in both group of children on enteral feeding – with behavioral feeding disorders or with feeding disorders resulting from organic disease that was described in mentioned studies.

CONCLUSIONS

The multidisciplinary hunger provocation program seems to be a promising method to promote discontinuation of tube feeding in young children with behavioral feeding disorders. However, there is a need for randomized controlled trials in a larger group of patients to established the most effective method of weaning tube in both groups – organic and nonorganic feeding disorders.

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