Original Article

Management of Gastrointestinal Cutaneous Fistulae.

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Summary:

Background: *-Gastrointestinal cutaneous fistula G.I.C.F. occur either postoperative or spontaneous, it is a major complication to patients & surgeons together,, still have significance incidence of morbidity & mortality.& it needs specific management.*

Aim:-*To study the causes of the fistula, to study the methods of treatment either medical or surgical with or without the use of total parenteral nutrition. T.P.N.*

Patients& methods: *-a prospective study done on 61 patients, divided into male &female, patients. G.I.C.F.were divided into high output & low output fistulae, then an attempt to find the causes of the fistulae & the type of treatment both conservative &surgical treatment, also to study the effect of the use of T.P.N.*

Result:*-45 patients were male &16 were female. Age range 13—58 years. The most common cause of the fistula was missile injury 39(63.93%)patients, followed by iatrogenic 6 (9.83%) then carcinoma of colon 6(9.83%).*

59(96.72%) patients developed fistula postoperative, & only 2(3.27%) patients developed the fistula spontaneous. The most common site of the fistula was the ileum 22(30.06%) patients; the least common site was the esophagus 2(3.27%).

32 (52.45%) patients were with high output fistula. 29(47.54%) patients were with low output fistula. Spontaneous closure rate was 57.37%, total number of patients treated by conservative methods were39, while the total number of patients treated by surgery were22.

89.74% closure rate by conservative treatment, closure rate by surgical treatment were63.63%..The mortality rate was 12 (19.67%) patients.

Conclusion: *-spontaneous closure rate of the fistula is high, the conservative treatment gave higher closure rate than the surgical treatment. The use of T.P.N.& octreotide decrease the morbidity & mortality.*

Keywords: *-G.I.C.F., causes, & treatment & the use of T.P.N.*

Introduction

Gastrointestinal cutaneous fistula (G.I.C.F.) is an abnormal tract lined by granulation tissue that connect any part of the gastrointestinal tract with the skin, (communication between two epithelial surfaces). Anatomically the fistula is either internal or external, physiologically, it is either low out put fistula the amount is less than 500 mls. / Day or high out put fistula the amount is 500--1000 mls per day or more, Fistula that occur during 7—10 post operative day after Gastrointestinal surgery may be due to tension on the anastamosis, poor blood supply, poor technique, while fistula that occur spontaneous is problematic .[1] The most common cause of postoperative fistula is gastrointestinal surgery, which compromise 75—85% of the cases [2,3]. While spontaneous fistula compromise 15—25% [3,4]as in carcinoma, T.B., radiation, Crohns' disease. Fistula will lead to loss of digestive juices, water, electrolytes,,enzymes& nutrients. So the malnutrition in (G.I.C.F.) is associated with increase in the morbidity & mortality. Edmunds et. al [5] reported 44% mortality rate but decreased to 6.5%--21% after the introduction of total parenteral nutrition (T.P.N.). Patients with fistulae who received more than 3000 k calory per day had a mortality of 12% while those who received less than 1000 k.calory per day had a mortality of 55%. [6]. The introduction of (T.P.N.) in 1970s the mortality rate reduced & the incidence of spontaneous closure increased, & even if the fistula did not close the patient will be in a better condition for surgery [7].

Esophageal fistulae commonly involve the respiratory tract than skin which cause mediastinitis , pneumonia, lung abscess & pleural effusion that is why it is associated with high mortality rate. The most common causes of esophageal fistulae are endoscopy, head, neck &chest surgery &malignancy.

Gastric & duodenal fistulae in 85% resulted as complication of surgery for peptic ulcer, biliary tract surgery, gastric carcinoma, pancreatic operations, RT. Colon surgery, aortic & kidney operations [8,9,10].

Small bowel fistula occur in 70—90% occurs after small bowel surgery [11,12]. while Crohns' disease is the main cause of 5%--50% of spontaneous fistula..

Colo cutaneous fistulae followed cases of diverticulitis, cancer, inflammatory bowel disease & appendicitis. Fistula is unlikely to close spontaneously if there is foreign body , infection or pus unless it is drained , inflammatory bowel disease , presence of neoplasm , there is distal obstruction , epithelization , there is complete disruption to the

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anastamosis & radiotherapy are the main causes of failure of spontaneous closure of fistulae.

Patients & Methods

This is a prospective study done at Baghdad teaching hospital (medical city.) during the period from January 2004 to October 2006. Sixty-one patients with (G.I.C.F.) included in this study, there were 45 male patients & 16 female patients. The ages ranged between13—58 years. (G.I.C.F.) cases included in this study. were esophageal, gastric, duodenal, smallbowel , & colon, while biliary, pancreatic & internal fistulae were excluded from this study. Primary cause of the fistulae & mode of closure whether by conservative or surgical treatment were also studied .

The data form was done included the name, age, gender, occupation, symptoms, physical examination, site & type of the fistula, blood investigations, abdominal ultrasound, fistulagram, barium meal or follow through &or double contrast barium enama also patients were classified according to the output of the fistula, high out put (more than 500 c.c.) & low out put (less than 500 c.c.) 23 Patients were managed by (T.P.N.) while 38 patients without, because it was not always available.

Conservative treatment included nothing by mouth except for low out put colonic fistula in which fluid diet was given, intravenous fluid & electrolytes requirement, Antibiotics consisting of metronidazole & third generation cephalosporine or according to culture & sensitivity test which cover gram +ve & gram –ve bacteria. Also the treatment included to give nutrition, the caloric requirement was 40—50 kcal/kg/day., protein requirement was 1.5—2.g/kg /day. (T.P.N.) was given in form 10—20 % glucose, aminoacid as vamin & intralipid I.V. 10—20% 2 to 3 times per week. Vitamins were given as well.

T.P.N.was given via a cannula placed into cubital vein or via central vein line as through subclavian vein. dressing done to the fistula too. Biochemical & haematological states were followed by repeated blood examination.

Results

Sixty one patients were studied with G.I.C.F. at Baghdad teaching hospital, 45 patients were male &16patients were female, the age range was 13—58years.

The most common cause of the fistulae were missile injury39 (63.93%) patients, table no.1, followed by iatrogenic 6 (9.83%) patients (3 of them operated on for incisional hernia, one patient for closure colostomy, one patient after cholecystectomy which caused colonic injury, and one patient for recurrent hydatid cyst). as shown in table one.

Table 1 shows causes of G.I.C.F.

#	CAUSES	No. Of Patients	Percentage
1	Missile injury	39	(63.93%)
2	Iatrogenic	6 3 due to incisional hernia repair,1 closure colostomy,1 after cholecystectomy&1for recurrent hydatid cyst.	(9.83%)
3	Ca.colon	6	(9.83%)
4	Perforated typhoid ulcer	2	(3.27%)
5	Inflammatory bowel disease	2	(3.27%)
6	Ca. stomach	2	(3.27%)
7	T.B. of terminal ileum	2	(3.27%)
8	Perforated duodenal ulcer	1	(1.63%)
9	Irradiation	1	(1.63%)
	TOTAL	61	100%

Fifty nine (96.72%) patients developed fistula post operatively while only 2 patients (3.27%) developed spontaneous fistulae, where one of them presented as an abscess of the abdominal wall & after drainage bowel contents came out which was diagnosed as T.B. of the terminal ileum by biopsy confirmation, the second patient was due to irradiation of the abdomen for malignancy..

The most common site of the fistula was the ileal fistulae 22 (30.06%)patients while the least common fistula was esophageal fistulae 2 (3.27%) patients.

Regarding the output of the fistula, 32 (52.45%) patients were with high output fistulae, while 29 (47.54%) patients with low out put fistula, Regarding the out put of the fistula, jejunal fistulae were the highest out put fistulae (800—2500 CC/24hours) & the colonic fistula was the lowest out put (150—350CC/24hours) as shown in table 2.

Table 2.shows the site & out put of the fistula.

#	Site	No. of Fistulae	No. of High output Fistulae	Average output of high fistulae (ml/24h)	No. of low output fistulae	Average of output of low fistula (ml/24h)
1	Oesophageal	2(3.27%)	1 (50%)	600	1(50%)	250
2	Gastric	3(4.91%)	2 (66.6%)	700(500—900)	1 (33.3%)	300
3	Duodenal	6(9.83%)	6 (100%)	750(500—1000)	0 (0.0%)	
4	Jejunal	12(19.67%)	10(83.33%)	1650(800—2500)	2(16.66%)	300(200—400)
5	Ileal	22(30.06%)	13(68.74%)	1300(600—2000)	9(31.25%)	375(300—450)
6	Colonic	16(26.22%)	0(0)		16(100%)	245(150—340)
	TOTAL	61	32(52.45%)	500--2500	29(47.54%)	150--450

The management of 32 patients with high output fistula was as follows;

17 patients treated by conservative treatment only 14 patients their fistula closed, while 3 patients failed & the 3 of them died. The other 15 patients treated by surgery, 9 patients their fistulae closed, but the other 6 patients fistulae failed to close by surgery & 6 of them died.

So from the total 32 patients, 23 patients had their fistula closed & the remaining 9 patients died.

The management of 29 patients with low output fistulae was as follows;

22 patients treated by conservative treatment, 21 patients cured & only one patient failed & died. While the other 7 patients treated by surgery, 5 patients cured, while 2 patients failed to close & 2 of them died.

From the total twenty nine patients, 26 patients had their fistula closed & only 3 patients died.

So the total mortality was 12 (19.67%) patients out of the total 61 patients.

The total numbers of patients treated by surgery were 22 patients, while the total numbers of patients treated by conservative treatment were 39 patients.

High mortality was seen in the esophageal fistula 50% .

The lowest mortality was seen in the colonic fistula it was 0%. .

Spontaneous closure was 12 (75%) patients. for colonic fistula & the lowest rate for spontaneous closure was seen in gastric fistula it was 1. (33.3%) while spontaneous closure for jejunal fistula was 5 (41.6%) patients.

The mean duration of closure of the fistula was 28.66 days, ranging from 17 days for esophageal fistula to 39 days for jejunal fistula as shown in table 3.

Table 3 represents the site & outcome of the fistula.

#	Site	NO	Spontaneous Closure	Mean Duration (Day)	Surgical	Mortality
1	Oesophageal	2(3.27%)	1 (50%)	17	0 (0.0%)	1 (50%)
2	Gastric	3(4.91%)	1(33.3%)	35	1(33.3%)	1(33.3%)
3	Duodenal	6(9.83%)	3 (50%)	31	1 (16.66%)	2(33.3%)
4	Jejunal	12(19.67%)	5(41.66%)	39	2(16.66%)	5(41.66%)
5	Ileal	22(36.06%)	13(59.09%)	23	6(27.27%)	3(13.63%)
6	Colonic	16(26.22%)	12(75%)	27	4(25%)	0 (0.0%)
	TOTAL	61	35 (57.37%)	28.66	14(22.95%)	12 (19.67%)

The outcome of the conservative & surgical treatment is as follows & as shown in table 4.

39 patients who were treated by conservative treatment 35(89.74%) of them had spontaneous closure & 4 (10.25%)patients had failure to close & 4 of them died.

While 22 patients who were treated surgically ,14 (63.63%) of them the fistula closed, but 8(36.36%) patients had failure & 8 of them died.

Table 4 shows the outcome of conservative & surgical treatment.

#	Type of the management	No.	Closure rate	failure	Mortality
1-	Conservative	39	35(89.74%)	4 (10.25%)	4 (10.25%)
2-	surgical	22	`14 (63.63%)	8(36.36%)	8(36.36%)
Total		61	49(80.33%	12 (19.67%)	12 (19.67%)

Regarding the total parenteral nutrition (T.P.N.), 23 patients received T.P.N. 15(65.20%) patients ended with spontaneous closure, 5 patients had cure by surgery, while the mortality was 3(13.04%) patients. as shown in table 5 On other hand 38 patients did not receive T.P.N. 20 (52.76%) patients ended with spontaneous closure, 9 patients had cure by surgery , while the mortality was 9(23.68%) patients as shown in table 5.

It seems that T.P.N. increase the number of spontaneous closure of patients, & decreasing the mortality rate.

Table 5shows the effect of T.P.N. on the outcome of the fistulae.

#		NO	Spontaneous Closure	Duration (Days)	Surgery	Mortality
1	With T.P.N.	23	15 (65.20%)	17	5 (21.73%)	3 (13.04%)
2	Without T.P.N.	38	20 (52.76%)	19	9 (23.68%)	9 (23.68%)
		61	35 (57.37%)		14 (22.9%)	12 (19.67)

The 23 patients who received T.P.N. 16 out of the 23 patients received T.P.N. plus octreotide (because it was not always available.) 10(62.5%)patients had spontaneous closure& the

mortality was 2 (12.5%) patients. as shown in table 67.Patients who received only T.P.N., 3 (42.8%) patients had spontaneous closure& the mortality was 2(28.57%)patients' .as shown in table 6

So patients who received T.P.N. in addition to octreotide had higher spontaneous closure rate & lower mortality rate.

Table 6shows the effect of T.P.N. & octreotide on the out come of the fistulae.

#		NO.	Spontaneous closure	Average duration/day	Surgical closure	Mortality
1	T.P.N. alone	7	3(42.8%)	15	2 (28.57%)	2 (28.57%)
2	T.P.N. with octerotide	16	10 (62.5%)	8	4 (25%)	2 (12.5%)

It was found that the main effect of serum albumin is on the mortality rate it was 25.71% for patients with serum albumin <3.5gm/dl & the mortality rate was 11.53% for patients with serum albumin>3.5gm/dl.

Also we found that patients who had hemoglobin level more than 10 gm/dl had higher spontaneous closure rate & lower mortality rate in comparison with patients with hemoglobin less than 10 gm/dl.

The 22 patients who under went surgical treatment , two patients with gastric fistula primary repair was done., where as 2 duodenal fistula one treated by pyloric exclusion with gastrojejunostomy the second one treated by primary repair.

For 6 jejunal fistulae 2 patients had primary repair & 4 patients had resection with anastamosis as shown in table 7.For 8 ileal fistulae, 3 patients had resection & anastamosis, 2 patients had primary repair, & 3 patients had ileostomy. See table 7 Finally 4 colonic fistulae, 3 patients had defunctioning colostomy & one patient had bowel preparation & primary repair. See table 7

Table 7 show types of surgical treatment & outcome of the fistula.

#	Site	NO	Type of Operation	Closure	Failure	Mortality
1	Gastric	2	2- primary repair	1(50%)	1(50%)	1 (50%)
2	Duodenal	2	1pyloric exclusion & gastrojejunostoy. 1 primary repair	1(100%) 0(0.0%)	0(0.0%) 1(100%)	0(0.0%) 1(100%)
3	Jejunal	6	2primary repair 4resection&anastomosis	2(100%) 0(0.0%)	0(0.0%) 4(100%)	0(0.0%) 4(100%)
4	Ileal	8	3-Resection& anastomosis 2-Primary repair 3-Ileostomy	2 (66.6%) 2(100%) 2(66.6%)	1 (33.3%) 0.(0.00%) 1(33.3%)	1(33.3%) (0.00%) 1(33.3%)
5	Colonic	4	3 by defunctioning colostomy. 1-bowel preparation & primary repair	3(100%) 1(100%)	0(0.00%) 0(0.00%)	0(0.00%) 0(0.00%)
	TOTAL	22		14(63.63%)	8(36.36%)	8(36.36%)

Regarding the complications are divided in to T.P.N. complications & non T.P.N. complications as shown in table 8

1	Septicemia.	14 patients, 12 of them died
2	Adult respiratory distress syndrome..	2patients
3	Renal failure	1 patient
4	Multiple organ failure	5 patients
5	Electrolytes imbalance.	5 patients
6	Bleeding.	1 patient

Table 8represents the complication T.P.N. related complications.

1	Pulmonary embolism.	2 Patients
2	Hyperglycaemia.	2 patients
3	Central vein infection.	5patients
4	Heart failure	1 patient

Non T.P.N. related complications.

The mortality rate was 12 (19.67%) patients & the main cause of death was septicemia which occurred in 14 patients but two patients survived &12 patients died.

Discussion

In this study the main cause of the fistula was missile injury 39(63.93%) Patients because during the period of this study the violence rate was high & included blast injury & high velocity missile injury ,. Followed by iatrogenic cause (9.83%) also carcinoma colon (9.83%).

Post operative fistulae compromise (96.72%) due to severly injuied patients, while other study it compromise (75—85%) [2,3]. Where as the spontaneous fistula in this study was only 2(3.27%) patients. while in other study it was 15%--25%[3,4]. due to inflammatory bowel disease, radiotherapy, diverticular disease, ischemic bowel disease, pancreatitis, & gynecological disease.

Spontaneous closure rate in our study was 57.37% while other study showed 62.5% closure rate [13,14].

This study showed that the conservative treatment gave better result with closure rate 89.74% while surgery, gave 63.63% closure rate & failure rate 36.36% specially with jejunal fistula the failure rate was 66.6%(4 out of 6 patients)& specially if the repair done earlier, a study done by Alfonso et al [15], showed if the repair done before 12 weeks the failure rate will be high.

The use of T.P.N.with octerotide is significance in lowering the duration of healing (from15days to 8 days) & this decreased the amount lost by the fistula so it decreased the mortality to 28.57% with T.P.N. alone & mortality to 12.5% with T.P.N.& octerotide.a study done by Nubiola [16] who reported 27 fistulae were treated by giving both T.P.N. & octreotide,, fistula output was decreased by 55% within first 24 hours &spontaneous closure rate was 77%.in the first week as compared to 4—6 weeks with T.P.N. alone. Regarding the complications, it is known that the main complications of G.I.C.F. are sepsis, electrolytes imbalance, &malnutrition. [17], however electrolytes imbalance & malnutrion became uncommon nowadays, because of good monitoring of nutritional status, hemoglobin &electrolyte changes &by the introduction of T.P.N. How ever sepsis was the most common cause of death, in this study, & sepsis was the main cause of multiple organ failure& renal failure. This is also proved by Victor W Fazio [18]. In our study septicemia affected 14 patients but 12(19.67%) patients died. a study done by Alfonso et al [15] showed the mortality rate was (48%), while other study done by Kaminsky [11] showed the mortality rate of 6.25%. this wide range in the mortality rate was due to the nature of the patients & their fistulae, some patients were well nourished & others in poor general & nutritional conditions.

Also a study done by Macfadyen [19] found the presence of complications like intra-abdominal abscess, sepsis, adult respiratory distress syndrome, upper gastrointestinal hemorrhage, renal or liver failure & thromboembolism was associated with 80% mortality, but when non of these complications present the mortality rate was 4% [15]. The mortality with high out put fistulae was (28.12%), while the mortality with low out put fistulae was (10.33%).

In this study the spontaneous closure rate was 43.75% with high output fistulae, while the spontaneous closure rate was 72.41% with low out put fistulae. While a study done by Laberge et al [20] showed the spontaneous closure rate for high out put fistulae was 25% and was 27.6% for low out put fistulae.The difference in closure rate between this study & others study can be explained by the fact that most of our patients were young & healthy patients & had no comorbid medical diseases.

Vector W Fazio et al [18]. found that hypoalbuminemia & anemia was associated with increased morbidity & mortality rate , a similar result was found in our study.

Conclusion

- Spontaneous closure rate of the fistula is high in comparison to other study.
- Conservative treatment gave better result regarding the closure rate than the surgical treatment.
- Surgical closure of colonic fistula gave better result than small bowel fistula.
- The uses of T.P.N. with octreotide gave better result & lower the morbidity & mortality rate.

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