Current Management of Enterocutaneous Fistulas

Khaled Mohamed Sharaf,[1] MD; Mohamed Attia M. Elsayed,[2] MD; Amr Mohamed M. Elhefny,[2] MD.

1) Department of General Surgery, Zagazig University, Egypt.
2) Department of General Surgery, Ain Shams University, Egypt.

Background: *Enterocutaneous fistulas are abnormal communications between the gastro-intestinal tract and the skin. More than 75% of all ECFs arise as a postoperative complication, while about 15-25% of them result from abdominal trauma or occur spontaneously. Fistulas are defined by their sites of origin, communication and flow.*

Aim of the work: *This paper reviews our experience in the treatment of enterocutaneous fistulas to evaluate current management practice and outcome.*

Patients and methods: *This retrospective study was conducted on 40 patients with enterocutaneous fistulas treated at El-Demerdash, Ain - Shams University Specialized hospitals in Cairo, Egypt and Alazhar Hospital in Riyadh, KSA during the period from March 2011 to March 2015. Thirty patients (75 %) were males and 10 patients (25%) were females. Their ages ranged between 30 and 50 years.*

Results: *95% of fistulas resulted from previous surgery and 5% after trauma. Fifty percent (50%) of the fistulas were high-output, 25% were intermediate-output fistulas and 25% were low-output fistulas. Conservative treatment was successful in 10 patients (25%) and all of them (100%) closed spontaneously while 30 patients (75%) had to be surgically explored and twenty seven patients (90%) were closed after surgery. The overall mortality rate was 10%.*

Conclusion: *It was concluded from this study, that surgical intervention was indicated in high-output fistulas and fistulas which fail to close with conservative management. Low- output fistulas usually require no surgery and mostly close with conservative treatment.*

Key words: *Enterocutaneous fistula (ECF), total parental Nutrition (TPN), surgery.*

Introduction:

Gastrointestinal (GI) fistula is an abnormal leak of the bowel contents to other organs (e.g. Colovesical), other parts of the intestine (entero- enteral) or the skin (enterocutaneous).[1]

The majority of fistulas are consequences of a surgical procedure. Causes include disruption of the anastomotic suture line, unintentional enterotomy or inadvertent bowel injury at the time of closure. Less frequently GI fistulas are the results of trauma. Inflammatory processes, such as inflammatory bowel disease (IBD), may also cause fistulas.[2]

Enterocutaneous fistulas (ECFs) are associated with considerable morbidity and mortality. Recent case series suggest a mortality rate of 6 to 33%, with sepsis and concomitant malnutrition being the most common causes of death. Increased mortality has been shown to be associated with high fistula output and the presence of infectious complications.[3]

Recent evidences support the fact that fistula output is a significant factor influencing closure of the GI fistula, with the odds of spontaneous closure 3 times greater for low output fistulas (effulent <200 ML/ 24h) than for high output fistulas (effulent <200 ML/ 24h).[4]

Surgical treatment should be reserved for use after sufficient time has passed from the previous laparotomy to allow lysis of

the fibrous adhesions using full nutritional and medical treatment and until a complete understanding of the anatomy of the fistula has been achieved.[5]

The successful management of GI fistulas requires a multidisciplinary team approach including a gastroenterologist, interventional radiologist, enterostomal therapist, dietician, social worker and surgeons. With this coordinated approach, enterocutaneous fistula can be controlled with acceptable morbidity and mortality.[6]

Although surgeons have been dealing with gastrointestinal fistulas for such a long time and despite the advances in nutrition and the ability of providing nutrition by total parenteral nutrition (TPN) for indefinite periods of time, enterocutaneous fistulas (ECF) remain one of the most dreaded complications of abdominal surgery which carry a mortality rate of approximately 11-20 % in most of the series. Besides, it is still controversial whether ECF are best treated surgically or conservatively and if surgically when is the ideal time to operate.[7]

Patients and methods:

This study included 40 patients who were treated from ECF at El-Demerdash, Ain-Shams University Specialized hospitals, Cairo, Egypt and Alazhar Hospital, Riyadh, Saudi Arabia, between March 2011 and March 2015. Thirty (75%) of them were males and 10 (25%) were females. Their ages ranged between 30 years and 50 years with median age of 40 years. 10 patients were treated conservatively without operative intervention and 30 were operated on.

The patients were examined for medical history, the cause of the fistula, the clinical condition of the patient and his electrolyte and nutritional status. The type of the discharge coming from the fistula and its amount in 24 hours, skin around the fistula and investigations done including laboratory investigations were noted. Contrast study using Gastrografin (either follow-through or enema) to detect the site of origin, ultrasound and C.T scan were done.

All patients were admitted and intravenous infusion of fluids was started to correct dehydration and electrolyte imbalance and to replace the fistula losses. Abdominal ultrasonography and CT scan were done to detect any purulent collections.

The proper antibiotics based on culture and sensitivity, were started. Oral intake was stopped. Total parenteral nutrition (TPN) was administered through a central venous line. The skin around the fistulous opening was protected from the erosive effect of the fistula discharge. Percutaneous intubation of the fistula with a tube drain was done which helped in draining and collecting the discharge. A colostomy bag was put to collect the fistulous discharge away from the skin and to measure its amount/day.

Octreotide analogue (somatostatin) was used in a dose of 100 microgram, eight hourly, subcutaneous for a maximum period of 14 days in all cases of high output fistula, to decrease the fistula output and correct fluid, electrolyte and nutritional disturbances.

The 30 patients were explored with the aim of resecting the diseased origin of the fistula, drain all abscesses and to restore the continuity of the gastrointestinal tract by anastomosing healthy opposed segments of intestines without tension. Peritoneal lavage and good drainage was done.

The following surgical procedures were done in different sessions as right hemicolectomy for the post- appendectomy fistulas, left hemicolectomy for patients with injury of the descending colon, resection-anastomosis of an ileal loop responsible for the fistula, drainage of intra- abdominal and pelvic collection, releasing all adhesions and relieving any obstruction and resection of the diseased portion of small intestine and re-anastomosis. Removal of a foreign body missed from a previous operation was found wrapped in the omentum. The piece of Gauze was removed and the fistula was excised with the involved ileal loop and the continuity was restored and finally drainage of subhepatic bilious collection (biloma) with tube drainage was done.

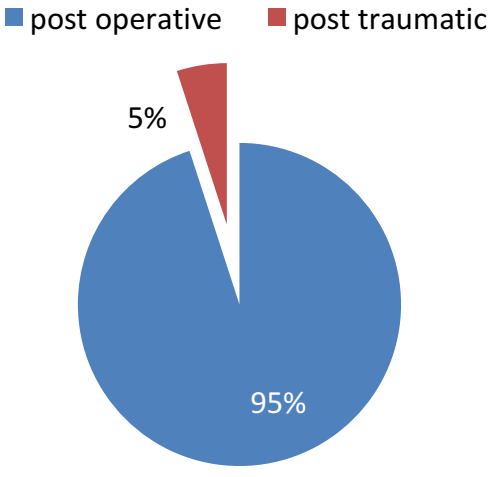

Figure (1): Causes of ECF.

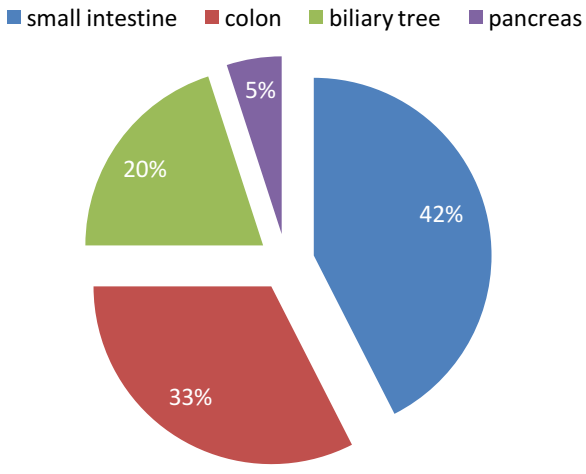

Figure (2): Sources of fistula.

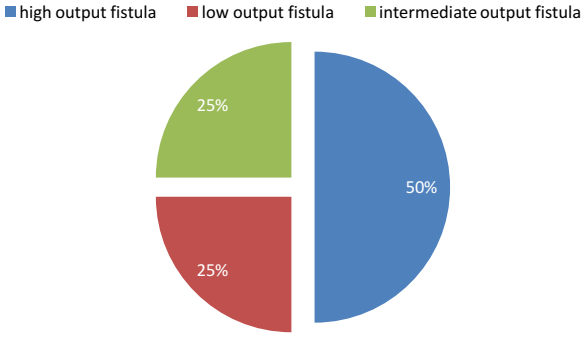

Figure (3): Types of fistula.

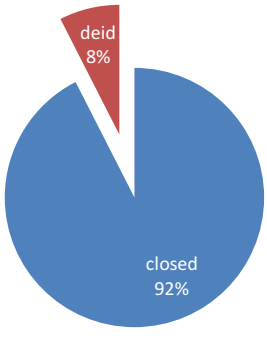

Figure (4): Total closure rate in the study.

Table (1): Causes, number and percentage of 40 patients with ECF.

Cause	No.	Percentage %
- Postoperative	38	95
- post- traumatic	2	5

Table (2): Sources of fistula.

Source	No	Frequency %
Small intestine	17	42.5
Colon	13	32.5
Biliary tree	8	20
Pancreas	2	5

Table (3): Types of fistulas and their frequency.

Type of fistula	No.	%
High- output (> 500 ML / 24 hours)	20	50
Low output (< 200 ML / 24 hours)	10	25
Intermediate- output (200- 500 ML/ 24 hours)	10	25

Results:

Patient's demographics: This study was a retrospective study of 40 patients; 30 males (70%) and 10 females (25%) with ages ranging

Table 4: Outcome after management of different types of ECF:

Type of fistula	Number of patients	Management	Outcome
Low output fistula	10 (25%)	Conservative treatment	100% spontaneous closure
High and intermediate output fistula	30 (75%)	Operative interference	90% closed
			10% died

from 30 to 50 years with a mean age of 40 years. The causes of the fistulas were divided as postoperatively and posttraumatic causes **Table (1)**. Postoperative causes included postappendectomy in 6 patients (15%). Post-drainage of appendicular abscess in 3 patients (7.5%), postadhesiolysis in 4 patients (10%) with adhesive intestinal obstruction, postlaparoscopic cholecystectomy in 6 patients (15%), after open cholecystectomy in 2 patients (5%), after left hemicolectomy in 2 patients (5%), after intestinal resection and anastomosis in 3 patients (7.5%), and after inadvertent stitching of a loop of small intestine with the abdominal wall in 2 patients (5%). Fistula following Caesarian section occurred in 3 patients (7.5%), after uterine curettage in 1 patient (2.5%), postoperative in two patients with acute pancreatitis (5%), one patient (2.5%) with advanced ovarian carcinoma infiltrating the entire peritoneal cavity and following enterotomy in 3 patients (7.5%) for evacuation of phytobezoars. Post-traumatic occurred in 2 patients (5%).

The sources of the fistulas were shown in **Table (2).**

The types of the fistula in this study according to their output is shown in **Table (3).**

The outcome of the 10 patients with fistulas treated conservatively: All cases (100%) were low-output and closed spontaneously with this conservative line of treatment. The closure rate in this group was 100%.

The outcome of the 30 patients with fistulas treated operatively **Table (4)**: Twenty of them (50%) were high–output and 10 (25%) were intermediate output. Twenty seven of these fistulas (90%) closed after operative interference. 3 patients of these fistulas failed to close (10%) and the patients died of severe sepsis and electrolyte imbalance which led to multisystem failure.

The total closure rate in this group was 92.5 % and the mortality rate 7.5%.

Discussion:

Enterocutaneous fistulas present a challenge to the combined surgical and medical management. Morbidity and mortality associated with fistula are still considerable and the current treatment even if successful may require prolonged hospitalization.[8]

Previous abdominal operations remain the commonest cause of ECF (95% in this study). Any abdominal procedure may be complicated by ECF especially if injury to the bowel or its blood supply or resection-anastomosis happened during that procedure. Different kinds of abdominal operations can cause ECF, like laparoscopic surgery, operations for obesity or the use of prolene mesh in hernia repair, but the more traditional operations, such as appendectomy, may still be complicated by ECF. Although Crohn's disease is a known cause for spontaneous or postoperative ECF.[9] Low-output fistulas have a great chance of closing without operations (100% in this study). Therefore no early surgical intervention is needed for them. They should be treated by Nil Per Os (NPO), TPN and antibiotics, drainage of sepsis, proper care of the skin around the fistula opening and kept under observation with monitoring of the amount of the fistula discharge and the patient general condition for 1-2 months.[10]

High-output fistulas, on the other hand, very rarely close without surgery. Therefore, once the patients with high-output fistulas are stabilized by TPN and control of sepsis, surgery should be done. Delaying surgery in These High- output fistulas may lead to more

deterioration of the patient until it becomes too risky to interfere surgically.[11]

Nutritional support has gained a central role in the management of enterocutaneous fistulas. To optimize nutrient metabolism, circulation and tissue oxygenation must be adequate. Total parenteral nutrition is a vital element in the management of patient with ECF. In low- output fistulas TPN can lead to closure of the fistulas without the need for surgery and in high- output fistulas, TPN supports the patient and prepare him, making the possible surgery safe and successful.[12]

The need to decrease the fistula output, particularly in high output fistula, help nutritional and fluid and electrolyte management in the initial phase and in non surgical closure of fistulas.[13]

Octreotide, a synthetic analogue of somatostatin, inhibits the release of all know GIT hormones and decreases splanchnic and portal flow thereby decreasing the fistula output. We used octreotide in all cases of high output fistulas and found a significant reduction in the fistula output within the first 48 hours. However all patients required a surgical procedure to close the fistula. Significant reduction in fistula output after octreotide has been reported by Paran et al, Saleth et al and Kocak et al. Although somatostatin effectively reduces the fistula output, the rate of spontaneous closure is not modified.[14]

The treatment of sepsis is vital and should have the priority. No fistula can heal before controlling the sepsis, even a low-output fistula.[9] In this study all patients received the proper antibiotic according to culture and sensitivity to control sepsis also to allow rapid healing.

With conservative medical management including TPN, spontaneous closure of the fistula occurs in about 24% patients within 27-39 days with a mortality of around 29% it must be noted that these results were seen in those favorable group of patients who had low output fistula no organic disease, no abscess cavity and were thus, subjected to conservative treatment.[15]

In our study, the total closure rate (for both conservative and surgical management together) was 92.5% and the mortality rate was 7.5%.

Conclusion:

Enterocutaneous fistulas are a challenging problem. The majority of them are an end result of post operative complications. Contrast studies do not contribute significantly to the ultimate outcome of the patient. Rather than following a conservative line of management, hoping for spontaneous closure of a fistula, we feel that staged surgery at the appropriate time will lead to lesser morbidity and mortality with a higher fistula closure rate.

Reference:

1- Dionigi G, Dionigi R, Rovera F, Boni L, Padalino P, Minoja G, Cuffari S, Carrafiello G: Treatment of high output enterocutaneous fistulae associated with large abdominal wall defects: Single center experience. *International Journal of Surgery* 2008; 6: 51–56.

2- Irving M: The treatment of enterocutaneous fistulas. *Br J Surg* 1984; 71(8): 653.

3- Lara J, Shahram Z, Robin P: Complications of enterocutaueous fistulas and their management. *Clin Colon Rectal Surg* 2010; 23(3): 209–220.

4- Evenson A, Fisher J: Current management of enterocutaneous *fistula. J Gastrointest Surg* 2006; 10(3): 455–64.

5- Lee SH: Surgical management of enterocutaneous fistula. *Korean J Radiol* 2012; 13(1): 17–20.

6- Chamberlain R, Kaufman H, Danforth D: Enterocutaneous fistula in cancer patients: Etiology, management, outcome, and impact on further treatment. *Am Surg* 1998; 64(12): 1204–1211.

7- Edmund S, Martin A: Enterocutaneous fistula. *Current Surgical Therapy* 2008; 143(9): 143–145.

8- Martineau P, Shwed J, Denis R: Is octeroide a new hope for enterocutaneous and external pancreatic fistula closure? *Am J Surg* 1996; 172: 386–395.

9- Said SM: Enterocutaneous fistula: When to operate? *Kasr El Aini Journal of Surgery* 2011; 12(2): 130–108.

10- Makhdoom Z, Komer M, Still C: Nutrition and enterocutaneous fistula. *J Clin Gastroenterology* 2000; 31(3): 195–204.

11- Hoffejee A: Surgical management of high output enterocutaneous fistulae: A 24-year experience. *Curr Opin Nutr Metab Care* 2004; 7(3): 309–316.
12- Lloyd D, Gabe S, Windsor A: Nutrition and management of enterocutaneous fistula. *Br J Surg* 2006; 93(9): 1045–1055.
13- Spiloritis J, Briand D, Gouttebel M: Treatment of fistulas of the gastrointestinal tract with total parenteral nutrition and octreotide in patients with carcinoma. *Surg Gynecol Obstet* 1993; 176: 575–580.
14- Aranda J, Chico B, Ramirez K, Haunte R, et al: Treatment of enterocutaueous fistula with or without octreotide and parenteral nutrition. *Nutricion Hospitalaria* 1996; 11(4): 226–229.
15- Chaudhry CR: The challenge of enterocutaneous fistulae. *MJAFI* 2004; 60(3): 235–238.