Outcome of colostomy closure with different skin closure techniques in a developing country

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ABSTRACT

Background: Colostomy site, which is a potentially contaminated wound, is traditionally closed with interrupted skin stitches and placement of intraperitoneal or parietal or both drains; often with poor cosmetic outcome in our country. This study aims at prospective evaluation of colostomy closure wounds by different techniques. **Patients and Methods:** This study was carried out in all infants and children with colostomy (for different pathologies) admitted for colostomy closure in our institute from August 1, 2006 to February 29, 2008. Patients were divided into two groups: Group A with colostomy closure without any drain and subcuticular skin closure and Group B with colostomy closure with both intraperitoneal and parietal drain and interrupted skin closure. Patient's details, including age, sex, body weight, diagnosis, preoperative bowel preparation, peroperative antibiotics, postoperative wound infection, anastomotic leaks, duration of hospitalisation and postoperative follow-up for wound assessment, were recorded. By the end of February 2008, 151 cases of colostomy closure were recorded, 70 in Group A and 81 in Group B. **Results:** Statistical analysis of the data showed no statistically significant difference in wound infection and anastomotic leak between the two groups. On postoperative follow-up, wound assessment showed significantly better cosmesis in the no drain subcuticular group. **Conclusion:** This study shows that closing colostomies without any drain and subcuticular skin closure does not result in any increased incidence of wound infection and has better cosmetic results.

Key words: Colostomy closure, cosmetic outcome, drain, subcuticular skin closure, wound infection

DOI: 10.4103/0189-6725.70415

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INTRODUCTION

The closure of surgical stomas is associated with significant morbidity and even mortality.[1] There are reports which document considerable incidence of anastomotic leak, wound infection and bowel obstruction in adult population. Although stomas are also commonly used in infants and children, there are comparatively fewer reports of the results of closure of colostomy in this age group.[2] As per earlier views, colostomy site was considered a potentially contaminated site and so its closure was not done primarily; healing by secondary intention was the rule.

Later on, primary closure of the wound was done with interrupted skin stitches and placement of drains, which is still in vogue. Kiely *et al.* in 1987 used subcuticular skin closure for colostomy site without drain in all their patients.[3] But there was no comparative analysis made in this study between patients with colostomy closure without drain and subcuticular skin closure and those with placement of drains and interrupted skin closure. With this background, the aim of this study aimed to compare the outcomes in patients with colostomy closure prospectively by two different techniques; with placement of drains and interrupted skin closure and without drain and subcuticular skin closure in terms of incidence of wound infection, anastomotic leak and the cosmetic outcome.

PATIENTS AND METHODS

This is an ongoing prospective study carried out in all infants and children who were admitted for colostomy closure (including Anorectal malformations, Hirschsprung's disease, and others) in our institute from August 1, 2006 to February 2008 [Table 1]. 151 patients were included in our study. Patients were divided into two groups. Group A consisted of 70 patients of Unit I whose colostomy closure (intraperitoneal) was done without drain and subcuticular skin closure. Group B consisted of 81 patients of Unit II whose colostomy closure (intraperitoneal) was done with placement of both intraperitoneal and parietal drains and interrupted

Table 1: Comparison of general parameters of Group-A and Group-B

	Group A	Group B
Mean age	3.86 years	3.53 years
Sex distribution	Males: 49, Females: 21	Males: 59, Females:22
Mean body weight	12.956 kg	12.732 kg
Cause of colostomy	A.R.M.*-45	A.R.M.*- 45
	Hirschsprung's disease-24	Hirschsprung's disease-34
	Posttraumatic fecal peritonitis- 1	Colonic atresia-1 Rectal injury- 1

*A.R.M.: anorectal malformation.

skin closure. Patients' details, including age, sex, body weight, diagnosis, preoperative bowel preparation, which consisted of mechanical bowel preparation for two days with normal saline washes, enemas and Polyethylene Glycol being given on the day before surgery along with oral antibiotics (Cotrimoxazole and Metronidazole) and intravenous fluids, were recorded and analysed. All patients were operated under general anaesthesia and intraperitoneal single layer end-to-end anastomosis was done in all. The antibiotics used at the time of induction (Ceftriaxone and Metronidazole) and postoperatively (Ceftriaxone, Amikacin and Metronidazole) intravenously were the same as per institutional protocol in all the patients. The incidence of postoperative wound infection and anastomotic leak, duration of hospitalization and postoperative follow-up for assessment of wound were recorded. The statistical analysis was done using Chi-square test.

RESULTS

The mean age of the patients in Group A was 3.86 years (range- seven months to 10 years) and in Group B was 3.53 years (range-14 months to 10 years). The sex distribution in Group A was: 49 males and 21 females and in Group B were 59 males and 22 females. The mean body weight of the patients in Group A was 12.96 kg (range- 7.2 kg to 28 kg) and in Group B was 12.73 kg (range-8.5 kg to 26 kg). In Group A, 45 patients had anorectal malformation, 24 suffered from Hirschsprung's disease and one had blunt trauma abdomen with colonic injury and faecal peritonitis. In Group B, 45 patients were of anorectal malformation, 34 were of Hirschsprung's disease and one patient each of colonic atresia and rectal injury [Table 1]. In Group A, sigmoid loop colostomy was done in 67 patients and transverse loop colostomy in the remaining three patients; in Group B 71 patients had sigmoid loop colostomy and 10 had transverse loop colostomy. Among the complications of colostomy encountered in Group A were prolapse of sigmoid loop colostomy in two patients of anorectal malformation and prolapse of transverse loop colostomy in one case of Hirschsprung's disease. In Group B, prolapse of sigmoid loop colostomy was seen in one patient of anorectal malformation and prolapse of transverse loop colostomy in one case of Hirschsprung's disease. Two patients, one in each group, had stomal recession. Pericolostomy skin excoriations were seen in 22 patients in Group A and 17 patients in Group B. All the above complications of colostomy were managed accordingly. No patient had complaint of stomal stenosis / obstruction or stomal bleeding in our series.

On statistical analysis of the above data, we found no significant difference between the two groups as per the mean age, sex distribution, mean body weight and diagnosis of the patients concerned. The incidence of postoperative superficial wound infections in Group A was seen in eight patients (11.43%); in Group B too, it was seen in eight patients (9.88%). However, all of them resolved completely by daily dressings and antibiotic coverage. No patient had to undergo any surgical intervention for these wound infections. This difference between the incidence of postoperative superficial wound infections in Group A and Group B was not found to be statistically significant by Chi square analysis (P value = 0.781).

Deep wound infection associated with anastomotic leak was seen in four patients (5.71%) in Group A, who developed faecal fistula. Two of these presented with leak on the postoperative days 5 and 8, which got resolved with conservative management. The other two presented with leak on the postoperative days 5 and 6, which did not improve by conservative management and surgical re-exploration was done; both of them underwent a transverse loop colostomy. One of these patients improved after colostomy but the other one succumbed to septicemia. In Group B, two patients (2.47%) had deep wound infection associated with anastomotic leak with features of acute intestinal obstruction and abdominal distension. Both the patients were initially managed conservatively but did not respond; were re explored and a right transverse loop colostomy was done in both. The difference between the incidence of postoperative deep wound infections in Group A and Group B was not found to be statistically significant by Chi square analysis (P value = 0.328) [Table 2].

There was one mortality (0.66) in our series. The mean duration of postoperative hospital stay was 9.64 days (range 5 to19 days) in Group A, a day lower than Group B (mean duration of postoperative hospital stay 10.64 days; range 7 to 33 days). However, this difference was

Table 2: Comparison of rate of wound infections in Group-A and Group-B

	Superficial wound infections (%)	Deep wound infections (%)	No. wound infection
Group A	8 (11.43)	4 (5.71)	58
Group B	8 (9.88)	2 (2.47)	71

also not statistically significant. Postoperative follow-up for wound assessment showed better scar in patients with subcuticular skin closure.

DISCUSSION

Though it is said that wound infection seldom occurs after closure of colostomy, this has not been a uniform experience.[4] A review of 2353 colostomy closures noted a mean fistula rate of 6.6%, wound infection rate of 14.9%, a mean mortality rate of 0.9% and mean complication rate of 33.1%.[2] In another study, the mean fistula rate was 5%, mean wound infection rate was 17%, a mean mortality of 0.5% and a mean complication rate was 27%.[3] In our series, the incidence of superficial wound infection was 11.43% in Group A and 9.88% in Group B, which is comparable to other reported series. This shows that colostomy closure without drain and subcuticular skin stitches does not result in increased incidence of wound infection. Intraperitoneal drains have been associated with higher anastomotic leaks in colostomy closures.[5-9] Higher rates of complications were also noted in patients who had soft silicone drains as compared to those without drains.[5] Another study suggested omission of intraperitoneal drains after loop stoma closure.[10]

In the series by Platell *et al.* anastomotic leaks occurred in 2.4% of anastomoses. The leak rate for intraperitoneal anastomoses was 1.5% vs. 6.6% for extra peritoneal anastomoses. Re-operation or percutaneous drainage procedures managed half of these leaks.[11] In this study, the incidence of anastomotic leak in Group A was eight per cent whereas in Group B it was four per cent. Majority of these leaks (4/6) were managed with re-operation and the remaining, conservatively. Again, this difference between the two groups was not found to be statistically significant. Bozzetti *et al.* calculated in a literature review of 3707 patients a median morbidity rate of 27.5% and mortality rate of 0.8% (Range: 0.5% to 4.5%).[12] A collective review of ostomy closure in 707 children showed mortality ranging from 0 to 8% [mean 0.5%].[3] There was a single mortality in our series. The mean duration of postoperative hospital stay was a day less in Group A patients.

CONCLUSION

There is still a belief that colostomies are potentially contaminated wounds and their closure needs drains and interrupted skin stitches in our country. Nevertheless, the initial part of our ongoing prospective study shows that closing colostomies without any drain and subcuticular skin stitches does not result in any increased incidence of wound infection and so is our preferred approach. Rather using subcuticular skin stitches results in better skin apposition, good cosmetic result and there is no need to remove the stitches later. Similar studies in the paediatric age group including a larger number of patients are required for further confirmation of this view.

ACKNOWLEDGEMENTS

We are grateful to the Principal and Medical Superintendent / Vice Principal of Sircar Medical College and Hospital, Nil Ratan, for allowing us to use the hospital records.

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Source of Support: Nil, **Conflict of Interest:** None declare.