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Effect of Returning versus Discarding Gastric Aspirate on the Occurrence of Gastric Complications and Comfort Outcomes on Enteral Feeding Patients

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Abstract
Enteral feeding (EF) is common for patients with different medical health problems, the use of gastric residual volume (GRV) is one of the most nursing practices for monitoring EF. In the nursing literature, there is a wide variation regarding whether the gastric aspirate should be returned to the patient or discarded. Therefore, the aim of the current study was to determine the effect of returning versus discarding gastric aspirate on the occurrence of gastric complications and comfort out comes on enteral feeding patients. A sample of 44 patients completed the study divided randomly into two groups, the control group who received the routine hospital care which was discarding all gastric residual aspirate, and the study group who received returned gastric aspirate up to 250 ml, all patients were followed up for 7consecutive days. The study was conducted in two medical departments of one of the Ministry of Health Hospitals at Center region (Kingdom of Saudi Arabia). Four tools were applied for the study, socio-demographic and medical data sheet, gastric and associate complications with tube feeding sheet, electrolyte and glucose monitoring sheet & comfort outcomes sheet. The study results showed that there was no statistical significant difference between study and control groups in relation to gastric residual volume, feeding intolerance, aspiration pneumonia, electrolytes monitored (sodium& potassium), glucose level, temperature &blood pressure and oxygen saturation in the 1st& 7th day. In addition, the results showed that there was a statistical significant difference between study & control groups in relation to gastric emptying delay in the 7thday, the study group had less mean level than control group, moreover, there was a statistical significant difference in pulse and respiration among control group before and after feeding procedure. Based on the study results, it is recommended to return gastric aspirate up to 250 ml to the patients as it had no indicated risk for gastric and associate complications as well as comfort outcomes when compared to discard gastric aspirate. In addition, further researches can be done to measure different amounts of returning gastric aspirate and its effect on patient's outcomes.
Key words: enteral feeding, gastric residual volume, gastric emptying delay, comfort outcomes, returning versus discarding gastric aspirate& gastric complications

1. Introduction

Enteral feeding (EF) is considered an integral part of management of many patients with different medical health problems and the preferred method of nutritional support (Brown et al., 2012). Administration via the gastrointestinal tract (GIT) is less expensive and more physiologic than parenteral nutrition, in addition, enteral nutrition helps to maintain the structure and function of the intestinal mucosa, reduces infection risks, decreased costs and length of hospital stay as well as avoid potential adverse outcomes of parenteral nutrition (Moreia&McQuiggan, 2009). Although enteral feeding is considered safe and cost effective procedure, it is not without complications that can usually be avoided or managed by closely observing gastric residual volume (GRV) and watching for signs and symptoms of gastric intolerance (Steele &Sabol, 2009).

GRV is the amount aspirated from the stomach (Hurt & McClave, 2014), it indicates that the GIT is functioning normally.The practice of GRV monitoring was originally designed to help prevent gastric emptying delay, whereas, enteral nutrition often is complicated by intolerance as indicated by elevated volumes of aspirated gastric residuals which may lead to increase in the potential for regurgitation, vomiting and a delay in the achievement of nutritional goals because of under delivery of feeds, in addition to occurrence of aspiration pneumonia (Williams & Leslie, 2004).So, in the clinical practice GRV is used as a surrogate for gastric motility and remains the most common method for assessment of enteral nutrition tolerance in patients with enteral feeding (Moreia&McQuiggan, 2009 and Zaloga, 2005).In the literature, there is a wide variation in the value for normal GRV, some reported that it was between 100 to 150 ml (Montejo, Minambres, & Bordeje, 2008) others considered it up to 250 ml (Marshal & West, 2006).It is recommended that GRVs be monitored every 4 to 8 hours and one event of elevated GRV should not prompt cessation of enteral tube feeding (Johnson, 2009).

Gastric emptying delay was defined as the difficulty in maintaining gastric residual volume within safe limits.Metheny, Schallom, and Edwards (2004) mentioned that clinically GRV is easier to measure than gastric emptying. GRV measurements are by far the most frequently recommended assessment for gastric emptying. So they have used GRV as a surrogate marker to determine gastric emptying delay. Moreover, Juve-Udina et al., (2009) reported that the regular checking of GRV by aspiration with a syringe isa common nursing intervention to assess gastrointestinal function and to minimize potential complications from enteral nutritional therapy. Although it is hypothesized that high GRV leads to gastric emptying delay which may lead to aspiration pneumonia (Moreira &McQuiggan, 2009 and Chang et al., 2007),but, Studies directly comparing gastric emptying delay with GRV have shown poor correlation. In studies using the paracetamol absorption test as a measure of gastric emptying, Landzinski, et al., (2008)and Parrish & McClave, (2008) showed that in patients determined to be intolerant with high GRV (defined by a single GRV > 150 ml), 100%had abnormal gastric emptying. In contrast to the patients determined to be tolerant with low GRV (defined by all GRV < 150 ml), still 70 % had abnormal gastric emptying. A third study showed that 25 % of intolerant patients with high GRV had normal gastric emptying(Rohm, Boldt, & Piper, 2009). Another study revealed that 57% of tolerant patients with normal GRV had abnormal gastric emptying. These studies confirm that GRV are inaccurate and unreliable indicator for emptying delay (Hurt &McClave, 2010).

Moreover, the relationship between high GRV and aspiration pneumonia is weak. Aspiration defined as the inhalation of material into the airway, is the main cause of pneumonia. A prospective study found that high aspirated residual volumes were an early indicator of feeding intolerance, which was associated with higher rates of pneumonia (Moreia&McQuiggan, 2009). By contrast, McClave et al. (2005) in their study emphasized that low residual volumes did not decrease the risk of aspiration and pneumonia.

Kaur et al., (2012) stated that the withdrawal of gastric juice would induce a sequence of metabolic changes which may affect the electrolyte balance. A study conducted on patients admitted for surgical interventions made continuous withdrawal of gastric contents through an indwelling gastric tube attached to gastric suction, found that serum sodium dropped as well as potassium. The study added that this can be prevented by reintroduction of aspirated gastric contents (David, 2011).

In the light of this presentation, it can be concluded that to return or to discard gastric aspirate is a controversial issue in nursing practice. The practice of returning gastric aspirate is justified by the belief that continual removal of gastric contents will contribute to alterations in body functions(Marshall and West, 2006). While, Bourgault, et al., (2007) suggested that discarding gastric aspirates may prevent complications.

1.2Significance of the study

The literature review shows a wide variation in nursing practices regarding the gastric aspirate, there is no nursing standards about whether the gastric aspirate should be returned to the patient or discarded (pullen, 2004and Williams & Leslie, 2004). Some nurses discard gastric contents while others reintroduce it to the patient, partially or completely, depending on their assessment (Marshall and West, 2006), unit tradition or routine. Individual beliefs and nurse's experience guide the decision whether to return or discard gastric aspirate. Some authors support returning gastric content aspirated in order to contribute to the maintenance of gastric juices and the electrolyte balance. Others hypothesize discarding as the best option in order to avoid delayed gastric emptying as well as to prevent aspiration pneumonia secondary to gastric emptying delay (Juve-Udina et al., 2009and Ridley & Davies, 2011).Moreover, there is no consensus on the amount of GRV that can be returned without risk for intragastric complications and aspiration pneumonia. So, it is important to perform researches in this area to have an evidence based nursing practice regarding this issue. Therefore, the aim of the current study was to determine the effect of returning versus discarding gastric aspirate on the occurrence of gastric complications & comfort out come son enteral feeding patients.

2. Subjects and Methods

2.1 Purpose of the study

The purpose of the current study was to determine the effect of returning versus discarding gastric aspirate on the occurrence of gastric complications & comfort outcome son enteral feeding patients.

2.2 Research design

Quasi-experimental design was selected to evaluate the effect of independent variable (returning versus discarding gastric aspirate) on the dependent variable (the occurrence of gastric complications and comfort outcomes).

2.3 Study Setting

The study was carried out in two of medical departments of one of the Ministry of Health Hospitals at Center region (Kingdom of Saudi Arabia).

2.4 Sample

A sample of 60 adult male and female patients admitted to the previously mentioned setting was studied with the following inclusion criteria: (a) Patients connected with enteral feeding within first 24 hours, (b) Patients on

enteral feeding for 7 consecutive days, while exclusion criteria includes patients with gastrointestinal tract problems or those with electrolyte disturbances. The 60 patients were randomly equally classified into two groups, the control group, 30 patients, who had discarding gastric aspirate (the routine hospital care) andthe study group, 30 patients, who had returning gastric aspirate up to 250 ml. 10 out of 30 patients of the control group and 6 out of 30 patients of the study group were dropped from the study either because of death or discontinued gastric feeding before the 7thday. Therefore the control group who completed the research was 20 patients, and 24 patients were in the study group.

2.5 Tools for Data Collection

Data were collected using four tools in order to achieve the aim of the study. These tools were developed by the researchers after reviewing the related literature. The tools were submitted to a jury of 7 members who are experts in the medical surgical nursing field and faculty staff members for its content validity. The validity for the various items varied between 80% & 100%. The four tools were:

1. Socio-demographic and medical data sheet: this part includes socio-demographic data such as age, gender and medical data which were present diagnosis, past medical history, and Glasgow coma scale.
2. Gastric and associate complications with tube feeding sheet: this tool measured the compilations regarding discarding versus returning gastric aspirate as well as associate complications with tube feeding. It includes items related to gastric residual volume (GRV), gastric emptying delay, feeding intolerance (vomiting, diarrhea) and occurrence of aspiration pneumonia.
3. Electrolyte and glucose monitoring sheet: serum potassium, sodium and glucose level were monitored.
4. Comfort outcomes sheet: it includes measurement of vital signs (temperature, pulse, respiration and blood pressure) as well as oxygen saturation which measured by pulse oximetry.

2.6 Ethical considerations

An official permission was taken from the research committee and hospital administrators. Also, each patient andguardian person for those whose GCS is <10 was informed about the purpose and nature of the study and informed consent was taken from each patient and guardian. The researchers emphasized that participation in the study is entirely voluntary; anonymity and confidentiality are assured through coding the data.

2.7 Pilot Study

A pilot study was carried out on 5 patients who met the predetermined selection criteria to assess the clarity and feasibility of the tools, the necessary modifications were done. The findings of the pilot study revealed that all of the items of the tools were clear and feasible to achieve the aim of the current study. The five Patients were excluded from the final study results.

2.8 Procedure

Once official permission was granted from the research committee and from the head managers of the selected hospital to proceed with the study, the researchers initiated data collection. They explained the purpose and nature of the study to the patients and guardians of the patients and once permission was taken, researchers started to perform the experiment. Patients were randomly assigned either to control group or study group by considering the 1stpatient for data collection as control and the second one as study and so on. For control group, patients received the routine hospital intervention which was to discard all gastric aspirate before feeding, while the study group had returning gastric aspirate up to 250 ml, any surplus over 250 ml was discarded, this amount was decided based on a study done by Udina et al., (2009), they reported that returning 250ml of gastric aspirate has no risk effect on patients, in addition to the consultant physician opinion about the safe amount of returning gastric aspirate. Both groups received intermittent gastric feeding using 60 ml syringe through a large bore feeding tube (16 Fr) to avoid occlusion of feeding tube, and the material of tube was from polyurethane. In addition GRV was checked routinely every 6 hours, for the study group eachtime GRV was checked the patients received the gastric aspirate up to 250 ml and nurses notes were revised to be sure of receiving gastric aspirate, while GRV was checked by the researchers for both groups during the morning shift, aspiration was done before meal via a 60 ml syringe. All the patients put in the semisitting position during feeding. All patients were followed up for 7 consecutive days .Normal gastric residual volume considered in the current research was from0 – 150 ml and the amount of more than 150 ml indicated presence of gastric emptying delay. Gastric emptying was divided based on the amount which exceeded 150 ml as follows: 151 – 250 ml light delay, 251 – 350 ml as moderate delay and more than 350 ml as severe delay. Daily scheduled lab test (8 a.m.) was obtained for serum potassium, sodium, and glucose. The normal range of the serum electrolytes and glucose according to the hospital laboratory were: potassium 3.5 – 5.5 mEq\ L, sodium 135 – 145 mEq\L and glucose 5 – 7.7 mmol\L. Before and after morning GRV check and feeding, vital signs and oxygen saturation were assessed to identify any signs of discomfort in the patient due to the procedure. Patients were monitored for feeding intolerance through occurrence of vomiting & diarrhea. Aspiration pneumonia was indicated by presence of shortness of breath, crackle chest sound, decreased oxygen saturation in addition to medical diagnosis of aspiration pneumonia.All the previous obtained data were recorded in designed format data sheet from the 1st day to seven consecutive days for all studied sample. The data were collected over 12 months.

2.9 Data analysis

Data was coded for entry and analysis using SPSS statistical software package version 16. Data was presented using descriptive statistics in the form of frequencies and percentages, means and standard deviations. Data was described by summary tables and figures. T-test &Chi square were used. Statistical significance was considered at P-value ≤ 0.05.

3. Results

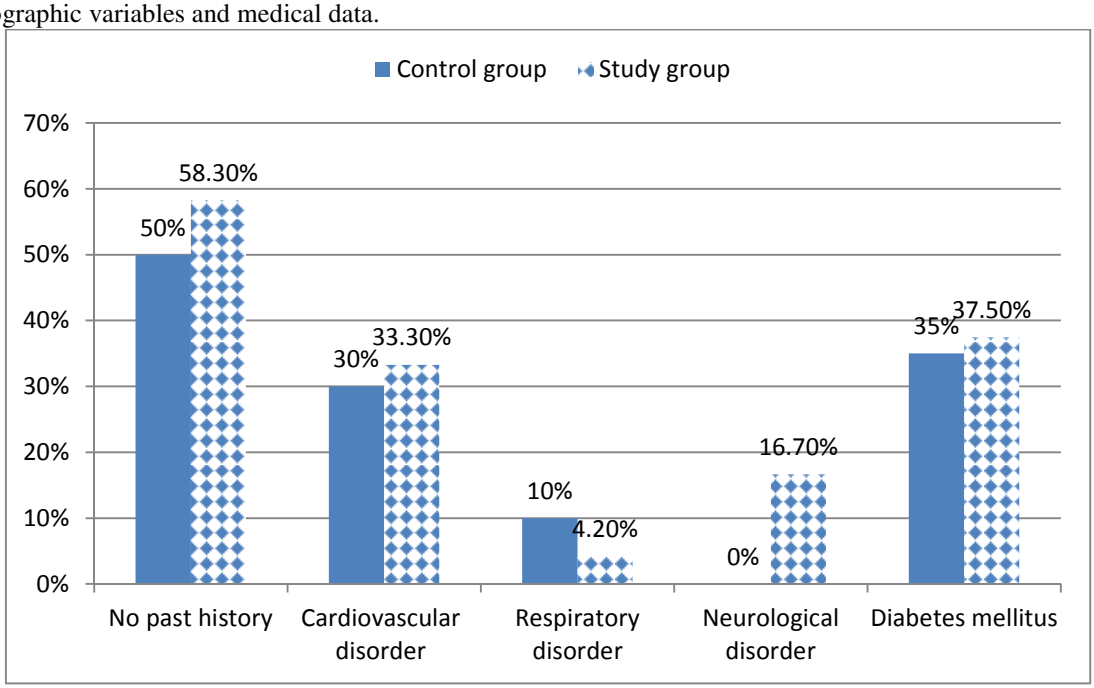
Table 1. Frequency distribution of the socio-demographic &medical data variables of control & study groups

Variables	ControlGroup:20		StudyGroup:24		Chi-square
	No.	%	No.	%	
Age:					
18-30	5	25%	2	8.3%	
30-	5	25%	7	29.2%	2.26
45-	8	40%	12	50%	
60 and more	2	10%	3	12.5%	
Gender:					
Male	11	55%	17	70.8%	1.13
Female	9	45%	7	29.2%	
Present diagnosis:					
Respiratory disorder	5	25%	5	20.8%	
Neurological disorder	7	35%	8	33.3%	0.32
Cardiac disorder	4	20%	6	25%	
Head or chest trauma	4	20%	5	20.8%	
Glasgow Coma Scale					
3 – 6	3	15%	3	12.5%	
7 – 10	6	30%	7	29.2%	0.08
11 – 15	11	55%	14	58.3%	

In relation to age (40 % & 50 %) of the control & study groups respectively had age range between 45 to less than 60 with (55 % & 70.8%) of the control & study groups respectively being males.

Regarding medical diagnosis, neurological disorders represent (35 % & 33.3 %) of control and study sample respectively. Additionally, Glasgow coma scale shows that (55% & 58.3%) of the control and study groups respectively had scores ranging from 11 to 15.

Table (1) shows that there was no statistical significant difference between both groups in relation to socio-demographic variables and medical data.



*This variable is mutually exclusive

Figure 1. Percentage distribution of past medical history among control and study groups

Regarding past medical history, (50 % & 58.3 %) among control and study groups respectively had no past medical history. In addition, (35 % & 37.5 %) of the control and study groups respectively had diabetes. There was no statistical significant difference between control and study groups regarding past medical history.

Table 2. Frequency distribution & comparison of means in relation to gastric and associate complications of tube feeding between control & study groups.

Variables	1st day		7th day	
	Control	Study	Control	Study
Gastric residual volume:				
0 – 150 ml	12	15	11	17
> 150 ml	8	9	9	7
X ± SD	135 ± 45.2	131.3±37.5	142.5	128.7
t-test	0.291		1.17	
Gastric emptying delay:				
Number of patients	8 (40%)	9 (37.5%)	9 (45%)	7(29.2%)
Light(151-250)	5	7	6	5
Moderate (251-350)	3	2	3	2
Severe (>350)	0	0	0	0
X ± SD	244.4±57.8	241.7±55.9	237.5±54.1	208.6±36.8
t-test	0.156		2.03*	
Aspiration pneumonia:				
Yes	2	2	0	1
No	18	22	20	23
Chi – square	0.043		1.02	

Table (2) shows that there was no statistical significant difference between study & control groups in relation to GRV, gastric emptying delay and aspiration pneumonia in the 1st day. While in the 7th day, there was a statistical significant difference between study & control groups in relation to gastric emptying delay (t-test: 2.03).

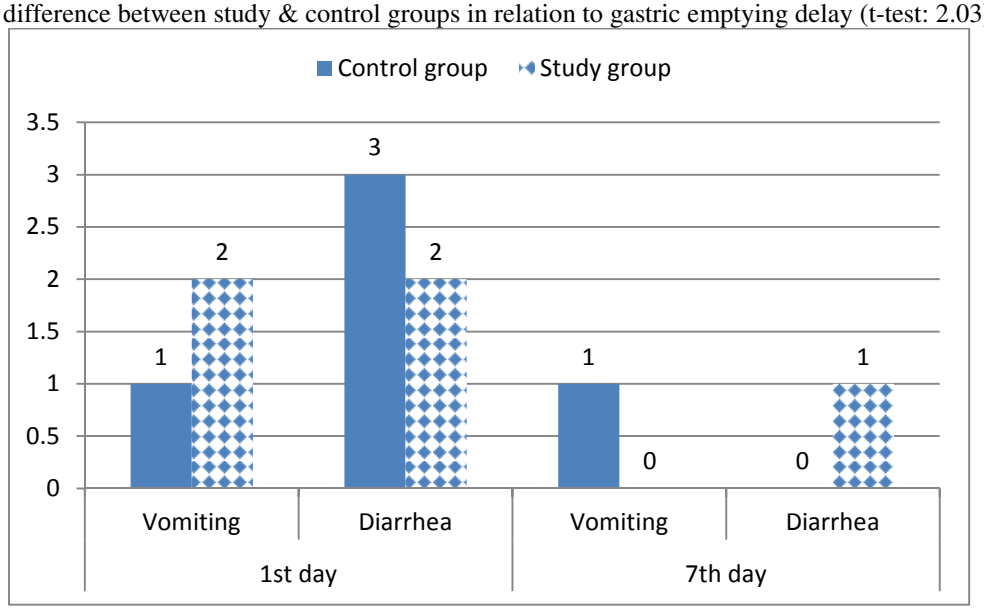


Figure 2. Frequency distribution of feeding intolerance indicators (vomiting & diarrhea) among study and control groups during 1st& 7th days.

Figure (2) shows that only 2 patients(less than 5 %) of the total studied sample had feeding intolerance indicators in the 7th day with no statistical significant difference between study and control groups either in the 1st or the 7th day.

Table 3. Frequency distribution and comparison of means in relation to the electrolytes & glucose between study & control groups

Variables	1st day		7th day	
	Control	Study	Control	Study
Potassium:				
Normal	12	16	18	23
Above normal	3	2	1	0
Below normal	3	6	1	1
X ± SD	4.49 ± .98	4.37 ± 1	4.5 ± 1.1	4.1 ± 0.6
t-test	0.40		1.33	
Sodium:				
Normal	16	20	20	23
Above normal	2	3	0	0
Below normal	2	1	0	1
X ± SD	142 ± 16.7	141.1 ± 10.5	141 ± 24.2	139.3 ± 14.1
t-test	0.21		0.27	
Glucose:				
Normal	15	20	17	22
Above normal	5	3	3	2
Below normal	0	1	0	0
X ± SD	7.6 ± 3.8	6.9 ± 3.9	6.8 ± 2.9	6.5 ± 1.5
t-test	0.60		0.42	

In relation to electrolyte & glucose level, table (3) revealed that there was no statistical significant difference between study & control groups either in the 1st day or by the end of the 7th day.

Table 4. Frequency distribution and comparison between before and after tube feeding procedure among control group and study group in relation to comfort outcomes (vital signs and oxygen saturation)

Variables	1st day				7th day			
	Control		Study		Control		Study	
	Before	After	Before	After	Before	After	Before	After
Temperature:								
Normal	13	13	19	19	18	18	18	18
Above normal	4	4	5	5	2	2	3	3
Below normal	3	3	0	0	0	0	3	3
X ± SD	37.2 ±0.9	37.29±0.9	37.5±1	37.5 ± 1	37.6±0.9	37.6 ±0.9	37.2±0.8	37.2±0.8
t-test	.321		0		0		0	
Pulse:								
Normal	17	14	16	15	16	12	20	19
Above normal	3	6	8	9	4	6	4	5
Below normal	0	0	0	0	0	0	0	0
X ± SD	88.7±15.7	98.9±14.5	81.8±15.9	89.9±16.1	85±18.3	97.1±14.9	93.8±14.7	97.6±15.8
t-test	2.17*		1.76		2.29*		0.86	
Respiration:								
Normal	18	17	19	20	20	18	20	20
Above normal	1	3	4	4	0	2	3	3
Below normal	1	0	1	0	0	0	1	1
X ± SD	19.5±3.9	20.1±4.2	21± 4.5	21.8±4.3	21±1.4	22.6±1.9	22.4±3.9	22.6±3.9
t-test	0.468		0.634		3.07*		0.178	
Blood pressure:	12	12	16	16	13	13	16	17
Normal	5	5	5	5	7	7	5	5
Above normal	3	3	3	3	0	0	3	2
Below normal								
Chi –square	0		0		0		0.24	
Oxygen saturation:								
Normal	20	20	23	23	20	20	24	24
Above normal	0	0	0	0	0	0	0	0
Below normal	0	0	1	1	0	0	0	0
X ± SD	97.9±2	97.6± 2	97.3±3.2	97.1±3.2	98.5±0.7	98.5±0.7	97.2±2.8	97.1±2.8
t-test	0.476		0.217		0		0.125	

Table (4) shows that, there was a statistical significant difference before and after tube feeding in relation to pulse during the 1st& 7th days among control group. In addition, in the 7th day there was a statistical significant difference before and after tube feeding regarding respiration among control group. While, there was no

statistical significant difference in vital signs and oxygen saturation before and after procedure among the study group during 1st& 7th day.

4. Discussion

It is a routine practice in many hospitals that gastric aspirate is discarded before giving each feed. Therefore, the aim of the current study was to determine the effect of returning versus discarding gastric aspirate on the occurrence of gastric complications & comfort outcomes on enteral feeding patients. (44)Patients completed the current study (20 patients in control group & 24 in study group). The study results revealed that about two thirds of both study & control groups had age ranging between 30 to less than 60 years. More than half of the studied sample were males. Moreover, about one third had neurological disorders with more than half of the sample having Glasgow Coma Scale ≥11 score. The study and control groups seem to be homogeneous groups whereas there was no statistical significant difference between both groups in relation to socio-demographic variables and medical data.

Regarding GRV, the study results concluded that there was no statistical significant difference between study & control group in both 1st&7thday indicating that returning gastric aspirate to the patient in the study group did not increase GRV in comparison to discarding gastric aspirate in the control group. The finding of the current research is congruent with a study done by Juve-Udina et al., (2009) on 63 patients to examine whether to return or to discard gastric aspirate, who found that there was no statistical significant difference between intervention group (returning group) and control group (discarding group) in relation to GRV. Moreover, several studies were done on GRV and none of them found an association between high GRV and complication rate (Kuppinger et al., 2013).

Regarding gastric emptying delay, the study results concluded that there was no statistical significant difference between study & control groups in the 1st day, while in the 7thday, there was a statistical significant difference between them with decreased mean of gastric emptying amount in the study group when compared to control group. In addition, the study results found that there was no statistical significant difference between study and control groups regarding feeding intolerance signs (vomiting & diarrhea) in the 1st& 7th day. The researchers may interpret these findings that returning gastric residual volume that had a partially digested food and gastric juice may enhance faster digestion which may decrease gastric emptying amount. The study results come into the same line with Kaur et al. (2013) who study the effect of reintroduction of aspirated gastric content on gastric emptying in patients receiving gastric feeding, found that more subjects in test group (receive the gastric aspirate) were in normal range of gastric emptying compared to control group (discarded gastric aspirate), in addition, feeding intolerance had no statistical significant difference between both groups, the study concluded that reintroduction of gastric aspirate had no effect on gastric emptying. Moreover, Hurt &McClave (2010)mentioned two studies were done on discarding versus returning gastric aspirate, in the 1st study patients were randomized to have the GRV returned or discarded and they concluded that no significant difference was seen in relation to gastric emptying delay, aspiration pneumonia & electrolyte abnormalities. The 2ndstudy done on 125 patients to have the GRV returned or discarded, showed that the severity and incidence of delayed gastric emptying was significantly lower in the returning group than discarding group, moreover feeding intolerance had no statistical significant difference between the two groups. (Hurt, & McClave, 2010).

In relation to aspiration pneumonia, the results concluded that there was no statistical significant difference between study & control groups in the 1st& 7th days. The study results congruent with the study done by Ridley & Davies (2011) who mentioned in their study that there was no difference in aspiration pneumonia when patients with a high GRV threshold were compared to a low GRV threshold. Moreover, a study done on 206 critically ill patients receiving gastric enteral tube feeding, patients were divided into three groups based on highest GRV obtained: ≥ 150 ml, ≥ 200 ml, and ≥ 250 ml, the authors stated that they found no consistent relationship between GRV and aspiration (Metheny, et al., 2008).

It is believed that discarding gastric aspirate may result in loss of electrolytes, but this could not be verified with the results of current study, as this study could not find any statistical significant difference between study & control groups in relation to electrolyte (potassium & sodium) and glucose in the 1st& 7th days. A study done on the effect of reintroduction of aspirated gastric content on serum electrolyte level agreed with the current study result which found that serum sodium and potassium levels did not change significantly in group of gastric aspirate introduction and the group of gastric aspirate discarding (Kaur et al., 2012). Many interpretations may explain these findings, one of them is that they may be because of the intravenous solutions that the patients receive which may contribute to keep serum electrolyte within normal, another researchers' explanation may be due to the ability of the body to compensate the electrolyte loss through different mechanisms such as renal re-absorption.

In relation to comfort outcomes that were measured by vital signs and oxygen saturation, the study results found that there was a statistical significant difference among control group regarding pulse in the 1st&7thdays and in respiration in the 7th day. On the other hand, there was no statistical significant difference in the study group in

relation to comfort out comes,indicating that the procedure of returning gastric aspirate may not discomfort the patient. The study results contradicted with findings of the study done by Udina et al., (2009) which concluded that no statistical difference was identified in relation to the discomfort outcomes which were also measured by vital signs among the control group and study group.

5. Conclusion

In the light of these results, it can be concluded that returning aspirated gastric content up to 250 ml does not contribute to gastric and associate complications as measured by gastric residual volume, gastric emptying delay, feeding intolerance as well as aspiration pneumonia. In addition returning or discarding gastric aspirate had no significant effect on electrolyte (sodium & potassium) and glucose level. Moreover, returning gastric aspirate procedure had no indicated risk for discomforting the patients.

6. Recommendation

Based on the results of the present study the following recommendations are suggested

- As returning gastric aspirate up to 250 ml had no indicated risk for the patients therefore it is recommended to include it as a nursing practice when caring for patients with EF.
- In addition, further researches can be done to measure different amounts of returning gastric aspirate and its effect on patient's outcomes.
- Prospective studies should be done to determine the benefit of returning gastric aspirate to the EF patients.

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References

Bourgault, A.M., Ipe, L., Weaver, J., Swartz, S., & O'Dea, P.J., (2007). Development of evidence-based guidelines and critical care nurses'knowledge of enteral feeding. Crit Care Nurse, vol., 27, No., 4, Aug., P.p 17-29.

Brown, A., Forbes, M., Vitale, VS., Tirodker, UH., & Zeller, R. (2012). Effects of a gastric feeding protocol on efficiency of enteral nutrition in critically ill infants and children.ICAN. vol. 4(3), 175-180.

Chang, WK., McClave, SA., Hsieh, CB., & Chao, YC., (2007). Gastric residual volume and gastric contents measurement by refractometry. JPEN J Parenter Enteral Nutr., 31:63.

David, J., (2011). Assessment of gastrointestinal problems. Available from: http://www.anaesthesiajournal abstract.

Gardiner, J. & Anderson, A. (2007): Nutrition Team Handbook. How to manage enteral and parenteral nutrition in a hospital setting. 2nd ed., Pp. 15-22.

Hodge, S. & Riley, N., (2008). Provision of nutrition support to critically ill burns patients. Can we do better ?. Nutrition.24, 504-5.

Hurt, RT., & McClave, SA., (2014). Gastric residual volumes in critical illness. What do. They really Mean?. Crit Care Clin. 26, 481-490.

Hurt, RT., & McClave, SA., (2010). Gastric residual volumes in critical illness. What do. They really Mean?. Crit Care Clin. 26, 481-490.

Johnson, AD., (2009). Assessing gastric residual volumes. Crit Care Nurse. 29, 72-7

Juve-Udina, M., Valls-Miro, C., Carreno-Granero, A., Martinez-Estalella, G., Monterde-Prat, D., Domingo-felici, M., Llusa-Finestres, Joan & Asensio-Malo, G., (2009). To return or to discard? Randomised trial on gastric residual volume management. Intensive and Critical Care Nursing. 25, 258-267.

Kaur, D., Agnihotri, M., Kaur, S., & Narayanan, S., (2012). Effect of reintroduction of aspirated gastric content on serum electrolytes levels of patients receiving nasogastric/orogastric feed admitted in intensive care units. Nursing and Midwifery Research Journal, Vol. 8, No.,2, April.

Kaur, D., Agnihotri, M., Kaur, S., & Narayanan, S., (2013). Effect of reintroduction of aspirated gastric content on gastric emptying in patients receiving nasogastric/ orogastric feed in intensive care unit. Nursing and Midwifery Research Journal, Vol. 9, No., 2, April.

Kreymann, KG., Berger, MM., Deutz, NE., Hiesmayr, M., Jolliet, P., Kazandjiev, G., et al. (2006). ESPEN

guidelines on enteral nutrition. Intensive Care. Clin Nutr. 25, 210-23.
Kuppinger, D., Rittler, P., Hartl, WH., & Ruttinger, D., (2013). Use of gastric residual volume to guide enteral nutrition. Systematic review of clinical studies. Nutrition,29(9), 1075-9.
Landzinski, J. Kiser, TH., Fish, DN., et al. (2008). Gastric motility function in critically ill patients tolerant versus intolerant to gastric nutrition. J Parenter Enteral Nutr, 32:45-50.
Marshall, AP., & West, SH., (2006). Enteral feeding in critically ill: Are nursing practices contributing to hypocaloric feeding? Intensive Crit Care Nurs. 22, 95-105.
Metheny, NA., SChallom, L., Oliver, DA., et al., (2008). Association between gastric residual volumes and aspiration in critically ill patients receiving gastric feedings. Am. J Crit Care., Nov:in press.
Metheny, NA, Schallom, ME, Edwards, SJ. (2004). Effects of gastrointestinal motility and feeding tube site on aspiration risk in critically ill patients: a review. Heart Lung, 33 (3), 131-45.
McClave, SA., Lukan, JK., Stefater, JA., Lowen, CC., Looney, SW., Matheson, PJ., et al., (2005). Poor validity of residual volumes as a marker for risk of aspiration in critically ill patients. Crit Care Med. 33, 324-30.
Metheny, NA., Schallom, L., Oliver, DA., & Close, RE., (2008). Gastric residual volume and aspiration in critically ill patients receiving gastric feedings. Am J Crit Care. 17(6), 512-9
Montejo, J., Minambres, E., & Bordeje, L., (2008). Gastric residual volume during enteral nutrition in ICU patients. Intens Care Med., Abstract 0455.
Moreira, T. V., and McQuiggan, M., (2009). Methods for the assessment of gastric emptying in critically ill, enterally fed adults. Nutrition in Clinical Practice, 24(2), April/May, 261-273.
Murphy, P., & Chudleigh, V. (2010): Adult nasogastric and gastrostomy tube feeding guidelines. Version 5, 1-50.
Nguyen, NQ., Fraser, RJ., Chapman, MJ., et al., (2007). Feed intolerance in critical illness is associated with increased basal and nutrient-stimulated plasma cholecystokinin concentrations. Crit Care Med.35(1), 82-88.
Parrish, CR., & McClave, SA., (2008). Checking gastric residual volumes. A practice in search of science? . Practical Gastroenterology. October, 33-47.
Pullen, RL., (2004). Measuring gastric residual volume. Nursing, 18-34.
Rohm, KD., Boldt, J. & Piper, SN., (2009). Motility disorders in the ICU. Recent therapeutic options and clinical practice. Curr Opin Clin Nutr Metab Care. 12, 161-7.
Ridley, E., & Davies, A., (2011). Practicalities of nutrition support in intensive care unit: The usefulness of gastric residual volume and prokinetic agents with enteral nutrition. Nutrition, 27, 509-512.
Steele, A.G., and Sabol, V., (2009), Common gastrointestinal disorder P.p 1025-1040 in Critical Care Nursing, A holistic Approach, by Morton, P,G., and Fontaine, DK., Ninth edition, 2009.
Williams, TA., & Leslie, GD., (2004). A review of the nursing care of enteral feeding tubes in critically ill adults. Part I. Intensive Crit Care Nurs. 20, 330-43.
Zaloga, GP., (2005). The myth of gastric residual volume. Crit Care Med. 33(2), 449-50.