

Cost Benefit Analysis of T Tube Feeding Jejunostomy

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Abstract : Nutritional support of patient is an integral component of critical care. Intravenous infusion of high calories and therefore high osmolar substrates require central venous catheterization which carries the risk of septic thrombotic and mechanical complications. Hence a certain renaissance in early postoperative enteral nutrition has occurred. Established fact that small bowel motility and absorption remain functionally intact despite laparotomy or stress, makes the jejunostomy tube placement most popular technique for enteral feeding. In our study cost benefit analysis of feeding jejunostomy was done as in comparison to parenteral nutrition. Total saving was ₹2,97,563 (25 patients) as compared to similar amount of calories delivered through parenteral route. Maximum cost benefit was derived in those patients, who were given feed for more than 15 days.

Keywords: Cost benefit, Feeding jejunostomy, Kehr's T tube,

I. Introduction

Nutritional support of patient is an integral component of critical care. Intravenous infusion of high calories and therefore high osmolar substrates require central venous catheterization which carries the risk of septic thrombotic and mechanical complications[1]. Hence a certain renaissance in early postoperative enteral nutrition has occurred. Total enteral nutrition when compared with total parenteral nutrition prevents gastrointestinal mucosal atrophy, attenuates the injury stress response, maintain immunocompetence, preserve normal gut flora[2]. Multiple methods of obtaining enteral access are in use as gastrostomy, gastroduodenal intubation and jejunostomy. Established fact that small bowel motility and absorption remain functionally intact despite laparotomy or stress, makes the jejunostomy tube placement most popular technique for enteral feeding[3].

II. Materials And Methodology

The present study was conducted on patients admitted in wards of Surgical Unit A at M.B. Hospital Udaipur. We planned feeding jejunostomy in those patients (25 cases) who could not take oral diet including oesophageal diseases (Benign and Malignant) and gastric outlet obstructions (Corrosive Stricture, Benign, Malignant) and as an additional procedure in patient who underwent major surgery on oesophagus, stomach, pancreato biliary tract, repair of large duodenal perforations. An emerging technique is used by us for feeding jejunostomy[4-8]. We used Kehr's T-tube (of no. 14-18) as feeding tube[9,10]. We used non-elemental diet for feeding. Feeding starts once patient passes flatus and bowel sound is present (After 48-72 hours). In this study cost computation will be based on expenses of diet given through feeding tube[11]. Gross saving will be calculated by subtracting the cost of total number of K-calories administered as defined diet from the cost of similar number of calories that would have been required as central or peripheral parenteral hyperalimentation.

Cost benefit of feeding catheter placement: Cost benefit which the patient derived from the jejunal feeding was divided into three categories – Minimal, Moderate and Maximum benefit. As most patients who have undergone permanent jejunostomy have feeding period of 30 or more days so their average duration of feeding was taken as 30 days.

(A) Minimal benefit: This category included the patient in whom feeding tube was used for 10 days or less. This group of patient would normally be given following I/V alimentation/day had the jejunal feeding tube not been present.

I/V alimentation	Amount	Cost/unit	Total cost (Rs.)	Calories
20% GDW	2 L	Rs.20/500CC	80	1600
10% GNS	1 L	Rs.15/500CC	30	400
M.V.I.	1 Amp.	Rs.10/one	10	--
Kesol(kcl)	3 Amp.	Rs.10/one	30	--
			150	2000 Kcal

I/V alimentation to this group of patient would be given through peripheral venous canula (Triath cost 75 Rs.) which have to be changed every 3rd day.

(B) Moderate benefit: This category included the patient in whom tube was used for 11-15 days. This group of patient would normally be given following I/V alimentation/day had the jejunal tube not been present.

I/V alimentation	Amount	Cost/unit	Total cost (Rs.)	Calories
20% GDW	2 L	Rs.20/500CC	80	1600
10% GNS	500CC	Rs.15/500CC	15	200
Aminocore 5S	500CC	Rs.600/one	600	200
M.V.I.	1 Amp.	Rs.10/one	10	--
Kesol(kcl)	3 Amp.	Rs.10/one	30	--
			735	

This group of patient require central venous canulation (Rs.400) for I/V alimentation.

(C) Maximum benefit: This category included the patient in whom feeding tube was used for > 15 days. This group of patient would normally be given following I/V alimentation/day had the jejunalfeeding catheter not been present.

I/V alimentation	Amount	Cost/unit	Total cost (Rs.)	Calories
20% GDW	1.5 L	Rs.20/500CC	60	1200
10% GNS	500CC	Rs.15/500CC	15	200
Aminocore 5S	500CC	Rs.600/one	600	200
Lipocore 20%	250CC	Rs. 620/250CC	620	500
M.V.I.	1 Amp.	Rs.10/one	10	--
Kesol	3 Amp.	Rs.10/one	30	--
			1315	

Other day: Same as for the group B (moderate benefit) patient costing 735 Rs/day. Thus average per day cost of the alimentation for this group of patient would be:

$$\frac{735 + 1315}{2} = \text{Rs.1025/day}$$

This group of patient require central venous canulation (costing Rs.290) for I/V alimentation. We have used following feeding formula:

Product	Amount	Cost (Rs.)	Kcal
Milk	1 L	25	700
Sugar	200 gm	8	800
Recupex	One sachet	30	220
Protinex Power	30 gm (6 TSF)	30	100
Pulses water	500 cc (100gm of pulse)	10	200
Vitamin Syp.	100 cc (2 TSF)	10	--
	Total	113	2000

Prices as on 31st March 2011

This formula provides about 2000 Kcal (56% from carbohydrates, 22.5% from fat and 21.5% from protein) with adequate vitamins and minerals, costing around Rs.113. Cost of Kehr's T-tube used as feeding tube is Rs.25[12].

III. Observation And Discussion

Total number of jejunostomy : distribution by age and sex

Age group (years)	Male	Female	Total
21-30	2	2	4
31-40	3	-	3
41-50	3	3	6
51-60	7	4	11
61-70	1	-	1
71-80	-	-	-
Total	16	9	25

Duration of feeding (feeding jejunostomy)
(Minimum benefit group)
Feeding < 10 days

Duration of feeding	No. of patients
5 days	-
6 days	1
7 days	1
8 days	1
9 days	-
10 days	1
Total	4

Total duration of feeding – 36 days
 Average duration of feeding/patient = 36/4 = 9 days

**Duration of feeding (feeding jejunostomy)
 (Moderate benefit group)**

Feeding 11-15 days

Duration of feeding	No. of patients
11 days	-
12 days	2
13 days	-
14 days	-
15 days	1
Total	3

Total duration of feeding – 39 days
 Average duration of feeding/patient = 39/3 = 13 days

**Duration of feeding (feeding jejunostomy)
 (Maximum benefit group)**

Feeding > 15 days

Duration of feeding	Mean	No. of patients
16-20 days	18	1
21-25 days	22	1
26-30 days	28	3
> 30 ~ 30	30	13
Total		18

Total duration of feeding = 514 days
 Average duration of feeding/patient = 514/18 = 28.4 ~ 28 days

The duration of feeding in cases of permanent feeding jejunostomy was assumed to be a modest 30 days for purpose of cost benefit calculation.

Cost Benefit For Minimal Benefit Group (Feeding Less Than 10 Days)

Average duration of feeding/patient = 9 days
 Cost of I/V fluid/day = `150/-
 Cost of jejunostomy feeding formula/day = `113/-

Cost of I/V alimentation (for 9 days/patient)

I/V fluid	I/V drip set (three)	Tricath (three)	Total cost
1350	`45	`150	`1,545

Cost of jejunostomy feed (for 9 days/patient)

Feed	Kehr's tube	Total cost
`1,017	`25	`1,042

Cost benefit = `1,545 – `1,042 = `503
 Total number of patients in this group = 4
 Cost benefit for 10 patients in 8 days of feeding = 530 x 4 = `2,012

Cost Benefit For Moderate Benefit Group (Feeding 11-15 Days)

Average duration of feeding/patient = 13 days
 Cost of I/V fluid/day for first 10 days = `150/day

For next 4 days = `735/day
 Cost of jejunostomy formula/day = `113

Cost of I/V alimentation (for 13 days/patient)

I/V fluid		I/V drip (five)	Central line	Total cost
First 10 days	Next 4 days			
`1,500	`2,940	`75	`400	`4,915

Cost of jejunostomy feed (for 13 days/patient)

Feed	T-tube	Total cost
`1,469	`25	`1,494

Cost benefit = `4,915 – `1,494 = `3,421/patient
 Total number of patients in this group = 3
 Cost benefit for 4 patients in 13 days of feeding
 = `3,421 x 3 = `10,263

Cost Benefit For Maximum Benefit Group (Feeding > 15 Days)

Average duration of feeding/patient = 28 days
 Cost of I/V fluid/day : For first 10 days = `150/day
 For next 5 days = `735/day
 For remaining 13 days = `1,025/day
 Cost of jejunostomy feeding formula = `113/day

Cost of I/V alimentation (28 days/patient)

I/V fluid			I/V drip set (nine)	Central line	Total cost
First 10 days	Next 5 days	Remaining 13 days			
`1,500	`3,675	`13,325	`135	`400	`19,035

Cost of jejunostomy feed (for 28 days/patient)

Feed	Kehr's T-tube	Total cost
`3,164	`25	`3,189

Cost benefit = `19,035– `3,189 = `15,846
 Total number of patients in this group = 18
 Cost benefit for 18 patients in 28 days of feeding
 = 18 x 15846= `2,85,288

Total saving = Minimal benefit + Moderate benefit + Maximum benefit
 2,012 + 10,263 + 2,85,288 = `2,97,563

IV. Conclusion

Most (43%) feeding jejunostomies were done in the age group 51-60 year with the range from 25 to 61 years. Total saving was `2,97,563 (25 patients) as compared to similar amount of calories delivered through parenteral route. Maximum cost benefit was derived in those patients, who were given feed for more than 15 days. Thus feeding jejunostomy is an effective method of enteral nutrition in elective and emergency cases where prolonged duration of intravenous alimentation is anticipated. T tube Feeding jejunostomy is not only a cost effective but it also provides balanced nutrition. This is an important consideration in our set up where majority of patients are from poor socioeconomic background. T tube Feeding jejunostomy provides inexpensive method of temporary or permanent nourishment with low rate of complications.

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