Role of Early Surgical Diversion Procedure in the Management of Enterocutaneous Fistulae

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This prospective, non-randomized comparative clinical study about the role of early proximal surgical diversion and TPN for treating patients with enterocutaneous fistula was conducted in Department of Surgery Mayo Hospital, Lahore. Main objective was to evaluate the role of early proximal diversion to minimize the hospital stay, decrease the expenses of hospitalization and reduction of morbidity and mortality associated with the enterocutaneous fistula. Total 32 patients, either referred from periphery or presenting to the Emergency Department with peritonitis, intestinal obstruction or abdominal trauma and who developed distal small bowel or colonic fistulas after primary surgery were included in the study. These patients were equally divided into two groups; Group A underwent conservative management with Total Parenteral Nutrition (T.P.N) for 6 weeks and Group B patients were subjected to early stoma formation. In Group A patients spontaneous closure rate of fistula was 56.25% with meantime of 6 weeks . Five patients (31.25%)of this group died due to uncontrollable sepsis. Two patients required definitive surgery after failure of six weeks of conservative management. Among Group B patients only 2 patients (12.5%) died and rest of them were discharged with stoma after mean time stay of 6.0 days. Stoma was closed after three months and mean stay time after stoma closure was 5.0 days. Both groups suffered from complications but the problems encountered by Group A patients were more disastrous. Similarly, these patients had to spend more money as compared to Group B patients.

Key Words **Enterocutaneous fistula, Stoma, Total Parenteral Nutrition (T.P.N.).**

Majority of the enterocutaneous fistula occur after operation over gastrointestinal tract. The operation falls short of both the surgeon's and the patient's expectations and the development of enterocutaneous fistula puts stress not only on the patient but also the surgeon[1].In our setting, patients who develop enterocutaneous fistula usually belong to low socioeconomic group, they cannot afford intravenous nutrition, antibiotics and other drugs for prolonged period and thus are at higher risk of developing intra-abdominal sepsis . Moreover fistulous output cannot be controlled properly, which spills over and excoriates the skin leading to severe infection due to lack of provision of costly appliances. In addition to all this, prolonged hospital stay for conservative management is not acceptable to these patients. So a vicious cycle of deterioration sets in, which accounts for higher mortality and major morbidity in our poor patients[2].In this study, such patient have been taken into consideration and the role of early diversion of intestinal effluents away from the defect by exteriorization of the digestive tract proximally to the defect has been evaluated and results are compared with conservative treatment and TPN in such patients.

Materials and Methods

This prospective comparative clinical study was carried out in Department of surgery Mayo Hospital Lahore from June 1996-1998.All patients who developed intestinal fistula of ileum or colon after being operated in emergency ward for abdominal trauma, intestinal obstruction and peritonitis were included in the study. Patients referred from periphery with entero-cutaneous fistula at the same levels were also included in the study. Total number of patients was 32.All patients were clinically evaluated thoroughly and followed by investigations e.g., blood complete examination, urine analysis, serum electrolytes, blood urea, blood sugar, and creatinine, chest, abdominal x-rays and ECG if patient above forty years of age, to assess the general status of the patients. The patients were resuscitated with judicious fluids, blood replacement and electrolyte balance. The patients were divided into two groups A & B on development of enterocutaneous fistula. Patients with group A were managed conservatively by keeping NPO ,TPN(2500-3000K/Cal) with central venous line, antibiotics, and application of pouches and skin barriers on abdomen for protection of skin from fistulous discharge. Continuous monitoring was carried out by measuring and replacing fluid and electrolyte losses, body weight, serial measurements of Hemoglobin, Total leucocyte count, Liver function tests, blood sugar, blood urea, serum creatinine, acid base status, serum albumin ,and trace elements. In case of suspicion of intra abdominal collection ultrasonography was carried out and if collection found it was drained percutaneously under ultrasonic guidance. In case of failure of spontaneous closure these patients were subjected to definitive surgery after six weeks of conservative management. The patients in group B were after initial resuscitation subjected to stoma formation on very next day of leak. The stoma was constructed by bringing healthy portion of gut to anterior abdominal wall proximal to leak and making an ileostomy in right iliac fossa.. After the stoma started functioning patients were discharged with proper instruction about stoma care. They were readmitted for stoma closure after

three months. Both these groups were kept under strict vigilance regarding treatment complications, hospital stay, and total cost of the treatment.

Results

A total of thirty-two patients were included in the study, eighteen were males and fourteen females. Mean age was twenty-six years. Twenty-six patients (81.25%) were operated in our emergency department and six patients were referred from periphery (18.75%)after fistula formation. Table 1 shows the mode of presentation of patients in emergency unit, which were operated. The timing of fistula formation after operation ranged from 4th postoperative day to the 8th postoperative day. The maximum number of patients (i.e12 patients, 46.15%) developed fistula at 5th postoperative day. The referral cases also reported to develop fistula at day5 or day 6.

Table 1:Mode of presentation of patients in emergency unit

Mode of presentation	n=،	%age
Intestinal obstruction	4	12.5
Peritonitis	11	34.375
Firearm injury abdomen	6	18.75
Stab injury abdomen	3	9.375
Blunt trauma abdomen	2	6.25
Referred patient with enterocutaneous fistula	6	18.75
Total	32	100

Mean duration of hospital stay in group A patients was 6 weeks, group B was 6-days after stoma formation and 5-days after reversal of stoma. In 9 patients (56.25%), of group A fistula closed spontaneously, and mortality was 31.25% (5 patients died) and 2 patients were subjected to definitive surgery after failure of 6 weeks trial of conservative treatment. The patients who got their fistula closed spontaneously stayed in hospital for mean time of 5 week. Group B patients were subjected to stoma formation after one day of fistula formation. Only two patients (12.5%) died. Fourteen patients (87.5%) were discharged from hospital in a satisfactory condition. These patients were readmitted in the hospital after a period of three months. Barium studies were carried out and on demonstrating absence of leakage, stoma was closed. The total cost of management of Group A patients was calculated by adding the daily cost of TPN formulas and daily cost of drugs, investigations per week ,body side wafers, pouches and stomahesive pastes in order to control the fistulous output. Table 2 shows the total cost of Group A patient per week. In this way, total cost per week was 17850/- approximately. Most of the patients of Group A stayed in hospital for 6 weeks and total cost of management was Rs.107100/- approximately per patient. Table 3 shows the approximate expenses of hospitalization of Group B patients. It included the cost of surgery (anesthetic drugs, surgical suture material and fluids during surgery), laboratory investigations which were carried out in the post-operative period, drugs and fluids which were administered to the patients after surgery till the time of discharge. Similarly Table 4 shows the expenses of these patients when they were subjected to their stoma closure.

Table 2 Approximate expenses of one patient of Group A per week

Expenses for	Cost per day Rupees	Cost per week in Rupees
TPN formulas and drugs	Rs. 2250/-	Rs.15750
Laboratory investigations		Rs. 1000
Pouches, body side wafers and stomahesive pastes		Rs. 1100
Approximate cost per week		Rs. 17850

Table 3: Approximate expenses of a Group B patient for stoma formation

Expenses	Amount in Rupees
Surgical procedures (stoma formation)	1500/- approx.
Laboratory investigations	500/- approx.
Stoma appliances	500/-approx.
Drugs and fluids	4000/- approx.
Total cost	6500/- approx.

Table 4:Approximate expenses of a Group B patient for stoma closure

Expenses	Amount in Rupees
Surgical procedures (stoma closure)	1600/- approx.
Laboratory investigations	1200/- approx.
Drugs and fluids	2500/- approx.
Total cost	5300/- approx.

The incidence of complications associated with the use of TPN was hydropneumothorax 31.25%, (treated by chest intubation) subclavian artery puncture 12.5%,catheter tip malpositioning 12.5%,catheter related sepsis18.75%, Hyperglycemia12.5%,serum electrolyte abnormalities 12.5%and deterioration in liver function 18.75% of cases. Complications associated with stoma formation were Paraileostomy herniation18.75%, retraction 12.5%, stenosis 12.5%, bleeding 6.25% and prolapse 6.25% of patients. Moreover after reversal of stoma postoperative wound infection, dehiscence of abdominal wound, and intra abdominal abscess formation were noted in 35.7%,14.28%,7.14% of patients respectively.

Discussion

To tackle with the problem of enterocutaneous fistula, reoperation and conservative means are two forms of management. These are not opposite to each other, rather they are complementary to each other and their implementation represents a point in the continuation of the patient's treatment.

Once effective nutritional support is instituted and sepsis is controlled, spontaneous closure is achieved in 23% to 80% of reported cases[3,4,5]. to be 24.3%. McFadyen

et al[6] has reported spontaneous fistula closure rates to be 70.5% in their papers.

In the present study 9 out of 16 patients (56.25%) got their fistula closed spontaneously. These results are lower as compared to the results of study mentioned above probably because of the non-compliance of the patients due to their financial problems. Many a times patient had to omit the doses of antibiotics or TPN fluids. They were unable to fulfill the protocol for management by conservative means, thus showing lower results in terms of spontaneous closure. Five patients out of sixteen (31.25%) died due to limitation of finances leading to irregular and incomplete availability of TPN contents and antibiotics and increasing sepsis. Among the nine patients who got their fistula closed spontaneously, eight patients (88.88%) did so within first month of conservative management. Only one patient (11.11%) had to wait for more than one month, similar results have been shown by Reber et al[7]. Most series recommend about 6 to 8 weeks of conservative management before definitive surgery[8].. In present study, two patients of Group A were subjected to surgery after 6 weeks of conservative management. Both were discharged from the hospital in a satisfactory condition.

Our present study has highlighted the role of early stoma formation in the management of enterocutaneous fistula. As already mentioned, our patients belong to low socioeconomic group and their compliance regarding management is always in doubt. Based on criticism and pitfalls in the studies of Hesp WLEM and Mulholland[9] we constructed loop ileostomy by taking proximal healthy gut to the surface in Group B patients. Rolando Rolandelli and Joel J Roslyn[10] have also mentioned the construction of proximal diverting stoma in patients with distal small bowel or colonic fistulas. According to them, most patients with fistulas in this region do well with an ileostomy or colostomy and are still able to eat orally. An ileostomy is preferred over a colostomy for proximal diversion. An ileostomy is easier to manage, because of its size, location and equipment than a loop colostomy (which is mostly constructed in transverse colon). Opening and closing a transverse colostomy puts the distal bowel at risk if the marginal artery is damaged[11].

Following many major procedures, and especially when the bowel has fistulated, there is a dense peritoneal reaction that is maximal from 10 to 21 days and lasts about 6-8 weeks before resolution[8]. Keeping this fact in mind, we subjected our Group B patients to reoperation and construction of stoma soon after the fistula formation.

Minimal fibrinous adhesions were encountered and loop ileostomy was constructed by taking the proximal healthy ileum out on the surface without much difficulty. All the patients, except two, did well in the postoperative period. Only two patients died due to ongoing sepsis .Rest of the patients were discharged from the hospital in a satisfactory condition and were readmitted for stoma closure.

Complication of total parenteral nutrition may be mechanical, septic or metabolic. Jones[12], Wolfe[13] and their coworkers noted 6.7% mechanical, 4.7% septic and 27.5% metabolic complications in their patients. The overall incidence reported in the literature of central venous catheter sepsis ranges from 7% to 27%[14]. In the present study 3 patients (18.75%) developed catheter related sepsis and removal of catheter led to the patient improvement. Among the metabolic complications, disturbance of liver function was noted in 3 patients (18.75%).

MH Irving and Ohulme[15] have noted loop stomas being more prone to complications. They have mentioned stenosis, prolapse, skin problems and parastomal hernia to be more frequent complications. In the present study parastomal hernia developed in three patients. Stoma got retracted in two patients and prolapse, bleeding and stenosis were noted in one patient each. All the patients with stoma were subjected to closure of stoma after a period of three months. Postoperative wound infection was the most common complication and intra-abdominal abscess developed only in one patient. These observations are supported by the study carried by Hesp WLEM et al[9]. They noted complications of stoma closure in 22 patients. They found wound infection to be most common complication. In our study patients were discharged from the hospital in a satisfactory condition after a hospital stay of 5-7 days.

In Table 2,3,4, approximate expenses of hospitalization of both groups of patients are shown. It is clear that patients on conservative management had to spend large amount of money as compared to Group B patients. The duration of management is greatly responsible for economic burden on the patients and this is a major factor resulting in non-compliance of the patients regarding management, thus accounting for greater number of complications and higher mortality rates.

Conclusion

In our poor socio-economic setup early proximal surgical diversion in enterocutaneous fistulas of distal small bowel or colonic origin is of greater help, as it is associated not only with lower complication rate but also less expensive as compared to conservative treatment and T.P.N.

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