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Case Report

Feeding Therapy in Preterm Infants

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ABSTRACT
Low Birth Weight (LBW) or Very Low Birth Weight (VLBW) infants often have feeding difficulty issues that impact feeding abilities, leading to complications such as difficulty gaining weight and prolonged length of stay (LOS) in the hospital. Early feeding therapy interventions have good outcomes for LBW or VLBW preterm in accelerating feeding goals, gaining weight, and reducing LOS. This article reported two cases of VLBW patients who were referred from the Pediatric Department to the Physical Medicine and Rehabilitation Department because of feeding difficulties that led to prolonged LOS, in order to achieve better outcomes in spontaneous oral feeding. The feeding therapy intervention was given to the infants every day by the speech therapist. Feeding therapy intervention shows promising results in provoking the proper sucking reflex in VLBW preterm infants, which helps them to achieve better oral feeding ability that accelerates weight gain and reduces LOS in the hospital.
Keywords: *Feeding difficulty, feeding therapy, Preterm infant, Sucking reflex, Very low birth weight.*

Introduction

One of the most common problems in pediatric rehabilitation is feeding difficulty which mainly occurs in neonates with low birth weight. The World Health Organization (WHO) defined LBW as a birth of weight fewer than 2500 grams.[1,2] The global prevalence of LBW is 15.5%, which means that about 20.6 million LBW infants are born each year and 96,5% are in developing countries. LBW is further categorized into very low birth weight (VLBW) and extremely low birth weight (ELBW), with a birth weight of fewer than 1500 grams and 1000 grams, respectively.[1,2] Low birth weight is a result of preterm birth (PTB), defined as a short gestation below 37 completed weeks; intrauterine growth restriction (IUGR), also known as fetal growth restriction; or both. Infants born prematurely often have complications.

The lower the birth weight, the greater the risk of complications. Some of the common problems of LBW or VLBW preterm infants include difficulty in staying warm, difficulty of feeding, and difficulty in gaining weight.[1,3,4]

Feeding is the process involving any aspect of eating or drinking, including gathering and preparing food and liquid for intake, sucking or chewing, and swallowing. Swallowing is a complex process during which saliva, liquids, and foods are transported from the mouth into the stomach while keeping the airway protected. The primary goals of feeding and swallowing intervention for children are to support safe and adequate nutrition and hydration, and to determine the optimum feeding methods and techniques to maximize swallowing safety and feeding efficiency. Optimum feeding in LBW or VLBW neonate can accelerate weight gain and hospital discharge.[3-7]

Material & Method (Case Presentations)

The first case was a 32-day-old preterm male neonate who was referred to the Neonatal Intensive Care Unit (NICU) in Wangaya Regional Hospital on July 18th, 2021, with VLBW. His weight was 1200 grams, similar to his birth weight, and he was suffering from respiratory distress syndrome (RDS). The infant was born on June 24th, 2021, with spontaneous labor at 28 weeks of gestational age. This newborn has been hospitalized for 24 days in the previous hospital. His blood culture on July 1st, 2021 showed infection of Klebsiella pneumonia. After being hospitalized in the NICU for five days from July 18th, 2021, until July 22nd, 2021, because of the neonatal septic and RDS. After the condition was resolved, the preterm infant was transferred to the perinatology ward with the weight was increased up to 200 grams. The preterm infant had already been in the perinatology ward for five days but was still having feeding difficulty and using the orogastric tube for nutritional intake, resulting in a lack of intake due to poor sucking and swallowing reflex. On his fifth day in the perinatology ward, the Pediatric Department consulted to the Physical Medicine and Rehabilitation Department on July 26th, 2021, with the diagnosis of a preterm neonate, VLBW, RDS, and neonatal septic, for the difficulty in feeding.

The physical examination revealed that the body weight was 1400 grams, and the correction age was 32 weeks and 4 days. The neonate had a very weak sucking reflex with no rooting reflex. The neonate can only be fed 25cc using an orogastric tube every 3 hours, which was targeted at a minimum of 29cc every 3 hours by the pediatric department. The respiratory rate is normal and the respiratory sound is normal vesicular without rhonchi. The blood test on July 26th, 2021, revealed that the leucocyte count was 13.79 x 10^3 uL in the normal range, hemoglobin was 10.7 g/dL, and the platelet count was 501 x 10^3 uL. This preterm infant was assessed with preterm birth and a feeding disorder. The management of this patient was feeding therapy that had been done by our team, consisting of a physiatrist, speech therapist, and nurse. The feeding therapy for this patient consists of oral motor stimulation, starting to feed the baby from a bottle with proper positioning and handling, light chin support during feeding from the bottle, and adding the baby pacifier as a nonnutritive sucking exercise. The feeding process was done in a dim and quiet environment.

The second case involved a 54-day-old preterm male infant with a history of preterm birth and a birth weight of 1200 grams who

was admitted to Wangaya Regional Hospital for 54 days. This preterm infant was born via spontaneous labor at Wangaya Regional Hospital on September 19th, 2021, at 28 weeks of gestational age with a premature rupture of the membrane. The mother has type 2 diabetes. After the delivery, the preterm infant was admitted to the NICU for 48 days and suffered from sepsis, RDS, mild asphyxia, and neonatal jaundice. After all the conditions were resolved, he was transferred to the perinatology ward on November 6th, 2021. After 6 days in the perinatology ward, on November 12th, 2021, the preterm infant was consulted to the Physical Medicine and Rehabilitation Department with a diagnosis of RDS, VLBW, neonatal septic, and feeding disorder using an orogastric tube for nutritional intake. During his 54 days in the hospital, the infant gained only 50 grams of weight.

The physical examination revealed that the body weight was 1250 grams, and the correction age was 35 weeks and 5 days. The infant had no sucking and no rooting reflex. The infant can only be fed 15cc using an orogastric tube every 4 hours, which was targeted at a minimum of 30 cc every 3 hours by the Pediatric Department. The respiratory rate was normal and the respiratory sound was normal vesicular without rhonchi. When he was transferred from NICU to the perinatology ward on November 6th, 2021, a blood test revealed that his total leucocyte count was 15.89x 10^3 uL on normal range, hemoglobin was 13.6 g/dL, platelet count was 521x10^3 uL. This infant was assessed with a preterm birth, VLBW, and feeding disorder.

Our team, which includes a physiatrist, a speech therapist, and a nurse, had been providing this patient with daily feeding therapy as part of his management. In addition to oral motor stimulation, the major feeding therapy for this patient was the addition of a baby pacifier as a nonnutritive sucking exercise, all of which were carried out in a calm, low-light setting. The infant's weight was just 1250 grams and we have decided to add the light chin support to maintain proper position and prevent getting tired early during feeding. The infant's parents were also educated earlier about how to do the oral motor stimulation with the intention of helping provoke the sucking and rooting reflex because their infant had no sucking and rooting reflex.

Result

After 15 days of feeding therapy, the first infant can feed orally on his own and the orogastric tube can be removed. On July 28th, 2021, the infant received a blood transfusion due to anemia. After 5 days of therapy on July 31st, 2021, the infant was showing some sucking and rooting reflexes. Therefore, we decided to try to feed him per oral with a target of 35cc every 3 hours, and we found that he could only feed 33cc per oral with the rest using the orogastric tube, his weight increased to 1500 grams. After 10 days of therapy, the infant can be fed 25cc every 2 hours via an orogastric tube. After 15 days of therapy on August 10th, 2021, the infant showed a good sucking reflex and a rooting reflex. We decided to remove the orogastric tube and he can be fed 30cc every 2 hours. Three days later, on August 13th, 2021, the patient was discharged from the hospital with a weight of 1800 grams.

After 6 days of therapy, the second infant showed good sucking and rooting reflexes. We decided to try oral feeding and preserve his orogastric tube with a target of 30cc every 3 hours. However, as he received a blood transfusion due to anemia, we had to postpone the oral feeding after the transfusion. After 10 days of therapy on November 22nd, 2021, he can received 35cc per oral. On his 12 days of therapy, November 24th, 2021, he was able to be fed up to 40cc every 3 hours per oral and we removed his orogastric tube. His weight increased from 1250 to 1800 grams. Five days after starting oral feeding on November 29th, 2021, the patient was discharged from the hospital with a weight of 1900 grams. Both infants had no complications during the therapy, such as a distended abdomen or aspiration pneumonia.

Discussion

Many preterm infants have significant difficulty feeding by mouth in the weeks following birth, particularly those who were born at a lower gestational age.[3-5,8,11] Feeding disorder are one of the most

common problems that occur concomitantly with preterm birth and LBW or VLBW newborn infants.[9-11] The contributing factors identified in the literature include immature or dysfunctional sucking skills, resulting in the difficulty of coordinating the sucking-swallowing-breathing rhythm that is essential for successful feeding. Preterm infants also easily get tired while feeding, are unable to properly suck the nipple or pacifier, have poor jaw closure due to difficulty in maintaining postural tone, and experience choking and vomiting.[7-11] The newborn infants that have VLBW with low gestational age further have difficulty gaining weight due to feeding disorders that decrease their nutritional intake. There are some guidelines to improve feeding in preterm babies, which consist of a pleasant environment, positioning and handling, nonnutritive sucking, oral motor stimulation, and preventing the infant from getting stress and exhaustion.[8-12] Feeding therapy was designed to increase food intake to meet caloric intake. In this cases, the feeding therapy consists of oral motor stimulation intervention, proper positioning, and handling while feeding, adding a baby pacifier as nonnutritive sucking exercise, and providing an adequate environment for feeding.[6-10,12]

The oral motor stimulations deal with the movement of the jaw, tongue, lips, teeth, and cheeks. Oral motor exercises include massage and tapping around the mouth; finger checking; or using a face vibrator; lip roll; ıip curl or lip stretch; gum massage; stimulating the lateral borders of the tongue and checking by finger or spatula; stimulating the mid blade of tongue and palate by finger or spatula; eliciting a suck by finger or pacifier to improve the mobility; awareness of placement; coordination; and strengthening of the oral muscles and structures (table 1).[12]

8 Steps	Technique	Frequency	Duration
Check C-Stretch	1. Place a finger inside the cheek, and one on the outer cheek. Slide and stretch front to back (toward the ear), then down, then back to front (C pattern). 2. Repeat for other side.	2x each cheek	30 seconds
Lip Roll	1. Place a finger on the inside and thumb on outside of upper lip. 2. Move finger in horizontal direction while moving thumb in opposite direction (rolling lip between fingers). 3. Do on the left side of lip, then repeat on the right side. 4. Repeat on lower lip.	1x each lip	30 seconds
Lip Curl or Lip Stretch	1. Place a finger outside the upper lip, and one on the inside. 2. Gently compress lip, and stretch downward towards midline, moving across lips. 3. Repeat on the lower lip, stretching upward. If the lips are too small to grab for Lip Curl, replace with Lip Stretch 1. Lay finger across upper lip, slightly compressing tissue. 2. Move tissue horizontally, stretching to one side, then the other side. 3. Repeat for bottom lip.	1x each lip	30 seconds
Gum Message	1. Place finger on left side of the upper gum, with firm sustained pressure slowly move across the gum to the other side. 2. Move down the lower gum (to continue a circle), with firm sustained pressure slowly move across to other side.	2x	30 seconds
Lateral Border of Tongue/ Cheeks	1. Place finger at the level of the molar between the side blade of the tongue and the lower gum. 2. Move the finger toward midline, pushing the tongue towards the midline. 3. Then move the finger back and all the way into the cheek, stretching it.	1x each side	15 seconds
Mid blade of Tongue/ Palate	1. Place finger at the center of the mouth, give sustained pressure into the hard palate for 3 seconds. 2. Move the finger down to contact center blade of the tongue. 3. Displace the tongue downward with a firm pressure. 4. Move the finger back up to the center of the hard palate.	2x	30 seconds
Elicit a Suck	1. Place finger at the midline, center of the palate, gently stroke the palate to elicit a suck.	1x	15 seconds
Support for Non-Nutritive Sucking	1. Leave finger or place a pacifier in the mouth and allow sucking.	1x	2 minutes

Table 1. Steps of the Oral Motor Stimulation.[12]

It is used to alter the oral tone, such as the cheeks, tongue, and lips, as well as face and neck muscles. Proper positioning for feeding was done by flexing the hip and knee joints, and covering them with a blanket to prevent unnecessary movement during feeding, much like their physiological position in the uterus. It will help the infants to reduce force or body movement to prevent fatigue and give a more comfortable position to the infants that resulting in an improved amount of the intake.[6-10] Light chin support while feeding by the bottle was done by placing the index or middle finger to support the mandible to help mouth closure, which can prevent fatigue (image 1).[8-12]

Image 1. The light chin support during feeding therapy for preterm neonate.[8]

Both infants in these two cases have a nearly identical gestational age (28 weeks), a similar birth weight of 1200 grams, and are classified as preterm neonates with VLBW. The contributing factors that affected the duration time of shifting from parenteral intake to oral intake in these cases are the gestational age of the infants, infection following birth (neonatal septic) and RDS.[8,11] They also take time gaining weight before starting feeding therapy, compared with after the therapy starts, in which the infants need 12-15 days to get the independent oral feeding. The second infant got a light chin support to prevent early fatigue during oral feeding, so it makes the infant only need 12 days of therapy. The response may vary between patients based on their concomitant health problems.[11,12] During the days of therapy, we also educate the parents about the importance of continuing the oral motor stimulations and how to do the oral motor stimulations at home.

Conclusion

Feeding therapy promises good results in achieving independent oral feeding in preterm infants, decreasing the length of stay and decreasing the length of time to achieve full oral feeding. Furthermore, the feeding therapy shows a good result in accelerating weight gain. Further studies related to the efficacy of feeding therapy in preterm infants and effective intervention strategies are needed.

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Conflict of Interest

The author declares there is no conflict of interest regarding the publication of the current report.

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Author Contribution

All of the authors equally contributed to the report, from the data gathering, physical examination, supporting investigation, and reporting the results of the case.

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