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Using Volume-Based Tube Feeding to Increase Nutrient Delivery in Patients on a Rehabilitation Unit

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Abstract

Purpose: The purpose of this study was to determine whether volume-based tube feeding (VBTF) increased nutrient delivery to patients in a rehabilitation unit.

Design: A cohort study with a prospective group and a historical control group was used as the study design.

Methods: The intervention was VBTF, a change from the standard hourly rate-based enteral nutrition. Data were collected on 70 rehabilitation patients. Data on the control group ($n = 35$) were collected through retrospective chart review of rate-based tube-fed patients. Data on the VBTF intervention group ($n = 35$) were collected prospectively after implementation of VBTF in the inpatient medical rehabilitation unit at University of Utah Health.

Findings: The results showed patients in the VBTF group received 82% of their prescribed feed whereas rate-based patients received 70%.

Clinical Relevance: VBTF appears to increase the amount of nutrition inpatient medical rehabilitation patients receive, which may help with the intensive therapy sessions these patients must undergo.

Keywords: Enteral nutrition; rehabilitation.

Introduction

Nutrition support is an essential component in the recovery of rehabilitation patients. If a patient is unable to eat orally and the gut is functional, the use of enteral nutrition (EN) support is preferred (Nelms & Sucher, 2015). The gastrointestinal tract runs from the mouth to the anus and is responsible for the breakdown and absorption of food. In a healthy individual, digestion of food begins in the mouth and continues into the intestines. In the case of a tube-fed patient, the digestive process starts in the stomach or the jejunum, depending on where the tube is placed. For these patients, postpyloric feeding is sometimes preferred due to delayed stomach emptying or gastric outlet obstruction (Nelms & Sucher, 2015). Nasointestinal feeds also minimize the possibility of aspiration (Doley & Phillips, 2017).

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Cite this article as:
Kinikin, J., Phillipp, R., & Altamirano, C. (2020). Using volume-based tube feeding to increase nutrient delivery in patients on a rehabilitation unit. *Rehabilitation Nursing, 45*(4), 186–194. doi: 10.1097/rnj.0000000000000211

Recent research has shown that most critical care patients do not usually receive their calculated nutrition requirements and may suffer from malnutrition and/or underfeeding during their hospitalization (Binnekade, Tepaske, Bruynzeel, Mathus-Vliegen, & de Hann, 2005; Friesecke, Schwabe, Stecher, & Abel, 2014; Haskins et al., 2017; Stewart, 2014a; Wilson et al., 2016). Underfeeding may result in longer hospital stays, more complications, and greater mortality (James et al., 2005). In 2016, the American Society for Parenteral and Enteral Nutrition (ASPEN) and the Society of Critical Care Medicine offered "Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient" (McClave et al., 2015). These guidelines recommend that EN be initiated within 24–48 hours if a patient is unable "to maintain volitional intake" (McClave et al., 2015, p. 105). According to the *ASPEN Adult Nutrition Support Core Curriculum*, EN is indicated for patients with impaired swallowing ability, including those who have experienced strokes and other neurological disorders (Doley & Phillips, 2017). These types of conditions are commonly seen in rehabilitation patients.

According to the chapter "Neurologic Impairment" in the *ASPEN Adult Nutrition Support Curriculum*, nutrition support therapies provided during the acute rehabilitation phase of injury are "equally important" as the initial therapies provided in the intensive care unit (Woodward, Ruf,

& Kolpek, 2017, p. 437). In fact, many rehabilitation patients were formerly critical care patients, and as such, these patients may experience eating limitations due to "dysphagia, cognitive impairment, limited mobility and movement" (James et al., 2005, p. S82). EN provides rehabilitation patients with adequate nutrition and the energy necessary to undertake intensive therapy sessions required for recovery (James et al., 2005). Therefore, if a rehabilitation patient is unable to eat orally, EN should be initiated to prevent nutritional decline.

Enteral nutrition may be administered by a continuous, intermittent, or bolus method. The feeding modality may change as the patient transitions across the continuum of care (Doley & Phillips, 2017). Patients on EN are usually fed using an hourly rate calculated to meet their total daily caloric needs. These needs are based on body weight and height, food/nutrient intake, health history and clinical diagnoses, dietary history and preferences, and presence or absence of muscle wasting and body fat stores (Lehman, 2015). Most patients receive only about 60% of their energy and protein needs due to both scheduled and unscheduled interruptions (Stewart, 2014a). EN may be disrupted for a variety of reasons, including procedures, positioning, technical issues with feeding accesses, and/or gastric intolerance (Stewart, 2014a).

To increase the likelihood of reaching calculated caloric intake for critical care patients, volume-based tube feeding (VBTF) has been proposed. With VBTF, feeding rates are recalculated by nursing staff and adjusted throughout the day to meet patients' daily nutrition goals. Currently, most enteral feeds are calculated using hourly rates (i.e., 70 ml/hour) to be delivered over a specified period of time, often 20–24 hours, or as bolus volumes, which are written for a set milliliter amount of formula to be given at specific times (Doley & Phillips, 2017). VBTF over bolus tube feedings was chosen for the study intervention because boluses may be missed while patients are receiving therapy or are absent for other procedures. Bolus feeding orders provide no flexibility to give the feeding at another time. Alternatively, VBTF provides nurses and other medical staff with patients' total daily volumes, and when feedings are interrupted, they are restarted using a greater rate or more concentrated formula to make up for the caloric loss experienced during the stoppage (Friesecke et al., 2014; McClave et al., 2015).

VBTF is an uncommon practice, and research describing the use of VBTF has only been found in the critical care literature. One of the first studies describing the use of VBTF in intensive care units was a multicenter study in Canada using the Enhanced Protein-Energy Provision via the Enteral Route Feeding Protocol (PEP uP protocol) (Heyland, Dhaliwal, Lemieux, Wang, & Day, 2015). In this study, a volume-based feeding rate was calculated, and feeds were given as necessary to meet the 24-hour volume goal. The patients on VBTF at the PEP uP protocol sites received significantly greater amounts of protein and calories than those at the control sites (Heyland et al., 2015). A single-site study found that volume-based feeding in the critically ill patient is safe, leads to increased caloric intake, and may improve patient outcomes (McClave et al., 2015).

To date, there are no studies on the use of VBTF in rehabilitation patients, but further research is warranted. Nutrition support is critical for these individuals as rehabilitation patients have increased energy needs (James et al., 2005). Enteral nutrition has been recommended as an important intervention in the rehabilitation of stroke (James et al., 2005) and traumatic brain injury (TBI) patients (Horn et al., 2015). Malnourishment in stroke patients may result in reduced energy, stamina, strength, and mental focus, which may lead to poorer outcomes (James et al., 2005).

The current study analyzed caloric intake of rate-based versus volume-based tube-fed patients in an inpatient medical rehabilitation (IMR) unit setting to determine whether VBTF increased caloric intake, and if so, whether the increased caloric intake resulted in improved nutrition-related outcomes including reduced length of stays and fewer readmissions for rehabilitation patients.

Methods

Study Design

A cohort study with a prospective group and a historical control group was used as the study design. The intervention was VBTF, a change from hourly rate-based EN, which is more commonly used in hospitalized patients. Data were identified through retrospective chart review of rate-based tube-fed patients and information collected prospectively after implementation of VBTF were compared to determine whether the implementation of VBTF in the IMR unit at the University of Utah Health resulted in increased calorie intake. In addition, the study compared preintervention and postintervention patients' length of stays and readmission rates to ascertain whether increased caloric intake improved these outcomes.

Ethics

The proposed study design was submitted to the University of Utah Institutional Review Board and deemed exempt (IRB 00099667).

Sample

Thirty-five patients over the age of 18 years sequentially admitted to the University of Utah Health IMR unit from September 1, 2017, through January 1, 2018, who required

EN support were included in the prospective data set. For the retrospective data, information on 35 patients admitted to the rehabilitation unit between August 1, 2016, through January 1, 2017, who required EN during their stay were sequentially pulled from the University of Utah Health Enterprise Data Warehouse. The total number of patients included in the study was 70. Patients who were less than 18 years of age and those who did not require EN were excluded. The study was a quality improvement project, and 35 patients from each group were deemed an acceptable number to provide enough information to learn about the effectiveness of the change.

Intervention

The nursing staff was primarily responsible for the implementation of VBTF in the prospective study population. To assist the nursing staff in making the change from rate-based tube feeding (RBTF) to VBTF, training was provided on the protocol through in-services, staff meetings, and one-on-one follow-up meetings. In roundtable discussions with clinical providers regarding setting parameters for the study, 150 mL/hour was chosen as the maximum infusion rate. The selection of this rate was based on the PEP uP study (Heyland et al., 2010). In addition, an article by McClave et al. (2015) suggested that this amount could be safely fed into the small intestine. VBTF orders were written as milliliters to be infused daily. In general, patients on the IMR unit are fed enterally after having received a J-tube placement on a previous hospital unit. VBTF versus straight bolus feeding was selected as the intervention to give the nursing staff the autonomy to make up for the time patients were disconnected from their feeding tubes. The use of VBTF in this study did not exclude bolus feedings, but the rate of formula and flush was limited to 150 ml/hour because of the prevalence of jejunal feeding. Checking gastric residual volumes is not common practice on this unit, and therefore, this information was not included in data collection. In the spectrum of order writing for EN, VBTF is written as total milliliters to be provided daily, and the amount could be given as either an hourly rate not to exceed 150 ml/hour or as a bolus if the patient had a gastrostomy tube placement.

To assist the nurses in executing VBTF, a written protocol (see Figure 1) and a volume-based feeding schedule (see Figure 2) were located at each nurses' station. Patients on EN in the prospective group received the tube feeding formula they were prescribed on a prior unit, or if they were admitted from a location outside the University of Utah Health, they received the University Health's formulary equivalent. The IMR dietitian determined patients' target volumes, and the VBTF order was written by the resident or physician on duty. The majority of tube-fed patients on this unit are admitted after having jejunal enteral feeding tolerance established on a previous hospital unit. The IMR unit nursing staff then determined the hourly rate to be administered based on the volume tube feed order. If the patient was disconnected from the tube feed, when the patient was reconnected, nursing staff recalculated the rate based on the amount already given and the remaining amount required and adjusted the rate to make up for the time lost. All patients on EN were checked for feeding tolerance. If a patient was distressed, such as experiencing nausea or fullness, the rate was reduced. If the patient continued to experience intolerance after the rate reduction, the dietitian was contacted to assess the formula recommendation.

Data Collection and Statistical Analysis

Data about admission diagnosis, volume received, length of stay, and 30-day readmission rates were recorded for the patients in the control group using retrospective chart analysis and prospectively for patients on EN entering the rehabilitation unit. No data on gastrointestinal (GI) reflux were collected, as the protocol clearly stated that "[i]f patient is distressed (nausea, fullness, etc.), reduce rate" and "if intolerance persists, contact dietitian to assess formula recommendation" (see Figure 1). The same dietitian calculated needs for both the prospective and retrospective study periods.

Data were analyzed using a combination of descriptive and analytical techniques. The primary analysis was proportion of recommended caloric intake preimplementation versus postimplementation of VBTF per length of stay for each patient. This percentage was calculated by dividing the total amount of EN received by the total prescribed at admission to the rehabilitation unit (Stewart, 2014b). An independent *t* test was used to determine if the proportion of recommended volume differed significantly between the two groups. A secondary analysis using linear regression was done to determine if increased caloric intake impacted the length of stays and/or readmission rates while controlling for gender and admit diagnosis. Data were analyzed using the Statistical Package for the Social Sciences (SPSS, Version 24, 2016).

Results

Three outliers were removed before statistical analysis was performed. These outliers were flagged after a careful review of patient data using boxplots and an analysis for skewness. No significant demographic differences were found between the retrospective and prospective cohorts (see Table 1). The retrospective group received 66.48% ± 23.98% of their prescribed tube feeding, whereas the prospective group received 80.92% ± 13.53% (see Table 2). The *t* test comparing the mean percentage

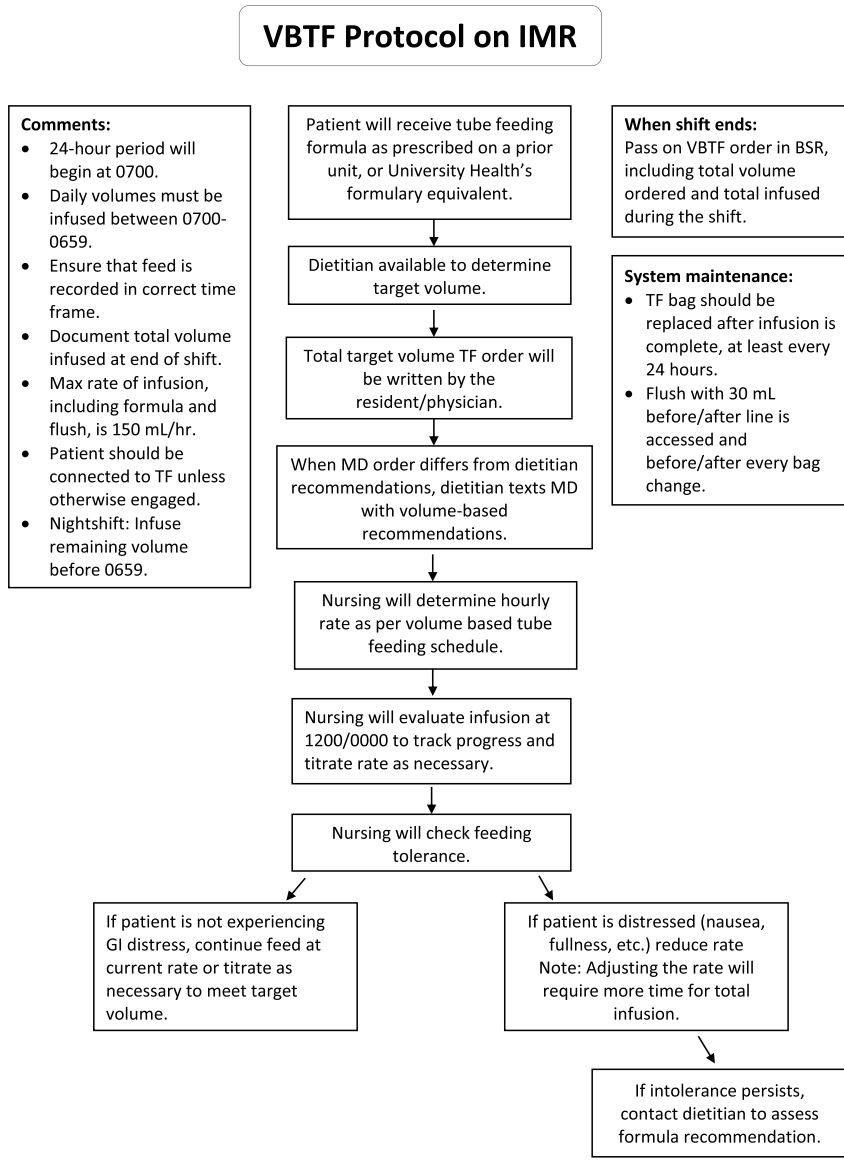

Figure 1. VBTF Protocol on IMR.

difference in percentage caloric intake between the retrospective and prospective groups showed that there was a significant difference (p = .004) between the means of the RBTF and VBTF groups. No significant differences were found between the length of stays (p = .820) and readmission rates between the two groups (p = .787). The average length of stay for the VBTF group was 22.6, whereas the average length of stay for the RBTF cohort was 21.7. The readmission rates for the two groups were also similar with the prospective group having six readmissions and the retrospective group having five.

Discussion

In searching the literature, no studies on the use of VBTF in a rehabilitation setting were found. Giving nurses the ability to adjust feeding rates using VBTF appears to increase the amount of nutrition IMR patients receive. This increase provides the energy and protein needed for the intensive therapy sessions these patients must undergo. Length of stays and readmission rates were similar between both groups. The nonsignificant differences in length of stays and readmission rates between the VBTF and RBTF cohorts may have been due to the small sample size or because both groups received adequate nutrition during their rehabilitation stays. In addition, many patients in the study were able to advance to oral intake prior to discharge, which may have decreased readmits secondary to tube feeding complications.

Limitations

The time frame from which patients in the retrospective and prospective groups in this study were chosen was quite

Volume Based Feeding Calculations

1. Calculate the feeding goal for the volume based enteral feeding for a 24 hour period (i.e 6 am to 6 am each day) using indirect calorimetry (IC), a published predictive equation or simplistic weight-based equation (25-30 kcal/kg/d).

2. Read the chart on the back corresponding to the 24 hour feeding goal for the patient. For example, if the total volume over a 24 hour period was 1200 mL, the first column will give the hourly feeding rate for the patient (in this instance 50 ml/hr)

3. Example calculation after feeding is held: if the patient was already fed 300 mL (over a 6 hr period at the rate of 50 mL/hr) and the patient is on 'hold' for 4 hours, calculate the following:

   (a) New Feeding Goal = Volume still remaining to reach the feeding goal

   = Total Goal Volume – Already fed Volume

   = 1200 – 300 = 900 mL (Round the volume, if needed, to the closest 50 mL)

   (b) Time remaining to reach goal = 24 – Time Fed – Hold Time

   = 24 – 6 – 4 = 14 hrs

4. Review the chart again with the New Feeding Goal and the corresponding time remaining as follows:

   For 900 mL, go to column 14 (the number of hours remaining to attain goal) to get the new hourly feeding rate. In this instance, the new feeding rate is 64 mL/hr*. The patient will receive 896 mL in 14 hours.

Important Nursing Assessment

Volume based feeding should be used with caution. Nurses should always assess for feeding intolerance.

Examples of intolerance include: abdominal distention, abdominal cramping, nausea, vomiting, diarrhea defined as 5 stools or 750 mL per 24 hour period, and gastric residuals greater than 500 mL**.

Please contact your ICU dietitian if you have any questions.

* Hourly rate not to exceed 150 mL/hr

** Sites may customize the gastric residual volume threshold in keeping with their current practice and best available evidence which supports a gastric residual volume ≤ 500 mL. McClave SA, et al. *JPEN J Parenter Enteral Nutr.* 2016;40(2):159-211.

Please note: The following is not intended as a substitute for medical advice.

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Figure 2. Volume Based Feeding Calculations. Reprinted with permission from Abbott Laboratories. Copyright Abbott Laboratories, Abbott Park, IL. All permission requests for this image should be made to the copyright holder.

Volume Based Feeding Schedule

Goal total mL formula per 24 hours	Hours remaining in the day to feed 24 hour volume																							
	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
2400	100	104	109	114	120	126	133	141	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
2350	98	102	107	112	118	124	131	138	147	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
2300	96	100	105	110	115	121	128	135	144	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
2250	94	98	102	107	113	118	125	132	141	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
2200	92	96	100	105	110	116	122	129	138	147	150	150	150	150	150	150	150	150	150	150	150	150	150	150
2150	90	93	98	102	108	113	119	126	134	143	150	150	150	150	150	150	150	150	150	150	150	150	150	150
2100	88	91	95	100	105	111	117	124	131	140	150	150	150	150	150	150	150	150	150	150	150	150	150	150
2050	85	89	93	98	103	108	114	121	128	137	146	150	150	150	150	150	150	150	150	150	150	150	150	150
2000	83	87	91	95	100	105	111	118	125	133	143	150	150	150	150	150	150	150	150	150	150	150	150	150
1950	81	85	89	93	98	103	108	115	122	130	139	150	150	150	150	150	150	150	150	150	150	150	150	150
1900	79	83	86	90	95	100	106	112	119	127	136	146	150	150	150	150	150	150	150	150	150	150	150	150
1850	77	80	84	88	93	97	103	109	116	123	132	142	150	150	150	150	150	150	150	150	150	150	150	150
1800	75	78	82	86	90	95	100	106	113	120	129	138	150	150	150	150	150	150	150	150	150	150	150	150
1750	73	76	80	83	88	92	97	103	109	117	125	135	146	150	150	150	150	150	150	150	150	150	150	150
1700	71	74	77	81	85	89	94	100	106	113	121	131	142	150	150	150	150	150	150	150	150	150	150	150
1650	69	72	75	79	83	87	92	97	103	110	118	127	138	150	150	150	150	150	150	150	150	150	150	150
1600	67	70	73	76	80	84	89	94	100	107	114	123	133	145	150	150	150	150	150	150	150	150	150	150
1550	65	67	70	74	78	82	86	91	97	103	111	119	129	141	150	150	150	150	150	150	150	150	150	150
1500	63	65	68	71	75	79	83	88	94	100	107	115	125	136	150	150	150	150	150	150	150	150	150	150
1450	60	63	66	69	73	76	81	85	91	97	104	112	121	132	145	150	150	150	150	150	150	150	150	150
1400	58	61	64	67	70	74	78	82	88	93	100	108	117	127	140	150	150	150	150	150	150	150	150	150
1350	56	59	61	64	68	71	75	79	84	90	96	104	113	123	135	150	150	150	150	150	150	150	150	150
1300	54	57	59	62	65	68	72	76	81	87	93	100	108	118	130	144	150	150	150	150	150	150	150	150
1250	52	54	57	60	63	66	69	74	78	83	89	96	104	114	125	139	150	150	150	150	150	150	150	150
1200	50	52	55	57	60	63	67	71	75	80	86	92	100	109	120	133	150	150	150	150	150	150	150	150
1150	48	50	52	55	58	61	64	68	72	77	82	88	96	105	115	128	144	150	150	150	150	150	150	150
1100	46	48	50	52	55	58	61	65	69	73	79	85	92	100	110	122	138	150	150	150	150	150	150	150
1050	44	46	48	50	53	55	58	62	66	70	75	81	88	95	105	117	131	150	150	150	150	150	150	150
1000	42	43	45	48	50	53	56	59	63	67	71	77	83	91	100	111	125	143	150	150	150	150	150	150
950	40	41	43	45	48	50	53	56	59	63	68	73	79	86	95	106	119	136	150	150	150	150	150	150
900	38	39	41	43	45	47	50	53	56	60	64	69	75	82	90	100	113	129	150	150	150	150	150	150
850	35	37	39	40	43	45	47	50	53	57	61	65	71	77	85	94	106	121	142	150	150	150	150	150
800	33	35	36	38	40	42	44	47	50	53	57	62	67	73	80	89	100	114	133	150	150	150	150	150
750	31	33	34	36	38	39	42	44	47	50	54	58	63	68	75	83	94	107	125	150	150	150	150	150
700	29	30	32	33	35	37	39	41	44	47	50	54	58	64	70	78	88	100	117	140	150	150	150	150
650	27	28	30	31	33	34	36	38	41	43	46	50	54	59	65	72	81	93	108	130	150	150	150	150
600	25	26	27	29	30	32	33	35	38	40	43	46	50	55	60	67	75	86	100	120	150	150	150	150
550	23	24	25	26	28	29	31	32	34	37	39	42	46	50	55	61	69	79	92	110	138	150	150	150
500	21	22	23	24	25	26	28	29	31	33	36	38	42	45	50	56	63	71	83	100	125	150	150	150

Please note: The following is used as part of a volume-based feeding protocol. For additional information see volume-based feeding protocols FEEDME and/or PEPuP. The following is not intended as a substitute for medical advice.

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Figure 2. Volume Based Feeding Calculations, continued.

Table 1 Patient demographics

	RBTF (n = 33)	VBTF (n = 34)	Two sample t test
	n	n	p
Average length of stay	21.7 ± 16.5	22.6 ± 14.2	.820
Average days on tube feeding	15.4 ± 10.1	14.6 ± 12.5	.756
Gender			.273
Male	21	16	
Female	14	19	
Admission diagnosis			
Brain injury	6	5	
Critical illness myopathy	10	6	
Encephalopathy	3	4	
Spinal cord injury	2	3	
Stroke	9	15	
Other	5	2	

Note. Significance set at $p < .05$.

different. The groups were selected a year apart, and factors, such as staffing or procedures, may have changed, possibly biasing the study results. This study also depended heavily on the nurses correctly administering and documenting the amount of nutrition received by each patient on VBTF (Morphet, Clarke, & Bloomer, 2016). Although staff training was completed to avoid errors, it is possible the amount of formula a patient received may have been administered or recorded incorrectly, resulting in measurement bias. Finally, if there were more patients who were sicker in either the historical or prospective group, the results may have been skewed. These patients may have experienced more gastrointestinal distress or required more tests and/or procedures resulting in their being disconnected from their feeding tubes for longer periods. These sicker patients may have had reduced calorie intake and possibly poorer outcomes, which may have potentially affected the study results. Although this may be a possibility, an analysis of the demographic data in Table 1 shows that patients in both the retrospective and prospective groups had a similar distribution of disease severity. Finally, no information on the number of patients who may have experienced GI reflux was collected.

Implications

Rehabilitation patients participate in many activities throughout the day, that are designed to facilitate their independence once they leave the facility. At a minimum, these patients are required to undergo at least 3 hours of therapy per day in the areas of physical therapy, occupational therapy, speech therapy, recreational therapy, specialized skill training, and rehabilitation psychology sessions. In addition, showers are taken in a different location, not in patients' rooms, and for some patients, bowel care may take a significant amount of time. Rehabilitation patients may also have to leave the unit for additional tests, such as swallow studies. All of these "interruptions" reduce the amount of time a patient is connected to EN, which may limit the volume received if on traditional RBTF.

The protocol for VBTF in this study has only been in place in the IMR since October 2017. Lichtenberg, Guay-Berry, Pipitone, Bondy, & Rotello, (2010) noted that a new protocol can take up to 2 or 3 years to fully implement. Although the protocol is located at each nursing station, some nurses may be unaware that this document exists. This possible lack of awareness of the VBTF protocol is compounded by the fact that the hospital in which this study was conducted is a teaching hospital, which means there is continual turnover of doctors and nurses. For this reason, education about what VBTF is and how to implement it must be ongoing. Although most doctors, nurses, and new residents are familiar with RBTF, they may be unacquainted with the concept of VBTF and how it is administered. For these reasons, it would be beneficial to conduct a similar retrospective/prospective cohort study after the protocol has been in place for at least 2 years.

Finally, the use of VBTF gives nurses more autonomy and control in overseeing their patients' nutritional needs. For nurses, VBTF allows them to function at the top of their licensure using the full extent of their education and training.

Conclusion

The purpose of this study was to demonstrate whether or not a change to VBTF would be beneficial in helping patients reach their prescribed caloric needs. This study found that a small cohort of rehabilitation patients on VBTF received more nutrition than patients on RBTF. The VBTF group received 82% of their prescribed feed, whereas rate-based patients received 70%. Because rehabilitation patients participate in a variety of activities throughout the day, adequate energy is needed. A switch to VBTF may be beneficial in helping these patients reach their prescribed caloric goals. The applicability of our study results

Table 2 Two-sample t test for the percentage of recommended tube feeding received

	RBTF	VBTF	Mean difference	
	%	%	%	p
Average percentage of tube feeding recommendation received	66.5 ± 24.0	80.9 ± 13.5	14.4	.004*

*$p < .05$.

Key Practice Points

- Volume-based tube fed patients receive significantly more (p=0.004) of their prescribed tube feeding than rate-based tube fed patients.
- Patients in rehabilitation units undergo at least 3 hours of therapy each day and increased caloric intake is important in meeting their energy needs.
- Nurses are a critical component in the implementation of a volume-based tube feed protocol.
- More research on the use of volume-based tube feeding in rehabilitation units is needed.

is limited due to the small number of patients. However, more research on the use of VBTF in rehabilitation units should be undertaken, as many patients in this setting may already be malnourished, especially those who have suffered a stroke (James et al., 2005). Further research should be conducted with a larger cohort of IMR patients, and additional demographic data (gender, age, weight, body mass index, and admission diagnosis) and outcome data (pressure injury, length of stay, discharge disposition, readmission rates, and tube feeding as sole source of nutrition) should be collected. An increased sample size will provide the power needed to determine what effect increased nutrition may have on important patient outcomes.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgments

The authors would like to acknowledge Julie Metos for serving as faculty advisor for this study, Caran Graves for completing the institutional review board for the project, John Speed for providing physician oversight, and Alissa Brown and Carissa Christensen for supporting the project and helping edit the final manuscript.

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The authors and planners have disclosed that they have no financial relationships related to this article.

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