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FEEDING JEJUNOSTOMY AS A LIFELINE FOR ESOPHAGEAL MALIGNANCIES

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ABSTRACT

Objective: To share experience about enteral nutrition via feeding jejunostomy in patients undergoing esophagectomies or for palliative purposes and compare our findings with similar studies. The objective of this study is to show the safety/viability of the procedure in patients undergoing esophagectomies and as a palliative procedure in inoperable CA esophagus.

Study Design: Observational study.

Place and Duration of Study: CMH Lahore and CMH Rawalpindi, from 2010 to 2016.

Material and Methods: Feeding jejunostomy is a surgical technique for placement of a feeding tube into small intestine mainly for administration of nutrition. Our method was based upon Witzel jejunostomy technique with emphasis on early postoperative commencement of enteral nutrition & achievement of target caloric and protein requirement subsequently. A total of 439 patients who underwent feeding jejunostomy were included. These include patients suffering from any benign or malignant pathology for which esophagectomy was done and those patients who are suffering from inoperable carcinoma and underwent feeding jejunostomy for palliative purposes.

Results: Result and price analysis shows that feeding jejunostomy is financially viable as per day nutrition cost for feeding via total parenteral nutrition (TPN) is Rs 8500 ± 500 (including required daily labs) and for enteral its around 560 ± 40 Rs/day. None of our patient was put on TPN and none suffered from malnutrition. Percentage of complications rendered were on par with the results from similar studies and meta-analysis.

Conclusion: We conclude that feeding jejunostomy is financially viable with minimal complications, that justifies its use and its superiority over TPN.

Keyword: Enteral nutrition, Esophageal cancer, Esophagectomy, Parenteral nutrition.

INTRODUCTION

Feeding jejunostomy is a procedure by which a tube is placed into the lumen of small intestine for the administration of nutrition. This procedure was first performed by Busch in 1858 for nutritional purpose in a patient suffering from inoperable CA[1], followed by Surmay de Havre in 1878 who achieved a jejunostomy via entrostomy[2]. The definitive Witzel technique for jejunostomy was devised for the first time in 1891.

It's been reported and observed repeatedly that mal-nourishment especially post operatively can cause serious complications[3,4]. Patients suffering from cancer experience more problems post-operatively in case of malnutrition as compared with well-nourished patients[5,6]. Administration of nutrition can be done through any enteral (Naso/Orogastric, -Ostomy) or parenteral route[7,8]. Enteral route is preferred because it results in improved utilization of nutrients, protection of mucosa from atrophy, protection of normal gut flora, ensurance of gut integrity, more immune competence and less incidence of septic complications when compared with TPN[9]. The enteral route most widely used is a jejunostomy because peristaltic activity of jejunum and absorptive capacity of small intestine is preserved after major surgery or multi systemic trauma (stomach and colon don't)[10]. Enteral route placed beyond ligament of Trietz results in less risk of gastroesophageal reflex and bronchial aspiration (as compared to a gastrostomy)[11].

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Absolute indication for a feeding jejunostomy is as an additional procedure in patients undergoing major surgery of upper GI & as a palliative care technique for patients suffering from malignant inoperable neoplasms who are hypermetabolic or hyper catabolic. Feeding jejunostomy is indicated for every patient undergoing esophagectomy via laparotomy[12] & administration of nutrition via a feeding jejunostomy is financially viable and in comparison, with TPN is cost effective[13] as is described later in the price comparison.

PATIENTS AND METHODS

This observational study was conducted at CMH Lahore and CMH Rawalpindi, from 2010 to 2016. Non-probability convenient sampling is used and 439 subjects are included in the study.

Feeding jejunostomy is a surgical technique for placement of a feeding tube into small intestine mainly for administration of nutrition. Our method was based upon Witzel jejunostomy technique with emphasis on early postoperative commencement of enteral nutrition & achievement of target caloric and protein requirement subsequently. A total of 439 patients who underwent feeding jejunostomy in CMH Lahore and CMH Rawalpindi from 2010 to 2016 were included. These included patients suffering from any benign or malignant pathology for which esophagectomy was done and those patients who were suffering from inoperable carcinoma and underwent feeding jejunostomy for palliative purposes.

Witzel jejunostomy technique has been proven to be an effective way to provide enteral nutrition[1,14]. An NG tube (#14 for most of the cases) was inserted 10-15 cm from DJ junction (by open laparotomy). After the placement and fixation of tube with canal suturing, on-table gravitational check was performed and any complication rendered was dealt accordingly. Enteral feeding was started within 24 hours postoperatively, effort was made to start feeding as early as possible because it's been observed and reported that early and in some cases immediate enteral feeding post operatively is beneficial for patients[15]. It was gradually increased in quantity till target caloric value was achieved i.e. 35-40 kcal/kg and 1.5-2.0 g/kg/day protein/day.

The enteral formula was devised that included on:

1st Day: Normal Saline 50 ml/2 hrs.

2nd Day (Onward): Milk, Beef Tea, Eggs (Blended with Milk), High Energy Powders (Mixed with water and/or milk), juices, shakes etc. every 3rd hour.

Eligibility criteria and literature search: From the hospital notes, we gathered information about preoperative condition and procedure done. We supplemented computerized searches of PubMed, Embase, and the Cochrane controlled trials register with checks of relevant reference lists.

Our collection of data was spread over 6 years of procedures conducted at two tertiary care centers. A total of 439 cases were documented that underwent esophageal surgery and feeding jejunostomy or feeding jejunostomy alone as shown in table-I. None of the patients were put on complete parenteral feeding. All the patients that underwent esophagectomy on account of suffering from any benign or malignant pathology that underwent feeding jejunostomy as an additional procedure were included in our data along with patients suffering from inoperable CA who underwent esophagectomy for palliative purposes (table-I). Patients who suffered from trauma or any other disease due to which esophagectomy was carried out were excluded along with patients who underwent gastrostomy. About 226 suffered from CA who underwent esophagectomy and had feeding jejunostomy done as an additional procedure, 41 patients who suffered from benign pathology who required esophagectomy were included and 172 patients who underwent palliative jejunostomy were included. Data analysis shows that feeding jejunostomy is financially viable as per day nutrition cost for feeding via total parenteral nutrition (TPN) is Rs 8500 ± 500 (including

required daily labs) and for enteral its around 560 ± 40 Rs/day.

RESULTS

Total number of subjects included in the study was 439. Result and price analysis shows that feeding jejunostomy is financially viable as per day nutrition cost for feeding via total parenteral nutrition (TPN) is Rs 8500 ± 500 (including required daily labs) and for enteral its around 560 ± 40rs /day. None of our patient was put on TPN and none suffered from malnutrition. Percentage of complications rendered were on par with the results from similar studies and meta-analysis.

None of the patients that were put on enteral feeding suffered from any form of malnutrition or any serious complication especially regarding the nutritional requirements of the patient. The number of complications was minimal including 3 accidental removals of the feeding tube that were appropriately managed, 7 patients suffered from tube blockade, 35 suffered from SSI, 21 suffered from abdominal distension and 2 suffered from abdominal colic (table-II).

Table-I: No of patients per year put on feeding jejunostomy in esophageal disease.

Disease	Procedure	Type	2010	2011	2012	2013	2014	2015	2016	Total
CA	Esophagectomy and feeding jejeunostomy (226) 51.4%	McKeown	3	4	4	8	4	1	3	27 (6.1%)
		Trans hiatal	3	6	12	7	17	3	8	56 (12.7%)
		Left Thoracoabdominal	20	16	15	12	10	1	7	81 (18.45%)
		Esophagogastrectomy	-	-	1	4	4	1	2	12 (2.7%)
		TLPO	3	3	5	5	5	8	5	34 (7.7%)
		Ivor-Lewis	-	-	-	-	1	1		2 (0.45%)
		Roux-en-Y Jejunal	2	4	6	-	-	-		12 (2.73%)
		Retrosternal Bypass	1	1	-	-	-	-		2 (0.45%)
Benign Structure	Esophagectomy and feeding jejunostomy (41) 9.3%	Trans hiatal	-	1	2	2	7	7	1	20 (4.5%)
		Cyst Excision	-	-	-	-	1	2		3 (0.68%)
		Colon Interposition	1	1	-	-	3	1	3	9 (2.0%)
		TLPO	-	-	1	1	1	-	1	4 (0.9%)
		Pull Up	2	-	1	-	-	1	1	5 (1.1%)
Inoperable CA feeding jejunostomy (172) 39.1%			22	17	21	25	49	19	19	172 (39.1%)
Total			57 (12.9%)	53 (12.0%)	68 (15.4%)	64 (14.5%)	102 (23%)	45 (10.25%)	50 (11.38%)	439

DISCUSSION

Feeding jejunostomy is a procedure by which a tube is placed into the lumen of small intestine for the administration of nutrition. This procedure was first performed by Busch in 1858 for nutritional purpose in a patient suffering from inoperable CA[1], followed by Surmay de Havre in 1878 who achieved a jejunostomy via entrostomy[2]. The definitive Witzel technique for jejunostomy was devised for the first time in 1891.

It's been reported and observed repeatedly that malnourishment especially post operatively can cause serious complications[3,4]. Patients suffering from cancer experience more problems post-operatively in case of malnutrition as compared with well-nourished patients[5]. Administration of nutrition can be done through any enteral (Naso/ Orogastric, -Ostomy) or parenteral route. Enteral route is preferred because it results in improved

utilization of nutrients, protection of mucosa from atrophy, protection of normal gut flora, ensurance of gut integrity, more immune competence and less incidence of septic complications when compared with TPN[16]. The enteral route most widely used is a jejunostomy because peristaltic activity of jejunum and absorptive capacity of small intestine is preserved after major surgery or multi systemic trauma (stomach and colon don't)[10]. Enteral route placed beyond ligament of Trietz results in less risk of gastro-esophageal Reflex and bronchial aspiration (as compared to a gastrostomy)[11].

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Table-II: Complications.

Accidental removals	3	0.68%
Tube blockade	7	1.59%
SSI	35	7.97%
Abdominal distension	21	4.7%
Abdominal colic	2	0.45%

Feeding jejunostomy is indicated for every patient undergoing Esophagectomy via laparotomy[12] & administration of nutrition via a feeding jejunostomy is financially viable and in comparison, with TPN is cost effective[13] as is described later in the price comparison.

Effective post-operative nutrition is integral for the well being and recovery of the patient and administration of enteral nutrition post operatively depends on the expertise of the surgeon and the available resources[12].

We live in a time where effective yet affordable healthcare is demand of the hour. Major invasive surgical procedures such as Esophagectomies on their own are quite expensive singularly and if they are coupled with TPN (post operatively) for a prolonged period they can put a serious strain on the patient's financial well being.

This study highlights the cost effectiveness (without compromising the safety of the patient) of enteral feeding over TPN.

The cost of administration of nutrition differs immensely for both techniques. It has been observed that enteral feeding causes much less complications when compared with TPN by reducing infectious complications[17], decreasing hospital stay among others[18]. It can be said that enteral feeding renders much less financial constraints on the patient when the post op complications are considered and as well as an overall nutrition providing method. EN has been proved to be multiple times cheaper than TPN[19-21].

Par enteral feeding costs around Rs 8500 ± 500 that includes the cost of feed itself that amounts to be around Rs 6000 per day as 2500ml feed is required and it costs around Rs 3000/ 1250ml. it also includes 2500 Rs of daily labs (LFTs, RFTs, Etc.) that are required along with the feeding. Enteral feeding that can consist of normal house hold eatables including Milk (Rs 25/feed) Beef tea (Rs 50/feed) others (juices, shakes etc. Rs 50/feed)) & some high energy supplements Rs 200/feed amounts to be around Rs 560 ± 40 Rs per day with an average single feed cost of around 80 Rs with 7 feeds minimally per day.

CONCLUSION

We conclude that feeding jejunostomy is financially viable with minimal complications, that justifies its use and its superiority over TPN.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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