



## Outcome of management of high output fistulas in Abdominal Surgeries with Re-feeding: An observational study, Tertiary care Hospital, Jaipur

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### Abstract

**Background:** To find out the proportion of cases with successful outcome in patients of high output fistulas put on re-feeding along with additional nutrients in first four months.

**Methods:** This observational study was conducted at a tertiary care hospital. Re-feeding formula prepared in ratio of 1:10 and given with every Re-feed. Ingredients of re feed: Coconut water 50 ml, Salt and sugar: 1 tsp each, 2 Eggs, Vitamin B and iron syrup: 1Tsp each, Protein powder 50 grams, Honey 2 tsp, Ghee 1tsp. Cases monitored till the stoma was closed.

**Results:** Majority (75%) survived during study period. Three out of five died during hospital stay and two after discharge. Seventeen patients required post operative ICU care. Majority (85%) of survivors had normal level of Vitamin B, Ferritin and electrolytes after 15 days. Ten patients required readmission for acute renal failure and managed conservatively. Additional PN was required in 10 patients.

**Conclusion:** Patients with proximal jejunostomies could be alternatively managed with distal Re-feeding with addition of nutrients. Majority recovered after one month of re-feeding. Mortality low.

**Keywords:** Outcome, Abdominal Surgeries, Re-feeding.

### Introduction

Majority (80%) of GI fistulas occur as a complications after abdominal surgeries with an incidence of 0.8% to 2%. The common risk factors associated with GI fistula are Cancer Surgeries, inflammatory bowel disease (IBD), adhesiolysis, peptic ulcer disease, gut gangrene, abdominal trauma (eg, gunshot wounds, sharp trauma), or motor vehicle accidents. Fistula mortality rates have been decreased from as high as 45-60 % to 5- 23 % recently though high output fistulas still have mortality rate of 35 %<sup>1</sup>. High output fistula leads to short bowel syndrome. Short bowel syndrome (SBS) comprises the

sequelae of nutrient, fluid, and weight loss that occurs subsequent to greatly reduced functional surface area of the small intestine. Signs and symptoms of SBS include electrolyte disturbances; deficiencies of calcium, magnesium, zinc, iron, vitamin B12, or fat-soluble vitamin deficiency; malabsorption of carbohydrates, lactose, and protein; metabolic acidosis, gastric acid hypersecretion; formation of cholesterol biliary calculi and renal oxalate calculi; and dehydration, steatorrhea, diarrhea, and weight loss.<sup>2</sup> Some Patients who undergo proximal jejunum resection are unable to undergo primary anastomosis and require exteriorization of the

proximal jejunum. These patients usually have major problems with short bowel due to the high output of the stoma. The output of a proximal jejunostomy contains abundant amounts of enzymes and electrolytes. Therefore, it is a feasible approach to re-infuse jejunostomy output with re feeding to regain homeostasis.<sup>3</sup> Re feeding formula with balanced nutrients as per individual requirement could enhance survival. Our Re-feeding formula was based on BMI and physical activity ratio of individual patient.<sup>4</sup>

### Methodology

This hospital based observational study was conducted on 20 eligible cases of high output fistula in a tertiary care hospital during June 2017 to December 2018. Only those cases who required conservative treatment (as per P- Possum criteria<sup>5</sup> with more than 50% expected mortality) were included in the study. Daily Amount and nature of fistula output estimated as per their location. The PAL (Physical Activity Level) using time and energy allocated to all activities is calculated. BMR (Basal Metabolic Rate) is calculated using age and weight. Daily energy requirement (kcal) is calculated using PAL and BMR according to different age groups. (FAO). The Daily Fistula Output is Re Fed in the distal limb along with a Re Feeding mixture (Using Foley's catheter in distal limb or FJ). Amount calculated based on daily calories needed. Amount calculated was mixed with fistula output in ratio of 1:10 and was divided in 12 portions to be fed every hour ( 12 hours- 9 am to 9 pm ). Monitoring of feeding regimes was done.<sup>E</sup> Outcomes was assessed on mortality, requirement of readmission, stoma closure, electrolyte imbalance and ICU care.

**Sample Size:** A sample of 20 cases are required at 95% confidence and 20% absolute error to verify the expected 74% survival<sup>6</sup> among cases of high output fistula put on Re-feeding formula. Eligible cases were included on first cum first basis till we reached sample size.

Method of Preparation of Re-feeding mixture: A mixture to fistula output in ratio of 1:10 was given with every Re-feed based on daily fluid loss in fistula.

### Re feed formula:

Coconut water 50 ml  
Salt and sugar: 1 tsp each,  
2 Eggs  
Vitamin B and iron syrup: 1Tsp each,  
Protein powder 50 grams,  
Honey 2 tsp,  
Ghee 1tsp.

**Study Area:** General surgery department SMS hospital Jaipur

**Design:** Hospital Based Prospective Observational Study

**Duration:** June 2017 to December 2018 - till sample size achieved.

**Sample Size:** A sample of 20 cases are required at 95% confidence and 20% absolute error to verify the expected 74% survival<sup>5</sup> among cases of high output fistula put on Re-feeding formula.

**Study Population:** Patients with High output fistulas managed conservatively.

**Inclusion Criteria:** Patients Who gave consent for the study.

**Exclusion Criteria:** Patients who did not give consent for the study.

### Statistics

The subjects who gave consent were allocated according to systemic random sampling. data compiled and analysed using Epi info Version 7.2

### Results

There were 14 males and 6 males in the age group of 21-70 yrs. Seventeen patients required post operative ICU care. Majority (85%) of survivors had normal level of Vitamin B<sub>12</sub>, Ferritin and electrolytes after 15 days. Ten patients required readmission for acute renal failure and managed conservatively (P value non sig). Additional PN was required in 10 patients. 15% cases had electrolyte imbalance during study period. No major complications were seen.

Fifteen cases survived at the end of 4 months of followup. Three out of five died during hospital stay and two after discharge.

The median hospital stay was 25 (15-60) days.

Fifteen patients had their stomas closed at 120(60-

250) days. (p >.085 ns) Longest time taken was 250 days for a single case.

**Master Chart**

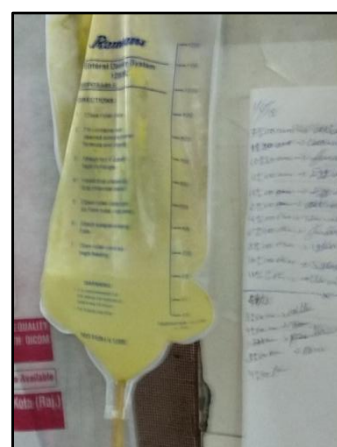
Case Record	Gender	AGE	FOLLOW UP FOR 4 MONTHS	REQUIRED READMISSION	TPN REQUIRED (WEEKLY)	LENGTH OF HOSPITAL STAY (DAYS)	POST OP ICU REQUIRED	FORTNIGHTLY MICRONUTRIENTS WITHIN NORMAL RANGE	STOMAS CLOSED AT (DAYS)
1	M	25	DEATH	READMISSION	YES	25	YES	NORMAL	NO CLOSURE
2	M	21	LIVE	NOT REQUIRED	NOT REQUIRED	20	YES	NORMAL	60
3	M	52	LIVE	READMISSION	YES	35	YES	NORMAL	120
4	M	35	LIVE	NOT REQUIRED	YES	20	NO	NORMAL	115
5	F	40	LIVE	READMISSION	NOT REQUIRED	26	YES	NORMAL	120
6	M	42	LIVE	NOT REQUIRED	YES	28	YES	NORMAL	120
7	F	27	DEATH	NOT REQUIRED	YES	18	YES	NORMAL	NO CLOSURE
8	F	46	LIVE	NOT REQUIRED	YES	23	YES	NORMAL	115
9	M	55	LIVE	NOT REQUIRED	NOT REQUIRED	32	YES	NORMAL	120
10	F	56	LIVE	READMISSION	YES	20	YES	NORMAL	100
11	F	49	LIVE	NOT REQUIRED	NOT REQUIRED	27	NO	NORMAL	115
12	F	36	DEATH	READMISSION	YES	31	YES	NORMAL	NO CLOSURE
13	M	37	LIVE	NOT REQUIRED	NOT REQUIRED	18	YES	NORMAL	250
14	M	42	LIVE	NOT REQUIRED	NOT REQUIRED	23	YES	NORMAL	118
15	M	44	LIVE	NOT REQUIRED	NOT REQUIRED	21	YES	NORMAL	100
16	M	52	LIVE	READMISSION	NOT REQUIRED	15	NO	NORMAL	120
17	M	71	DEATH	READMISSION	YES	60	YES	DECREASED	NO CLOSURE
18	M	62	LIVE	READMISSION	NOT REQUIRED	25	YES	DECREASED	120
19	M	69	DEATH	READMISSION	YES	30	YES	DECREASED	NO CLOSURE
20	M	42	LIVE	READMISSION	NOT REQUIRED	32	YES	NORMAL	120

**Illustrations**

I According to location of high output fistula, output and electrolyte imbalance is calculated. This case has a jejunostomy and high potassium loss. Output was ~ 2l daily.



II Amount of distal refeeding calculated and fed in portions throughout the day with help of feeding bag.



III Feeding bag connected with help of foley's to distal loop of fistula.



A . Predicted output of fistulas according to their loactions in gastrointestinal tract corresponding to electrolyte imbalances.

**TABLE 10-6: PREDICTED OUTPUT AND ELECTROLYTE COMPOSITION OF FISTULAS ACCORDING TO LOCATION**

Source	Volume (mL/d)	pH	Na	K	HCO <sub>3</sub> <sup>-</sup>	Cl
Gastric	2000–2500	<4	60	10	—	90
		>4	100	10	—	100
Pancreatic	1000		140	5	90–110	30–45
Bile	1500		140	5	35	100
Small bowel	3500		100–130	15	25–35	100–140

All values for sodium, potassium, bicarbonate, and chloride given in milliequivalents per liter.  
Adapted from Evenson AR, Fischer JE. Current management of enterocutaneous fistula. *J Gastrointest Surg.* 2006;10:455.

B Physical Activity level for each patient calculated according to abilities of movement and energy expenditure everyday.<sup>4</sup>

Category	PAL value
Sedentary or light activity lifestyle	1.40-1.69
Active or moderately active lifestyle	1.70-1.99
Vigorous or vigorously active lifestyle	2.00-2.40*

C Calculation of basal metabolic rate using weight ,height and age parameters which are further used to calculate daily calorie requirements using PAL.

Men:	
<b>METRIC:</b>	$10 \times \text{weight (kg)} + 6.25 \times \text{height (cm)} - 5 \times \text{age (years)} + 5$
<b>IMPERIAL:</b>	$10 \times (2.02) \text{ lbs} + 6.25 \times (0.39 \times \text{height in inches}) - 5 \times \text{age (years)} + 5$
Women:	
<b>METRIC:</b>	$10 \times \text{weight (kg)} + 6.25 \times \text{height (cm)} - 5 \times \text{age (years)} - 161.$
<b>IMPERIAL:</b>	$10 \times (2.02) \text{ lbs} + 6.25 \times (0.39 \times \text{height in inches}) - 5 \times \text{age (years)} - 161$

D Calculations for a man weighing ~ 60 kg , in age group of 40-50 years with average height - total calorie requirements 2400 kcal<sup>4</sup>. This re feeding mixture provided ~ 650 kcal. Four quantities of this mixture was churned with fistula ouput and given im distal loop throughout the day.

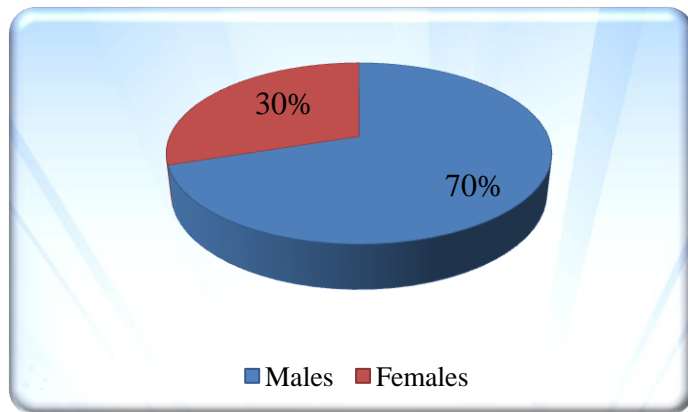
Ingredients	Calories {kcal }
Coconut water 50 ml	10
Salt and sugar - 1 tsp each	50
2 Eggs	140
Vitamin B vitamin c and iron syrup - 1Tsp each	
Protein powder 50 grams	220
Honey 2 tsp	120
Ghee 1tsp	112
<b>TOTAL</b>	<b>~650</b>

E Daily Weekly and Fortnightly Monitoring of various parameters were observed.

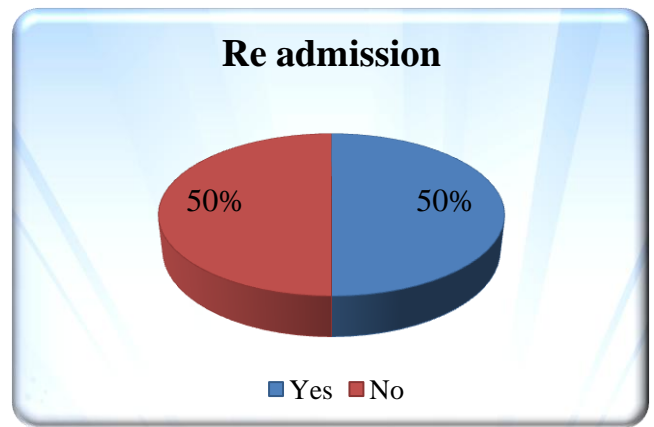
Daily	Body weight Fluid balance Full blood count, urea and electrolytes Blood glucose Electrolyte content and volume of urine and/or urine and intestinal losses Temperature
Weekly (or more frequently if clinically indicated)	Urine and plasma osmolality Calcium, magnesium, zinc and phosphate Plasma proteins including albumin Liver function tests including clotting factors Thiamine Acid-base status Triglycerides
Fortnightly	Serum vitamin B12 Folate Iron Lactate Trace elements (zinc, copper, manganese)

Graphs

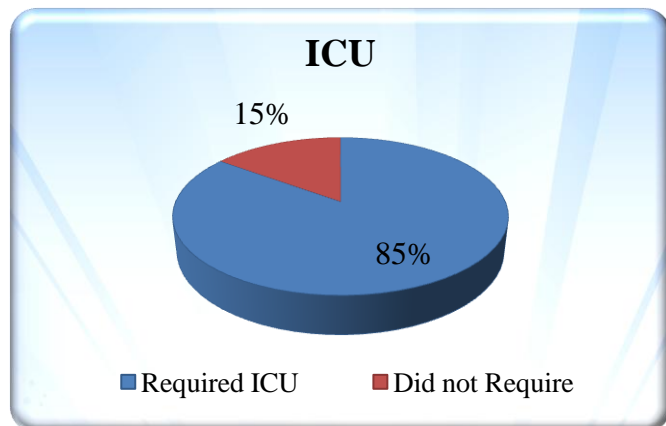
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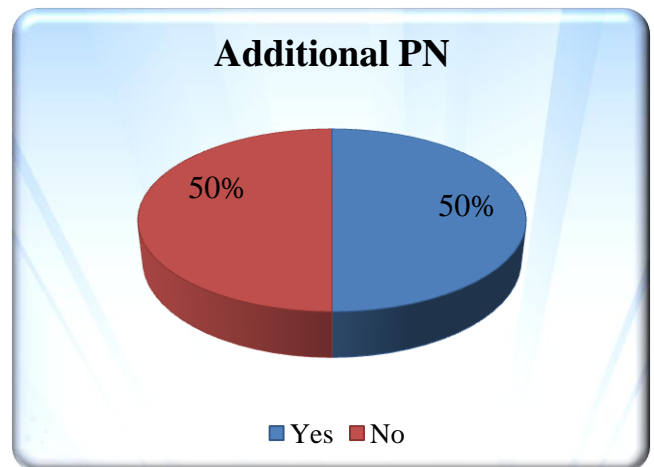
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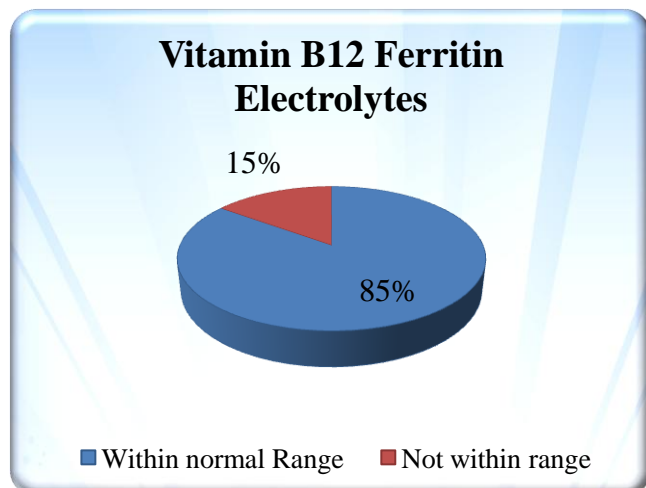
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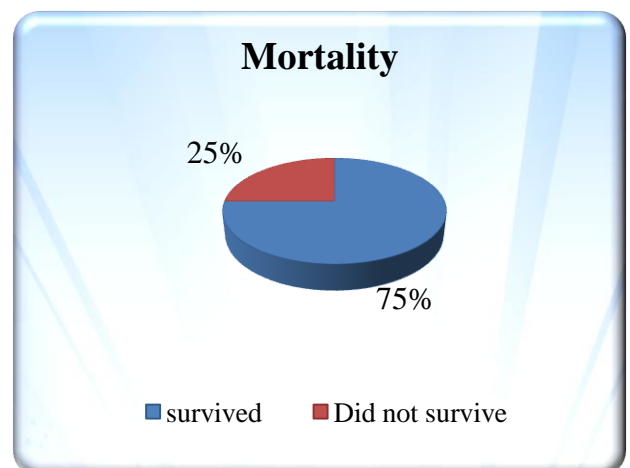
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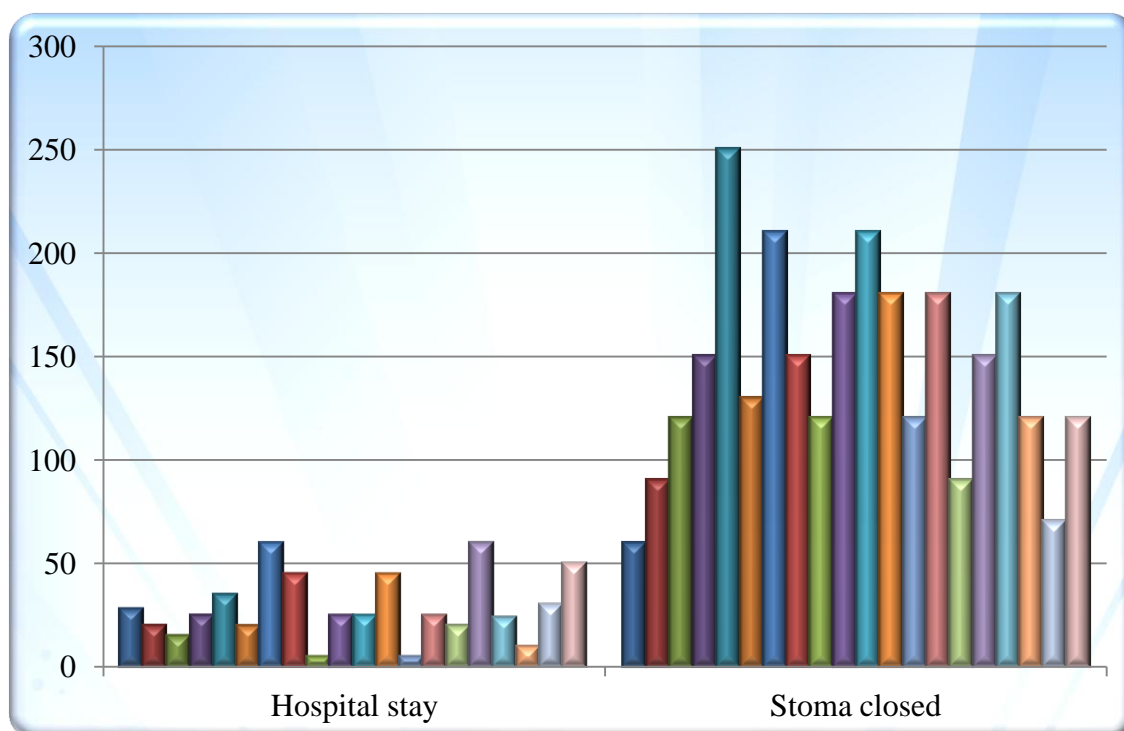
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### Discussion

- Patients with high output fistulas can be alternatively managed with distal Re-feeding with addition of nutrients. Majority recovered after around four months of re-feeding. Mortality was low.
- Study by Nagar A et al<sup>6</sup> there were 26 males and 9 females, whose median age was 47 (19-74) years. Twenty-five (71%) patients required post-operative ICU care. Additional PN was required in 6 (17%) patients during their index admission. Their median hospital stay was 13 (6-60) days. Patients were discharged without intravenous (IV) lines. Eight (26%) patients required re-admission for acute renal failure which was managed conservatively. No major problems were associated with re-feeding. None of the patients required PN after discharge from hospital. Thirty (86%) patients had their stomas closed at 65 (14-224) days. Both the patients with colon only as their distal bowel remnant died. Sepsis was the cause of mortality in 4 (11%) during index admission and 3 after their discharge. On

follow-up after bowel re-connection, 2 patients died after 1 and 12 months, both due to intracranial bleeding, and the overall survival was 74%. These results are in accordance with our study.

- According to study by Lau EC et al<sup>7</sup> the refeeding group showed less bowel ends size discrepancy (25 vs 53%,  $p=0.034$ ) and less postoperative anastomotic leakage (3 vs 20%,  $p=0.029$ ). Fewer refeeding group patients developed parenteral nutrition related cholestasis (42 vs 73%,  $p=0.045$ ) and required shorter parenteral nutrition support (47 vs 135days,  $p=0.002$ ). No major complication was associated with refeeding.
- To conclude, Mucous fistula refeeding is safe and can decrease risk of anastomotic complication and parental nutrition related cholestasis. It provides both diagnostic and therapeutic value and its use should be advocated.

### References

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