

Enteral Feeding Protocol to Improvement Functional Outcome in Stroke Patient

Entisar .G. Shabaan¹, Ahmad .M. Abdelwarith², Thanaa .M. Diab³

(1&3) Department of Medical and Surgical Nursing, Faculty of nursing, Aswan University, Egypt.

(2) Neurology department, Faculty of Medicine, Aswan University, Egypt.

Abstract

Background: dysphagia and other swallowing difficulties in stroke patients may lead to malnutrition which will reflect on health status and clinical outcomes including disability, and mortality, especially patients admitted to stroke unit. **Aim:** determine the effects of enteral feeding protocol as a role to improvement nutritional status in patients with recent stroke and its impact on anthropometric measurements, complications, and functional outcomes. **Setting and Subjects:** A total of 75 adult patients (26 male and 49 female) and 35 controls admitted to stroke unit and neurology department at Aswan university hospital. **Study Design:** A quasi-experimental research design was utilized in this study. **Tools of data collection:** tool I Nutritional status assessment tool and Protocol for the enteral nutrition support in stroke patient, MRS (Modified Rankin scale) and NIHSS (National Institute Health Stroke Scale). **Results:** Marked improvement with highly significant difference ($P<0.001$) comparing follow-up with baseline and control group in all symptoms (nausea, vomiting, esophageal reflux and malabsorption). Also significant difference ($P<0.001$) between groups such as improvement of daily energy and protein intake, weight, BMI, Hemoglobin (Hb), Platelets, lubricating lips and replace tape with follow-up between all groups. MRS and NIHSS significantly improved on follow up. **Conclusion:** The application of the enteral feeding protocols may result in low incidence of malnutrition, gastrointestinal complications and enhance improvement in patients with recent stroke. **Recommendations:** Protocol for enteral nutrition in patients with acute stroke and disturbed level of consciousness to improve functional outcome in those patients and shortens hospital stay.

Keywords: Enteral feeding, Nutritional status, stroke.

E-mail: Entisar.gaad@yahoo.com

Introduction

Stroke is the most common leading cause of serious long-term disability and the fifth leading cause of death worldwide. World Health Organization (WHO) predicts that, by the end of 2020, stroke will be the second cause of death after ischemic heart disease in developing and developed countries. Intracerebral hemorrhage account in 10% of cases, whereas 87% are ischemic strokes (Benjamin, Blaha, & Chiuve, 2017).

As many neurological diseases followed by a disturbance of nutritional intake, stroke is commonly associated with malnutrition. Malnutrition in stroke patients is under-recognized and undertreated; its prevalence on admission is estimated to be around 20% (Sabbouh & Torbey, 2018). Many Factors lead to inadequate nutrition include: nature of

the disease, delayed starting of EN, gastrointestinal complications, incomplete delivery of required nutrition, disturbed consciousness, some of these factors can be improved with enteral feeding protocols (American Heart Association, 2019).

Outcomes that focuses on eliminating or reducing the severity of stroke-related deficits, and improving functional status at 60 days, with Frequent assessment of neurological status, nutritional state, blood sugar, swallowing impairment and identify early stroke complications is the key to success in the care of stroke patients (AHA, 2019).

Recovery of neurocognitive function in individuals with ischemic stroke may indeed be enhanced by nutrition interventions. This is particularly important because, lack of drugs that acting on damaged brain structures in clinical practice. Also, 80% of the recovery of

neurological impairment occurs within the first 30 days after acute ischemia (Yaghi, Willey, & Cucchiara, 2017), which suggests that every effort should be made to obtain the best functional outcomes during this period of rehabilitation (Aquilani, Scocchi, & Iadarola, 2008). Meanwhile tyrosine, the amino acid precursor of brain adrenergic neurotransmitters (epinephrine, norepinephrine, and dopamine) was found to be reduced plasma of patients with acute stroke (Aquilani, Verri, & Iadarola, 2004).

Limiting the brain metabolic alterations following stroke by supporting the nutrition status would improve functional outcome in those patients. Swallowing difficulties and dysphagia can impair safe oral intake, leading to malnutrition, dehydration, aspiration pneumonia, and poor post stroke outcomes, and to prevent that, clinicians needs to decide within the first 48 hours whether enteral feeding protocol should be established or not (Balami, White, & McMeekin, 2018). Hence, the role of enteral feeding protocol to provide support to patients who are unable to meet their nutritional requirements through oral intake alone (Powers, Rabinstein, Ackerson, 2018).

Enteral feeding as a protocol can provide sole source of nutrients in patients who cannot consume adequate caloric intake orally (Liaw, & Liebeskind, 2020). There is a wide variety of feeding formulae ranging from homemade slenderized diet to commercially available enteral formulae (Frontera, Lewin, & Rabinstein, 2016).

Guidelines issued by the American Society for Parenteral and Enteral Nutrition and the Society of neurological Care Medicine suggest the use of enteral feeding protocol to improve nutritional outcomes (Yaghi, Willey, & Cucchiara, 2017). Enabling bedside nurses to initiate, monitor and alter the administration of feeds without direct orders from the attending physician (Arnold, et al., 2016).

Significance of the study

The prevalence of malnutrition following an acute stroke could range from 18% to 34% in neurological and emergency department (Hospital statistical record, 2019). Many

factors lead to inadequate enteral nutrition in neurological and emergency department include: delayed starting of EN, gastrointestinal complications, incomplete delivery of required nutrition, and frequent interruption of EN.

Some of these factors can be handled with enteral feeding protocols, therefore preventing malnutrition in neurological ill patients, so this study aimed to investigate the role of safety enteral feeding protocol in rapid improvement nutritional status in recent stroke patient admitted to neurological and emergency department.

Aim of the study

To determine the effects of implementing of enteral feeding protocol as a role to improvement nutritional status in patients with recent stroke and its impact on anthropometric measurements, weight changes, complications, and functional outcomes in those patients.

Research Hypotheses:

H1: Patients on whom the enteral feeding protocol was applied have significant improvement in their nutritional status.

H2: Anthropometric measurement, gastrointestinal complications and laboratory analysis will be improved after protocol application in recent stroke patient.

Subjects and Method

The study aimed to determine the effects of implementing safety of enteral feeding protocol as a role to improvement nutritional status in patients with recent stroke and its impact on anthropometric measurements, weight changes, complications, and functional outcomes in those patients.

The pursued of the methodology in the conduction to the following designs; technical, operational, administrative, and statistical design.

1. Technical design

This design contains the study design; setting, the study subject, and tools of data collection.

Study Design

A quasi-experimental research design was utilized in this study.

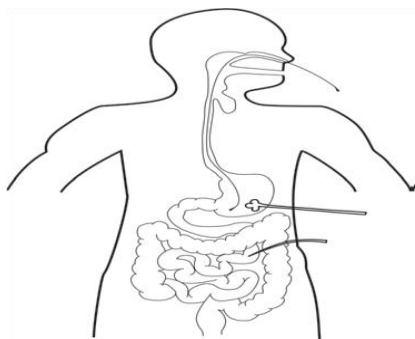
Study Setting

This study was conducted at the stroke unit and neurology department at Aswan university hospital.

Study Subjects

A convenience sample of 75 adult patients (26 male and 49 female) admitted to the stroke unit and neurology department at Aswan university hospital. With inclusion criteria is age ≥ 18 year with recent stroke, unable to maintain oral nutritional intake, and received exclusively EN (enteral nutrition) were included in the study, with 35 cross matched controls. The subjects were followed at baseline then after two weeks and after one month, patients received nutritional support either (oral or parenteral nutrition) were excluded from the study.

Enteral Tube Feeding: Refers to the delivery of a nutritionally (completely feed) directly into Gastric through tube (Blumenstein, Shastri, & Stein, 2014).



(Blumenstein, Shastri, & Stein, 2014)

Sample Size

was as estimated using the Epi info 7 statistical based on the previous year's statistical report of admission to the stroke unit and neurology department, 2019 at 90 % confidence level and acceptable margin of error 5 .%The total sample size was 162 .One hundred and ten patients consented to participate in the study.

Tools of the study

- I. Nutritional status assessment tool (Annex 1)
- II. Protocol for the enteral nutrition support in stroke patient (Annex 2)

Each patient was subjected to:

Tool I: Nutritional status assessment tool (Annex 1):

This tool was constructed by the researcher after reviewing the related literatures to assess the nutritional status of patients with stroke. This tool composed of six items:

- **Patient profile:** Patient's ID, age, gender (modified Rankin Scale (MRS (Wilson, Hareendran, & Grant, 2002) & National Institutes of Health Stroke Scale (NIHSS) (National Institute of Health) on admission.
- **Anthropometric measurements:** height, weight, body mass index & mid upper arm circumference (>23.5 cm or <23.5 cm) cm.
- **Medical data:** medical diagnosis, hospital length of stay & status on discharge (MRS) & (NIHSS) on discharge.
- **Nutritional intake:** calories received, protein received, number of EN interruptions, total time of EN interruptions.
- **Gastrointestinal complications:** diarrhea >500 cc/day, abdominal distention, constipation, and emesis.
- **Laboratory analysis:** complete blood picture, total serum protein, serum albumin, white blood cells (WBCs), Platelets, Hemoglobin and Mean blood pressure (MBP).

Tool 2: Protocol for the enteral nutrition support in stroke patient (Annex 2):

Constructed by the researcher after extensive literature review (Ortíz, Martínez, & Lupián, 2017), this tool was applied on the study group to evaluate the efficacy and safety of implementing an EN protocol in the nutritional status and occurrence of complications in recent stroke it consisted of 12 items:

1. Assess the type of feeding (Post pyloric feeding for all subjects).
2. Assess rate of infusion (continuous infusion: start bolus infusion with 250 ml and wash

by 50 water ml each 4-6h, monitoring tolerance each 8-12h).

3. Assess gastrointestinal symptoms (If diarrheas, emesis, if the intolerance persists, replace gastrointestinal (GI) fluid losses, checking gastric residual every 4 hours during the first 48 hours of feeding).
4. Check and record the amount of urinary output every 8 hours.
5. Check skin turgor every 8 hours.
6. Evaluate laboratory values as complete blood count, hemoglobin, blood glucose& albumin.
7. Assess mouth for redness, dryness, or fissures every shift.
8. Report irritated tissues and treat at once.
9. Lubricate lips with water-soluble lubricant.
10. Brush patient's teeth, tongue, and gums daily if patient is able, rinse mouth with nonalcoholic based mouth.
11. Report irritated tissues and treat at once, use a cotton swab moistened with warm water to clean the outside edges of the nares.
12. Making sure you do not move the tube.

Scoring system:

Each item has been noted, categorized, and scored as (Performed = 1 or not Performed = 0) on all items.

The content validity of this tool was checked by expert professors in the fields of medicine and nursing and corrections were carried out accordingly.

II. Operation design

This design explains the steps of actual implementation of the study including the pilot and field work.

Preparatory phase

This study was carried out through a period of six months beginning from March 1st 2019 to August 30th 2019. The studied patients who met the criteria for inclusion were identified daily from admission records. The studied patients were followed during three intervals at baseline then the enteral tube

feeding protocol was applied then the patients were followed after two weeks then after one month.

A pilot study

It was carried out on (8 patients) of study subjects. The pilot study was done to ensure clarity, applicability, feasibility of conduction of the study tools, and time needed for each tool to be filled in. some modifications were done according to the pilot study findings.

Field work

Started with reviewing related literature and preparation of data collection tools and validating the tools through experts in the medical and nursing fields. The study period comprised three phases: Pre-intervention and post- intervention.

Pre-intervention

After patient admission, the researcher started to assessing the patient's nutritional status for the studied population by recording: age, weight, body mass index, skin integrity, subjective global assessment, serum albumin, complete blood picture, calories and protein received assessing type of feeding if gastric feeding or post-pyloric feeding, and incidence of complication in the form of (mouth-inflammation\redness, dryness, or fissures, nausea-vomiting, esophageal reflux, abdominal distention & constipation, diarrhea,& constipation) MRS, and NIHSS. This stage takes about twenty-four hour beginning from time of patient assessment till starting the protocol.

Intervention

The baseline data was collected and analyzed after that the enteral feeding protocol was applied during all shifts the researcher spend eight hours daily then ask the nurse to continue throughout the day after explain the protocol and the studied patients were assessed after two weeks then after one month.

The researcher started by assessing the calories and protein requirements then the type of feeding (post-pyloric feeding), also the type of access (bolus infusion) after that began the enteral feeding.

Tolerability evaluated over the initial 8 to 12 hours of EN and if there were no signs or symptoms of intolerance, then amount increased by 10 to 20 mL/h every 8 to 12 hours.

The regimen starts with 250 ml nutrients and wash by 50 ml water every 4 to 6 hours and evaluation of tolerability in the next 8 to 12 hours and assessing tolerability by measuring the gastric residual volume, monitoring the gastrointestinal signs and symptoms such as vomiting, absent bowel sound, distension and diarrhea every 8-12 hour.

If diarrhea or emesis: the tube feed is held for 4h then resume the tube feeds with 10 ml/ If the intolerance persist and is not possible to cover < 60 % of their requirement with this support, starting total parenteral nutrition (TPN) also replace gastrointestinal (GI) fluid losses (e.g., vomiting, diarrhea, and ostomy drainage) with a rehydration solution that contains appropriate amounts of water and electrolytes.

Then, all responses were documented in the medical records. We asked the nurse to check the amount of urinary output every 8 hours, check skin turgor, assess mouth for dryness, or fissures every shift, report irritated tissues, lubricate patients' lips, tongue, and gums with water-soluble lubricant. Assess nose for redness, dryness, or fissures, lubricate nares with water-soluble lubricant, wash skin with soap and warm water, making sure the tube do not move; rinsed well and pat dry then tape is replaced. This stage persists for One month.

Post intervention

Patient reassessment patient status performed after application of the enteral feeding protocol as stated earlier in the form of (assessing the type of feeding, protein & calorie requirements, monitoring gastrointestinal symptoms, anthropometric & clinical parameters and complications) and comparison was done between the three phases (base line, Pre-intervention and post-intervention). We used the PRISMA 2009 Checklist. The total time spent with each patient was about 32 days from admission until post assessment after protocol application.

Ethical Consideration

Consent was taken from each patient and relatives after explaining the aim and benefits of the research. The researchers emphasized that participation in the study was completely voluntary and each patient has the right to withdraw from the study at any time without giving any reason. As well as, anonymity and confidentiality were assured through coding and tabulating the data.

Statistical Analysis

Statistical Package for Social Science (SPSS), version 21 was for statistical analysis of the data. The following tests were used, arithmetic mean as an average, describing the central tendency of intervention, the standard deviation as a measure of dispersion of results around the mean. The frequency and percentage of intervention and repeated measures.

Results

Table 1: This table show the demographic data of the studied group and reveals that the mean age of the studied group was 53.08 ± 8.65 and the control group was 51.74 ± 4.63 with non-significant difference between the two groups. Regarding gender, about two thirds of the study and control group were male (65.33%) and (65.71%) respectively with non-significant difference between the two groups. In relation to the BMI, the mean was (25.29 ± 2.92) of the study group and (26.03 ± 1.79) of the control one with non-significant difference between the two groups.

Table 2: This table present the occurrence of complications in all cases and show that significant difference was observed between baseline and after 1 month and between the study and control group regarding to nausea & vomiting, mouth inflammation, esophageal reflux, abdominal distension & constipation, diarrhea and mal absorption

Table 3: this table show the energy and protein intake of the study and control group and reveal that significance difference ($P < 0.001$) was observed between baseline and follow up and between the study and control groups regarding energy intake and also significant difference ($P < 0.02^*$) was observed regarding protein intake

between baseline and follow up and between the study and control groups.

Table 4: Reveals changes in anthropometric & clinical parameters in follow up with significant difference was observed between baseline and follow up and between study and control group regarding to weight, body mass index, platelet and hemoglobin while non-significant difference was observed between groups in relation to mean blood pressure and white blood cells.

Table 5: Shows improvement of various parameters of Patient care on follow up. There

was highly significance difference ($P < 0.000$) in gastrointestinal symptoms, lubricating lips gastric residual, assessing mouth for redness, dryness, or fissures between baseline and follow –up.

Table 6: Presents significant difference in MRS between baseline and after 1 one week and after 1 month and between study and control group also significant difference was observed regarding to NIHSS between baseline and after 1 one week and after 1 month and between study and control group

Table 1: Demographic data for the studied population (Study N=75, Control N=35):

Item	Subjects	Control	P-value
1. Age (years)	53.08±8.65	51.74±4.63	P=0.574 n.s
2. Gender:			P=0.388 n.s
• Male	49(65.33%)	23(65.71%)	
• Female	26(34.67%)	12(34.28%)	
3. Body Mass Index	25.29±2.92	26.03±1.79	P=0.642 n.s
4. Type of stroke:			
• Infarction	33.3%	11(31.42%)	
• hemorrhage	67.6%	24(68.57%)	P=0.581 n.s

*Significant difference at p-Value < 0.05

Table 2: Complications on follow up for all cases (Study N=75, Control N=35):

Complications	Study group N=75			Control group N=35	P - value
	Base line	After 2 weeks	After 1 month	Control group	
1.Mouth inflammation	28(37.33%)	10 (13.33%)	4(5.33%)	14(40.0%)	P<0.001**
2. Nausea & Vomiting	59(78.67%)	59(78.67%)	8(10.67%)	25(71.42%)	P<0.000***
3. Esophageal reflux	32(42.67%)	18(24.0%)	7(9.33%)	14(40.0%)	P<0.000***
4. Abd.distension & Constipation	32(42.67%)	16(21.33%)	8(10.67%)	13(37.14%)	P<0.001**
5. Diarrhea	14(18.67%)	8(10.67%)	3(4.0%)	6(17.14%)	P<0.04*
6. Malabsorption	29(38.67%)	21(28.0%)	7(9.33%)	12(34.28%)	P<0.000***

*Significant difference at p .value <0.05, **Significant difference at p .value <0.01.

Table 3: Improvement of Daily Enteral Caloric and Protein intake among study subjects:

Calorie and protein intake	Base line	After 2 weeks	After 1 month	Control group	P - value
Energy Intake (caloric):					
Mean kcal/d	825.4 ±22.46	1484.44 ±215.22***	1998.47±122.43***	817.31±38.51	P<0.000***
Mean kcal/kg/d	16.9± 4.95	52.6 ± 6.23***	43.51 ± 9.02***	14.83±6.21	P<0.001**
Protein Intake (g):					
Mean g/d	38.5± 12.82	76.47 ± 2.68*	99.37 ± 11.23***	37.27±11.41	P<0.02*
Mean g/kg/d	0.5± 0.31	4.2± 1.06***	2.2 ± 0.45**	0.46±0.08	P<0.03*

*Satisfactory level ≥ 50 **significant at P. values ≤ 0.05.

Table 4: Shows changes in anthropometric & clinical parameters in follow up (Study N=75, Control N=35):

anthropometric & clinical parameters	baseline	After 2 weeks	After 1 month	Control group	P- Value
Weight	68.91±11.26	73.22±12.47	77.47±13.21*	69.34±14.492	P<0.02*
BMI	25.29±2.92	26.48±2.97	27.33±3.02*	26.02±2.14	P<0.01*
Mean B.P	98.62±3.21	97.32±2.54	97.89±3.21	97.58±4.02	P=0.273n.s
Hb	9.21±2.13	11.32±3.24	12.04±2.97	9.94±2.48	P<0.02*
Platelet	320.28±98.34	396.36±78.32*	395.27±65.21*	318.85±95.43	P<0.03*
WBCs	5.76±1.23	4.33±1.02	4.02±0.99	5.43±1.44	P=0.285n.s

*Satisfactory level ≥ 50 **significant at P. values ≤ 0.05 .

Table 5: improvement of various parameters of Patient care on follow up

Item	Baseline	After 2 w	After 1 m	Control	P_ Value
*** GIT Symptoms:					
* Dysphagia & Aspiration	75(100%)	35(46.67%)	31(41.33%)	35(100%)	P<0.000***
* GI fluid loss (vomiting, diarrhea)	75(100%)	39(52.0%)	31(41.33%)	35(100%)	P<0.000***
Gastric volume residual	75(100%)	69(92.0%)	26(34.67%)	35(100%)	P<0.001
Presence of irritated tissue or ulceration	33(44.0%)	24(32.0%)	12(16.0%)	13(37.14%)	P<0.02
*Mouth hygiene	75(100%)	42(56.0%)	17(22.67%)	35(100%)	P<0.001**
*Dry mouth, fissured lips	75(100%)	42(56.0%)	17(22.67%)	35(100%)	P<0.001**
*Checking skin turgor every 8 hours	31(41.33%)	27(36.0%)	17(22.67%)	14(40.0%)	P=0.494n.s

*Satisfactory level ≥ 50 **significant at P. values ≤ 0.05 .

Table 6: Improvement of neurological outcome of Patient with care on follow up (Study N=75, Control N=35):

Item	Baseline	After 1 w	After 1 m	Control	P_ Value
MRS	4.48±0.42	2.12±0.42**	1.02±0.04***	4.37±0.67	P<0.000***
NIHSS	15.14±2.15	9.87±3.45**	4.01±1.28***	15.73±1.79	P<0.000***

*Satisfactory level ≥ 50 **significant at P. values ≤ 0.05 .

- Modified Rankin Scale (*MRS*) & National Institutes of Health Stroke Scale (*NIHSS*).

Discussion

Nutritional status is important in stroke care, but little is known regarding the prognostic role of nutritional status on long-term functional outcomes among stroke survivors (Hsiu, et al.,2011 & Christopher, 2001).

Rehabilitation of patients with ischemic stroke, the nutrition strategies are adopted to

provide tube fed individuals with adequate nutrition intakes and/or to avoid the body wasting responsible for poor functional outcome and excessively prolonged stay in hospital (Kim, Lee, &Sohn, 2017)

Experimental studies have shown that protein synthesis is suppressed in the ischemic penumbra. In clinical studies on rehabilitation patients, patients receiving such supplementation had enhanced recovery of

neurocognitive function (Roberto, et al., 2011). The main aim of this study is to determine the effects of implementing safety of enteral feeding protocol as a role to enhance nutritional status in patients with recent stroke.

Regarding the demographic data & clinical characteristics of the studied population there was no statistical significant difference between the studied population and the control group.

In this study age (mean 53.08 ± 8.65 years), which is in consistent with (Khedr, et al., 2013) epidemiology of stroke in Egypt, found that the mean age of their patients was (59.1 ± 10.8) years (range 38–79 years) and also in Egypt, (El Tallawy, et al., 2015) Conducted his study on 477 patients (age range 23–95 years, with mean age (62.19 ± 12.65); 277 males (58.1%) with mean age (63.52 ± 12.05) and 200 females (41.9%) with mean age (60.35 ± 13.25).

Concerning gender data, we found that, more than half of the cases. (65.33%) were men. this result was in agreement with (El Tallawy, et al., 2015), who found that males outnumbered females in all subtypes of stroke (57.1% in transient ischemic attacks [TIAs], 57.4% in ischemic, and 62.5% of hemorrhagic strokes)., In relation to the medical characteristics for patients with acute ischemic stork BMI of cases was about 25.29 kg/m.

Regarding GIT complications in follow-up among groups, the study revealed that, marked improvement of GIT symptoms (nausea –vomiting, esophageal reflux, malabsorption) on follow up which was highly significant difference ($P < 0.000$) comparing follow-up with baseline and control group, also, abdominal distention significantly improved ($P < 0.001$), this finding was in agreement with (Kim, 2017).

The present study reported improved daily caloric and protein intake measures for all groups with highly significant difference ($P < 0.000$) in mean Kcal/d on follow-up. Also there was significant difference ($P < 0.05$) of mean protein intake g/d & mean g/kg/d on follow-up. Those findings are inconsistent with (Manolescu, 2013), who stated that, daily

calorie and protein requirements in stroke patients may be calculated as 20-30 kcal/ kg.

In the same context (Zhang, et al., 2015) mentioned that, although protein-energy malnutrition has been cited as a frequent complication following stroke, there is very little data describing nutritional intake among hospitalized patients.

Similarly, it is in agreement with studies conducted by (Oesch, et al., 2017) about EN use in different clinical settings to support daily calorie and nutrient intake, and these studies highlighted positive effects in terms of functional (e.g., increased grasp strength), nutritional (e.g., weight gain, achieving daily protein and calorie targets).

The current study showed that changes in anthropometric & clinical parameters on follow up were significantly different ($P < 0.05$) between each of weight, BMI, Hb and platelets on baseline and follow up and control group, and non-significant difference between MBP, WBCs. These results come in agreement with (Nakazora, et al. 2017), & (Simons, & Hamdy. 2017), who concluded that, the nutritional state and fluid intake of stroke patients should be evaluated at admission and at regular intervals for, weight, BMI, Hb and platelets and the best nutritional plan should be prepared for patients.

Regarding assessment of improvement of various parameters of care and fluid support done for the patients, there was highly significant difference ($P < 0.001$) with improvement in all GIT symptoms (dysphagia, diarrhea, vomiting and gastric fluid residual) on follow up between our group and control group. Also irritated tissues and ulceration mouth hygiene improved on follow up significantly.

However, In contrast to (Wirth, et al., 2013). We found that bolus infusion was better for our patients, it may be explained by the chronicity of the condition patients with stroke receive treatment for long periods, also, intermittent EN at home is more suitable for family healthcare providers, Intermittent enteral feeding may be preferred in patients who are planned to receive enteral feeding at home.

We start infusion rate at 20ml/hour and if there is no complications infusion rate was increased by 10-20 ml /hour every 8-12 hours to reach the target calories, to provide efficient enteral feeding, this was in agreement with (American Heart Association, 2019),

Furthermore, findings of (Balami, et al., 2018) were in agreement with our results, who stated that oral hygiene performed at least twice daily using oral antiseptics such as chlorhexidine decreases the risk of pneumonia in stroke patients with an enteral feeding requirement.

Our results support data by National Institute for Health and Care Excellence, (2019), that, enteral tube feeding, is an effective method of providing nutritional support to those patients with functional deterioration who are unable to meet their nutritional requirements through the oral route alone, and according to (Yaghi, et al., 2015), safety enteral feeding protocol is needed to support patients' immune system, nursing homes including neurology department and emergency hospitals.

This was clearly evident in the results which concluded that, as few studies used MRS and NIHSS as predictors for good functional outcomes in patients with stroke after nutritional support programs. marked improvement ($P < 0.000^{**}$) noticed in both scales which means shorter hospital stay, low morbidity and mortality, decrease rate of dependency and decrease healthcare costs.

Conclusion

Based on the results of the present study, it can be concluded that, the application of enteral feeding protocol in recent stroke patients early at onset resulted in rapid improvement of nutritional status, decreased incidence of gastrointestinal complications and improving anthropometric measurement, as well as maintain laboratory analysis in the normal baseline.

Recommendation

According the results unified Protocol is recommended for EN in patients with acute stroke and disturbed level of consciousness to improve functional outcome in those patients

and shortens hospital stay. Also the protocol has to be disseminated different stroke unit in different health care sector and the nurses have to be trained with this protocol and assess periodically patient outcome.

References

- American Heart Association (AHA) (2019):** Introducing Target: Stroke Phase III 2019. Available at www.heart.org/en/professional/quality-improvement/target-stroke/introducing-target-stroke-phase-iii. Accessed October 11,
- Andre Simons ,Shaheen Hamdy (2017) :** The Use of Brain Stimulation in Dysphagia Management Dysphagia. doi: 10.1007/s00455-017-9789-z. Apr; 32(2):209-215. PMID: 28353151.
- Aquilani R, Scocchi M, Iadarola P., (2008):** Protein supplementation may enhance the spontaneous recovery of neurological alterations in patients with ischaemic stroke. Clin Rehabil. 22: 1042– 1050.
- Aquilani R, Verri M, Iadarola P., (2004):** Plasma precursors of brain catecholaminergic and serotonergic neurotransmitters in rehabilitation patients with ischemic stroke. Arch Phys Med Rehabil. 85: 779– 784.
- Arnold M., Liesirova K., Broeg-Morvay A., Meisterernst J., Schlager M., Mono M et al., (2016):** Dysphagia in acute stroke: Incidence, burden and impact on clinical outcome. PLoS ONE. 11:e0148424. doi: 10.1371/journal.pone.0148424.
- Balami JS, White PM, McMeekin PJ., (2018):** Complications of endovascular treatment for acute ischemic stroke: prevention and management. Int J Stroke13:348-6.
- Benjamin EJ, Blaha MJ, Chiuve SE., (2017):** Heart disease and stroke statistics update, a report from the American Heart Association, Circulation, 135: e146-e603.

- Blumenstein I, Shastri YM, Stein J., (2014):** Gastroenteric tube feeding : techniques, problems and solutions . World J Gastroenterol Jul 14(20):26:(8505-24 .doi :10.3748/wjg.., 20.i26.8505.
- Christopher R. Burton BN RGN., (2001):** A description of the nursing role in stroke rehabilitation 25 December (2001) <https://doi.org/10.1046/j.1365-2648.2000.01411>
- Eman M. Khedr, Noha Abo Elfetoh, Ghada Al Attar, Mohamed A. Ahmed, Anwer M. Ali, Ahmed Hamdy et al., (2013):** Epidemiological Study and Risk Factors of Stroke in Assiut Governorate, Egypt: Community-Based Study, Neuroepidemiology: 40:288–294 DOI: 10.1159/000346270.
- Frontera JA, Lewin JJ, Rabinstein AA., (2016):** Guideline for reversal of antithrombotics in intracranial hemorrhage: a statement for healthcare professionals from the Neurocritical Care Society and Society of Critical Care Medicine. Neurocrit Care. 24:6-46.
- Hamdy N El Tallawy, Wafaa M Farghaly, Reda Badry, Nermin A Hamdy, Ghaydaa A Shehata, Tarek A Rageh et al., (2015):** Epidemiology and clinical presentation of stroke in Upper Egypt (desert area), 11:2177-2183 <https://doi.org/10.2147/NDT.S87381>
- Hsiu-Chu Shena, Hsueh-Fen Chenc, Li-Ning Pengd, Ming-Hsien Lind, Liang-Kung Chend, Chih-Kuang Lianga, et al., (2011):** Impact of nutritional status on long-term functional outcomes of post-acute stroke patients in Taiwan, Archives of Gerontology and Geriatrics 53 -149–e152.
- Kim BR, Lee J, Sohn MK., (2017):** Risk Factors and Functional Impact of Medical Complications in Stroke. Ann Rehabil Med:41:753.
- Liaw N, Liebeskind D., (2020):** Emerging therapies in acute ischemic stroke. F1000Res. Rev-546. doi: 10.12688/f1000research.21100.1. e Collection. PMID: 32551094.
- Manolescu, B. N., Berteanu, M., Cintează, D., (2013):** Effect of the nutritional supplement ALAnerv® on the serum PON1 activity in post-acute stroke patients. Pharmacological Reports, 65(3), 743-750.
- National Institute for Health and Care Excellence, (2019):** Nutrition Support for Adults: Oral Nutrition Support, Enteral Tube Feeding and Parenteral Nutrition. Available online: [Nice.org.uk. /guidance/cg32](https://www.nice.org.uk/guidance/cg32)
- National Institute of Health, National Institute of Neurological Disorders and Stroke. Stroke Scale. https://www.ninds.nih.gov/sites/default/files/NIH_Stroke_Scale_Booklet.pdf**
- Oesch, L.; Tatlisumak, T.; Arnold, M.; Sarikaya, H., (2017):** Obesity paradox in stroke - Myth or reality? A systematic review. PLoS ONE, 12, e0171334.
- Ortiz-Reyes L A, Martínez L C., Lupián-Angulo., (2017):** Increased Efficacy and Safety of Enteral Nutrition Support with a Protocol (ASNET) in Noncritical Patients: A Randomized Controlled Trial. JOURNAL OF THE ACADEMY OF NUTRITION AND DIETETICS, doi.org/10.1016/j.jand, 09.020.
- Perry L., (2004):** Eating and dietary intake in communication-impaired stroke survivors: a cohort study from acute-stage hospital admission to 6 months' post-stroke. Clin Nutr. 23: 1333–1343.
- Powers WJ, Rabinstein AA, Ackerson T., (2018):** guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart

- Association/American Stroke Association. *Stroke*; 49:e 46-e110.
- Roberto Aquilani , Paolo Sessarego , Paolo Iadarola , Annalisa Barbieri PhD, Federica Boschi., (2011):** Nutrition for Brain Recovery After Ischemic Stroke An Added Value to Rehabilitation 16 May (2011). <https://doi.org/10.1177/0884533611405793>.
- Ronghua Zhang, Zhaopin Wang, Ying Fei, Biao Zhou, Shuang shuang Zheng, Lijuan Wang, et al., (2015):** The Difference in Nutrient Intakes between Chinese and Mediterranean, Japanese and American Diets. *Nutrients*. 2015 Jun; 7(6): 4661–4688. Published online (2015) Jun 9. doi: 10.3390/nu7064661.
- Tomoko Nakazora , Junko Maeda , Konosuke Iwamoto , Sayori Hanashiro , Yoshikazu, Nakamura , Tetsuhito Kiyozuka , Kazuhisa Domen et al., (2017):** Intervention by Speech Therapists to Promote Oral Intake of Patients with Acute Stroke: A Retrospective Cohort Study PMID: 28041902 DOI: 10.1016/j. J Stroke Cerebrovasc Dis: 12.007
- Toni Sabbouh and Michel T Torbey, (2018):** Malnutrition in Stroke Patients: Risk Factors, Assessment, and Management. *Neurocrit Care*. Dec; 29(3): 374–384. doi: 10.1007/s12028-017-0436-1
- Wilson JL, Hareendran A, Grant M., (2002)** : Improving the Assessment of Outcomes in Stroke: Use of a Structured Interview to Assign Grades on the Modified Rankin Scale". *Stroke*. 33 (9): 2243–2246.
- Wirth R, Smoliner C, Jäger M, Warnecke T, Leischker AH, Dziewas R., (2013):** DGEM Steering Committee. Guideline clinical nutrition in patients with stroke. *Exp Transl Stroke Med.*; 5(1):14. doi:10.1186/2040-7378-5-14.
- Yaghi S, Boehme AK, Dibu J., (2015):** Treatment and outcome of thrombolysis-related hemorrhage: a multicenter retrospective study. *JAMA Neurol*; 72:1451-7.
- Yaghi S, Willey JZ, Cucchiara B., (2017):** Treatment and Outcome of Hemorrhagic Transformation After Intravenous Alteplase in Acute Ischemic Stroke: A Scientific Statement for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke*;48: e343-e61