Global Academic Journal of Medical Sciences

Available online at www.gajrc.com
DOI: 10.36348/gajms.2023.v05i02.00X

OPEN ACCESS

ISSN: 2706-9036 (P)
ISSN: 2707-2533 (O)

Original Research Article

Outcomes of Incisional Surgical Site Infection without Mesh to Prevent Incisional Hernia

Dr. Shyamal Chandra Barai[1*], Md. Shahadot Hossain Sheikh[2], Dr. Abu Taher[3], Dr. Mohammed Tanvir Jalal[4], Dr. Zhuma Rani Paul[5], Dr. Chowdhury Sazzad Hyder[6], Dr. Krishna Pada Saha[7], Dr. Mohammad Haroon Or-Rashid[8], Dr. Ishtiaq Alam[9], Dr. Arun Kumar Pal[10]

[1]Medical Officer, 250 Beded General Hospital, Gopalganj, Bangladesh
[2]Professor, Department of Laparoscopic Colorectal Surgeon, Bangabandhu Sheikh Mujib Medical University Hospital, Dhaka, Bangladesh
[3]Professor, Department of Colorectal Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
[4]Associate Professor, Department of Colorectal Surgery, Bangabandhu Sheikh Mujib Medical University Hospital, Dhaka, Bangladesh
[5]Medical Officer, 250 Beded General Hospital, Gopalganj, Bangladesh
[6]Assistant Professor, Department of Surgery, Shaheed Suhrawardy Medical College and Hospital, Dhaka, Bangladesh
[7]Junior Consultant Surgery, Kuwait Bangladesh Friendship Govt. Hospital, Dhaka, Bangladesh
[8]Junior consultant (Casualty Surgery), Dhaka Medical College Hospital, Dhaka, Bangladesh
[9]Assistant Professor Department of Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh
[10]Assistant Professor Department of Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh

***Corresponding Author**
Dr. Shyamal Chandra Barai
Medical Officer, 250 Beded General Hospital, Gopalgan, Bangladesh

Article History
Received: 05.02.2023
Accepted: 27.03.2023
Published: 30.03.2023

Abstract: ***Background*****:** wound infections that develop after a hernia repair can be linked to systemic issues, mesh infections, and hernia recurrence. ***Objective*****:** To assess outcomes of incisional surgical site infection without mesh to prevent incisional hernia. ***Methodology*****:** This was a Prospective interventional study which was conducted in Department of Colorectal Surgery Bangabandhu Sheikh Mujib Medical University fromApril, 2019- September, 2020 using a semi-structured questionnaire through face to face interview. Data were analysed using a computer programme SPSS 24.0 version. ***Result*****:** the mean age of the respondents was 56.73±7.72 years**.** About 80% were male. The mean BMI was 25±5.5. About 16.7% had Parastomal Hernia and 8.3% had midline Incisional Hernia. 3 patients at 4th week and 1 patient at 3rd month had surgical site infection. ***Conclusion***: Hernia operations are traditionally regarded as clean operations due to the anticipated, low likelihood of infection at the site of surgical intervention (SSI).

Keywords: BMI, COPD, SSI.

INTRODUCTION

The European Society of Radiology defines incisional hernias as "abdominal wall defects, with or without a bulge, around post-operative scars, observable or palpable by clinical examination or imaging" [1]. A higher rate of incisional hernias were detected when clinical and imaging (CT or MRI) assessment were combined rather to clinical or radiological screening alone [2]. An unappreciated, delayed side effect of enterostomy reversal is the development of a hernia at the location of a prior colostomy or ileostomy [3]. Studies on the frequency of ostomy site incisional hernias following stoma closure have been conducted, although the percentages are varied, ranging from 0 to 50% [4]. Avoiding the development of hernias should improve patient outcomes over the long run and

lower the expense of further follow-up visits and potential reoperations [5]. In order to prevent herniation in clean wounds, the use of synthetic mesh reinforcement has been recommended. It is a proven treatment for primary and recurring hernias. Because to contamination from the previously exposed bowel lumen, there is a substantial risk of infection and wound breakdown at stoma locations. Mesh-related difficulties in the early postoperative period have prevented its widespread usage in contaminated wounds like the closure of a stoma site due to concerns about infection risk [6]. A biologic mesh may have a lower risk of infection in this case [7]. The thorough incorporation of biologic mesh into the host tissue lowers the likelihood of infection afterward [8] while continuing to provide structural support throughout high-risk abdominal wall closure, especially during the recovery phase [9].

METHODOLOGY

The study was a Prospective interventional study which was conducted in Department of Colorectal Surgery Bangabandhu Sheikh Mujib Medical University fromApril, 2019- September, 2020. Patients aged 18 or over undergoing elective surgery to close a stoma (ileostomy or colostomy; loop or end) were eligible. The stoma may have been constructed by open or laparoscopic technique. Trephine, midline or laparoscopic approaches to the planned stoma closure were all eligible. The exclusion criteris includes large parastomal hernias definitely need mesh repair, Patients took part in another clinical study related to the surgical procedure, Allergic to prolene mesh , history of familial adenomatous polyposis (due to increased risk of cutaneous desmoid tumors) and unable or unwilling to provide written informed consent. . Maintaining all formalities face to face interview was taken by using pre-tested questionnaire with Purposive sampling type of sampling technique. Total 25 patients were enrolled in this study. The detail of the study was explained to each eligible respondent and consent was taken. After collection, the data were checked and cleaned, followed by editing, compiling, coding and categorizing according to the objectives and variable to detect errors and to maintain consistency, relevancy and quality control. Collected data were edited and analyzed according to the objectives and variables by IBM software- Statistical package for Social Science (SPSS 24) version. Ethical clearance was taken from the IRB of the institution. The aim of the study was to assess outcomes of incisional surgical site infection without mesh to prevent incisional hernia. The mean duration of surgery was 78.88±15.

RESULTS

This prospective interventional study was carried out in the Department of Colorectal Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. During the study period, a total no of 25 patients fulfilling the selection criteria and giving consent to participate in the study.

Table 1: Distribution of patients by their age, (n=25)

Age (years)	No Mesh (n=25)	
	n	%
< 40	0	0
40 - 60	20	80
> 60	5	20
Mean±SD	56.73±7.72	

Table 1 shows the mean age of the respondents was 56.73±7.72 years. About 80% were aged between 40-60 years and 20% had more than 60 years.

Table 2: Distribution of patients by their gender (n=25)

Gender	No Mesh (n=25)	
	n	%
Male	18	70.9
Female	7	29.1

Table 2 shows there were a majority of male patients. About 70.9% were male and 29.1% were female.

Table 3: Distribution of patients by their occupation (n=25)

Occupation	No Mesh (n=25)	
	n	%
Service Holder	3	12.5
Businessman	3	12.5

Students	2	8.3
Housewives	7	29.2
Others	10	37.5

Table-3 shows that 29.2% were housewife, 12.5% were Service Holder and Businessman respectively.

Table 4: Distribution of patients by their BMI (n=25)

BMI	No Mesh (n=25)	
	n	%
Underweight (< 18.5)	4	16.7
Normal Weight (18.5 – 25)	6	25.0
Overweight (25 – 30)	6	25.0
Obese (> 30)	9	33.3
Mean±SD	25±5.5	

About 33.33% of the patients were obese, 25% were in normal weight and overweight respectively. The mean BMI was 25±5.5.

Table 5: Distribution of patients by their Co-morbidities

Comorbidities	No Mesh (n=8)	
	n	%
Diabetes Mellitus	2	8.1
COPD	1	4.3
Hypertension	5	12.5

Among the patients 8 had comorbidities. About 5(12.5%) had hypertension, 1(4.3) had COPD and 2(8.1) had DM.

Table 6: Distribution of patients by type of ostomy (n=25):

Ostomy	No Mesh (n=25)	
	n	%
Ileostomy	20	80
Colostomy	5	20

Table 7 shows the distribution of patients by their type of ostomy. About 80% patients had ileostomy and 20% had colostomy.

Table 7: Distribution of patients by presence of hernia (n=25):

Hernias	No Mesh (n=25)	
	n	%
Parastomal Hernia	4/24	16.7
Midline Incisional Hernia	2/24	8.3

Presence of hernias – parastomal and midline incisional hernia before ostomy closure are reflected in the Table 8. About 16.7% had Parastomal Hernia and 8.3% had midline Incisional Hernia.

Table 8: Distribution of length of hospital stay and operation duration (n=25)

Duration of Hospital Stay	No Mesh (n=24)	
	n	%
3 Days	5	20.8
4 Days	4	16.7
5 Days	3	12.5
6 Days	9	37.5
7 Days	3	12.5
Mean±SD	5.04±1.39	
Duration of Surgery (Mean±SD) minutes	78.88±15	

The mean length of hospital stay was 5.04±1.39 and the mean duration of surgery was 78.88±15.

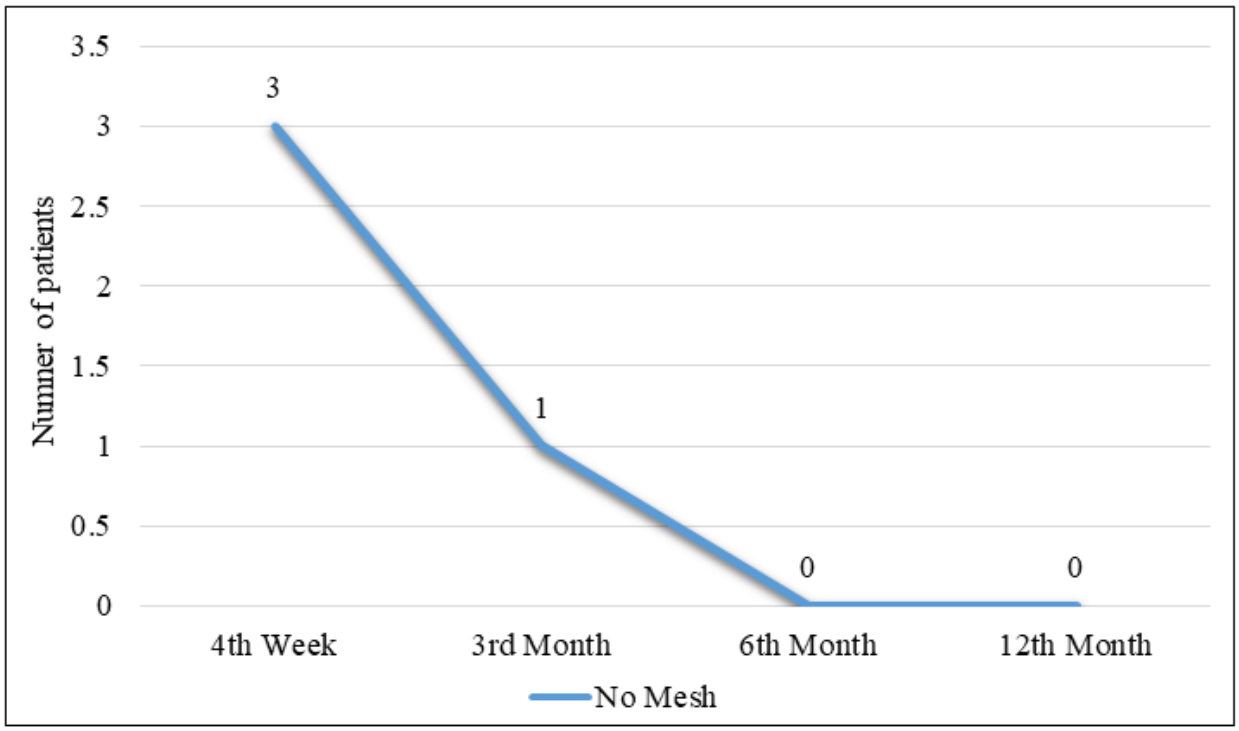

Figure 1: Distribution of infection after ostomy closure at follow up (n=25)

Figure above shows 3 patients at 4th week and 1 patient at 3rd month had surgical site infection.

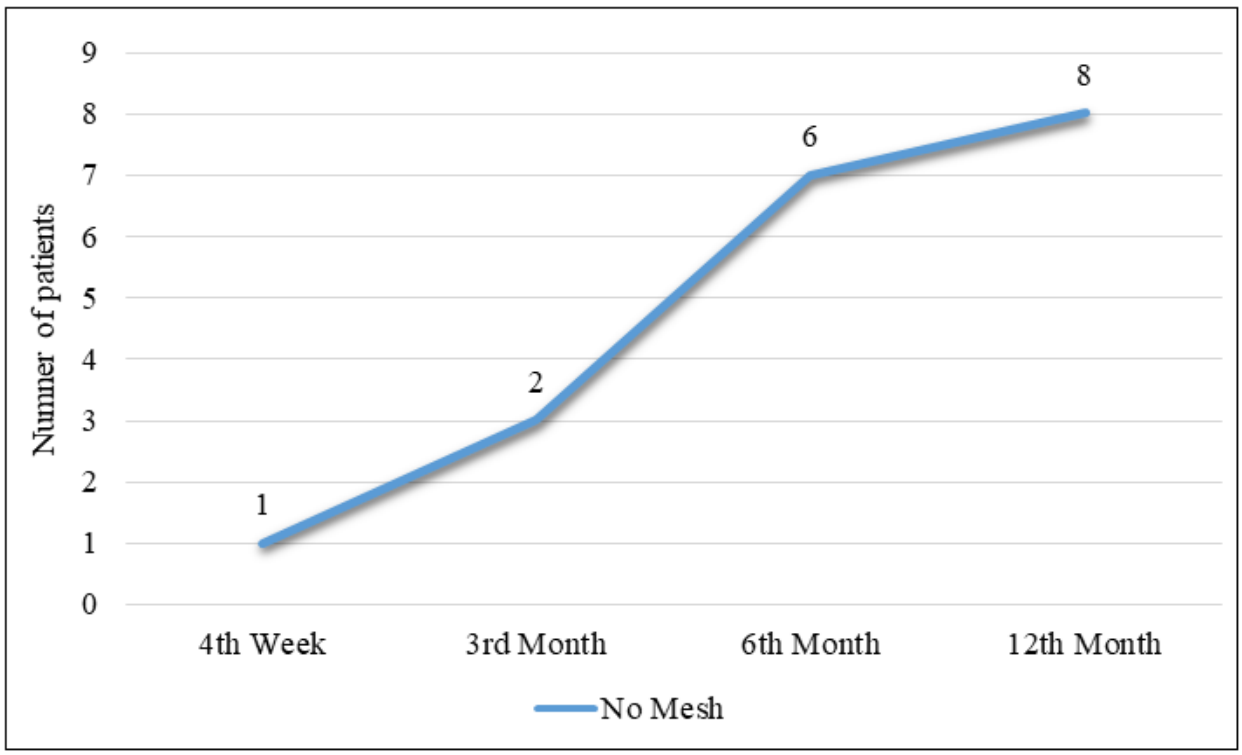

Figure 2: Distribution of hernia after stoma closure at follow up (n=25)

Figure above shows 1 (4.2%) patients at 4th week, 2 (11.5%) at 3rd month, 6 (28.1%) at 6th month and 8 (34.3%) at 12th month follow-up had stoma site incisional hernia.

DISCUSSION

This prospective interventional study had been designed to assess outcomes of incisional surgical site infection without mesh to prevent incisional hernia. Total 25 patients were selected who were candidates for ostomy closure and presented at the Department of Colorectal Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU) from April 2019 to September 2020.

In this study, the mean age of of the respondents was 56.73±7.72 years. Warren *et al*., found the mean age was 54.8 ± 15.7 years [3]. In the present study, there were a majority of male patients (80%) and 20% were female. Study conducted by Liu, Banham and Yellapu found 58.3% in no mesh group were male [10]. In the following study, the mean BMI of the patients was was 25±5.5. About 33.33% of the patients were obese, 25% were in normal weight and overweight respectively**.** BMI was classified as per WHO BMI index (<18.5 as under weigt, 18.5 – 25 as normal, 25 – 30 as overweight and >30 as obese). In the study of Maggiori *et al*., the mean BMI was 25±4 [11]. In this study, comorbidities, principally – diabetic mellitus (DM), chronic obstructive pulmonary disease (COPD) and Hypertension were evaluated (Table 5). Among the patients 8 had comorbidities. About 5(12.5%) had hypertension, 1(4.3%) had COPD and 2(8.1%) had DM. Warren *et al*., found almost the similar findings [3]. In our study about 80% patients had ileostomy and 20% had colostomy. Presence of hernias – parastomal and midline incisional hernia before ostomy closure are reflected in the Table 8. About 16.7% had Parastomal Hernia and 8.3% had midline Incisional Hernia. ROCSS (2020) study stated 24% had parastomal hernia 6% had midline incisional hernia [12]. In our series, surgeries were performed by three experienced surgeons in the field (colorectal surgeons). The mean duration of surgery was 78.88±15min. Warren *et al*., found mean duration of surgery was 133.5±87.5 min [3]. In the current study the mean length of hospital stay was 5.04±1.39. Similar results to current study were observed in the studies of Warren *et al*., [3], Liu, Banham and Yellapu [10], and Maggiori *et al*., [11]. In this series 3 patients at 4th week and 1 patient at 3rd month had surgical site infection These results are consistent with the results of Warren *et al.*, [3] and Wijeyekoon *et al.*, [13]. Our study shows 1 (4.2%) patients at 4th week, 2 (11.5%) at 3rd month, 6 (28.1%) at 6th month and 8 (34.3%) at 12th month follow-up had stoma site incisional hernia. The result was similar with the primary outcome in studies of Liu, Banham and Yellapu [10], and Maggiori *et al*., [11]. In the presence of prior/current infection, loss of domain, bowel involvement, and frequently in the context of substantial co-morbidities, repair of incisional hernias is complicated [14]. Hernia operations are traditionally regarded as clean operations due to the anticipated, low likelihood of infection at the site of surgical intervention (SSI). The frequency of SSI following hernia surgery is higher than is generally believed. Although the effects of a mesh infection could be serious, using the mesh does not increase the frequency of SSI [15].

CONCLUSION

After ostomy reversal, incisional hernias frequently happen. Incisional hernias at the site of a prior stoma closure can result in considerable morbidity, decreased quality of life, hernia imprisonment or strangling that poses a life-threatening risk, and they can place a significant financial burden on healthcare systems. Despite this, there is not much evidence to support the claim [16]. The prevalence of SSI following hernia surgery is higher than previously thought. Hernia operations are traditionally regarded as clean operations due to the anticipated, low likelihood of infection at the site of surgical intervention (SSI)

REFERENCE

1. Muysoms, F. E., Miserez, M., Berrevoet, F., Campanelli, G., Champault, G. G., Chelala, E., ... & Kingsnorth, A. (2009). Classification of primary and incisional abdominal wall hernias. *hernia*, *13*, 407-414.
2. Bhangu, A., Fletcher, L., Kingdon, S., Smith, E., Nepogodiev, D., & Janjua, U. (2012). A clinical and radiological assessment of incisional hernias following closure of temporary stomas. *The surgeon*, *10*(6), 321-325.
3. Warren, J. A., Beffa, L. R., Carbonell, A. M., Cull, J., Sinopoli, B., Ewing, J. A., ... & Cobb, W. S. (2018). Prophylactic placement of permanent synthetic mesh at the time of ostomy closure prevents formation of incisional hernias. *Surgery*, *163*(4), 839-846.
4. Sharp, S. P., Francis, J. K., Valerian, B. T., Canete, J. J., Chismark, A. D., & Lee, E. C. (2015). Incidence of ostomy site incisional hernias after stoma closure. *The American Surgeon*, *81*(12), 1244-1248.
5. Reinforcement of Closure of Stoma Site (ROCSS) Collaborative and the West Midlands Research Collaborative, Bhangu, A., Ives, N., Magill, L., Futaba, K., Forde, C., ... & West Midlands Research Collaborative. (2018). Randomized controlled trial of standard closure of a stoma site vs biological mesh reinforcement: study protocol of the ROCSS trial. *Colorectal Disease*, *20*(2), O46-O54.
6. Choi, J. J., Palaniappa, N. C., Dallas, K. B., Rudich, T. B., Colon, M. J., & Divino, C. M. (2012). Use of

mesh during ventral hernia repair in clean-contaminated and contaminated cases: outcomes of 33,832 cases. *Annals of surgery*, *255*(1), 176-180.
7. Shankaran, V., Weber, D. J., R Lawrence Reed, I. I., & Luchette, F. A. (2011). A review of available prosthetics for ventral hernia repair. *Annals of surgery*, *253*(1), 16-26.
8. Lalezari, S., Caparelli, M. L., & Allamaneni, S. (2017). Use of biologic mesh at ostomy takedown to prevent incisional hernia: A case series. *International journal of surgery case reports*, *41*, 107-109.
9. Reinforcement of Closure of Stoma Site (ROCSS) Collaborative and the West Midlands Research Collaborative, Pallan, A., Patel, A., Patel, A., Patel, A., Patel, A., ... & Yu, L. (2016). Feasibility study from a randomized controlled trial of standard closure of a stoma site vs biological mesh reinforcement. *Colorectal Disease*, *18*(9), 889-896.
10. Liu, D. S. H., Banham, E., & Yellapu, S. (2013). Prophylactic mesh reinforcement reduces stomal site incisional hernia after ileostomy closure. *World journal of surgery*, *37*, 2039-2045.
11. Maggiori, L., Moszkowicz, D., Zappa, M., Mongin, C., & Panis, Y. (2015). Bioprosthetic mesh reinforcement during temporary stoma closure decreases the rate of incisional hernia: a blinded, case-matched study in 94 patients with rectal cancer. *Surgery*, *158*(6), 1651-1657.
12. Bhangu, A., Nepogodiev, D., Ives, N., Magill, L., Glasbey, J., Forde, C., ... & Docherty, J. G. (2020). Prophylactic biological mesh reinforcement versus standard closure of stoma site (ROCSS): a multicentre, randomised controlled trial. *The Lancet*, *395*(10222), 417-426.
13. Wijeyekoon, S. P., Gurusamy, K., El-Gendy, K., & Chan, C. L. (2010). Prevention of parastomal herniation with biologic/composite prosthetic mesh: a systematic review and meta-analysis of randomized controlled trials. *Journal of the American College of Surgeons*, *211*(5), 637-645.
14. Skipworth, J. R. A., Vyas, S., Uppal, L., Floyd, D., & Shankar, A. (2014). Improved outcomes in the management of high-risk incisional hernias utilizing biological mesh and soft-tissue reconstruction: a single center experience. *World journal of surgery*, *38*, 1026-1034.
15. Zuvela, M., Milićević, M., Galun, D., Lekić, N., Basarić, D., Tomić, D., ... & Palibrk, I. (2005). Infection in hernia surgery. *Acta Chirurgica Iugoslavica*, *52*(1), 9-26.
16. Harries, R. L., & Torkington, J. (2018). Stomal closure: strategies to prevent incisional hernia. *Frontiers in surgery*, *5*, 28.