OUTCOME OF SKIN ONLY TEMPORARY ABDOMINAL CLOSURE METHOD AND REPEATED PERITONEAL WASH IN PATIENTS WITH SECONDARY PERITONITIS

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ABSTRACT

OBJECTIVE: To determine the outcome of skin only temporary abdominal wall closure and repeated peritoneal wash therapy in the management of secondary peritonitis in terms of fascial closure and mortality.

MATERIAL AND METHODS: This prospective descriptive study was conducted on 80 patients with secondary peritonitis, selected by convenience non probability sampling technique after fulfilling the inclusion and exclusion criteria, in emergency surgical department of Govt PGMI Lady Reading Hospital Peshawar from January 2011 to July 2012. Patients were diagnosed on the basis of history, clinical examination, hematological and radiological investigations, operated in casualty and skin only temporary abdominal closure method was applied with prolene 2/0 and planned re-laparotomy was carried out after 24 hours. Further re-laparotomies were decided by the operating surgeon till proper fascial closure. The impact of skin only closure and number of operations were analyzed postoperatively in terms of fascial closure and mortality. The demographic and clinical (intraoperative and postoperative) data of the all patients such as name, age, gender, duration of hospital stay, indication and number of operations were recorded in a proforma. The data was analyzed with SPSS version 16. Frequency and percentages were computed for categorical variables such as gender and number of operations, fascial closure and mortality while numerical variables such as age, hospital stay was presented with Mean $\pm$ SD.

RESULTS: A total of 80 patients were included in the study and out of which 55 (68.8%) were male and 25 (31.2%) female with male to female ratio of 2.2:1. The age of patients ranged from 18 to 65 years. The mean age was 37.83 ± 1.194 . The ranged of re-operations were 1 to 4 with mean 2.06 ± 0.785 . The ranged of hospital stay was 9 - 50 days with mean 21 ± 7.719 .

The fascial closure was 82.5% and mortality was 13.8%.

CONCLUSION: Peritoneal wash is life saving procedure in the treatment of secondary peritonitis and skin only temporary abdominal closure is easy, quick and fascial preserving procedure. Both techniques should be encouraged in secondary peritonitis cases.

KEY WORDS: Peritonitis, Re-Laparotomy, Skin Closure.

INTRODUCTION

Secondary peritonitis is associated with high mortality and morbidity rates^{1,10}. Approximately 9.3 per 1000 emergency hospital admissions, has been reported due to secondary peritonitis, in the United States². Acute mortalities due to this condition range between 35% and 70%³. Development of sepsis with multiple organ failure in secondary peritonitis causes high mortality, long duration of hospital stays, and high morbidity².

Standard treatment for secondary peritonitis

consists of prompt control or elimination of the source of the infection by surgical procedure, antimicrobial drugs, and critical care support. Among the surgical treatment, a midline laparotomy is the standard approach to eliminate the infectious source in patients with secondary peritonitis^{1,4}. After the initial laparotomy, re-laparotomy may be necessary to eradicate persistent peritonitis or a new infectious focus in the abdomen. There are two commonly used methods of relaparotomies, one is planned relaparotomy and other one is on-demand relaparotomy that is when the patient's condition

demands it².

In patients with secondary peritonitis, the abdominal infection causes edema of the abdominal wall and bowel distention due to which the surgeon leave the abdomen open¹⁰. All patients with an open abdomen are critically ill and have a high risk of developing major complications, like intraabdominal abscess, multiple organ dysfunction syndrome, enterocutaneous fistula, and abdominal wall hernia^{6,7}. The open abdomen is associated with high mortality that ranges between 30% to 50 % and the risk of mortality is even higher in the infected open abdomen than in the traumatic^{5,6}.

Open abdomen requires temporary closure to protect the exposed gut^{5,6,10}. A number of techniques are used for this temporary abdominal closure. Absorbable or non-absorbable mesh implantation, Bogota bags, towel clips or running skin closure, vacuum-assisted closure are common methods for open abdomen^{5,7,8}. In skin only method for temporary abdominal closure, the skin is closed over the fascial defect with towel clips or a running suture. Skin provides a natural cover for the viscera. The benefit of this method is to close the abdomen rapidly, thus allowing resuscitation of the clotting system, shock, and hypothermia. Disadvantages of this technique are high incidence of abdominal compartment syndrome, evisceration, injury and loss of skin^{1,5}. Final aim is delayed primary fascial closure or a planned ventral hernia¹⁰.

Temporary abdominal closure has proved to be helpful in improving both short-term and long term survival and early successful definitive fascial closure when used in the surgical management of secondary peritonitis⁹. However, there are limited number of prospective and retrospective studies about treatment and outcome of open abdomen, so there is lack of evidence about generally applicable temporary closure method for open abdomen and secondary peritonitis^{1,7}.

So the objective of our study is to determine the outcome of skin only method of temporary abdominal closure and number of operations

technique in patients with secondary peritonitis in terms of fascial closure and mortality in our surgical unit.

OBJECTIVE

To determine the outcome of skin only temporary abdominal closure and repeated peritoneal wash therapy in the management of secondary peritonitis in terms of fascial closure and mortality.

METHODOLOGY

This prospective descriptive study was conducted in emergency surgical department, Lady Reading Hospital, Peshawar from January 2011 to November 2012 after obtaining approval of the Institute Ethics Committee, and non-probability, consecutive sampling technique was used.

Patients aged more than 14 years, all consented patient having secondary peritonitis of more than 6 hours requiring surgical intervention and opening of abdomen of both sexes were included in the study. Patient having secondary peritonitis due to trauma, peritoneal dialysis catheter, those with incisions other than midline incisions, and those with burst abdomen and open abdomen management without definitive closure of the abdominal fascia were excluded.

All consented patient having secondary peritonitis according to inclusion and exclusion criteria were admitted through the surgical emergency department. After confirmation of the diagnosis midline laparotomy was carried out. Decision about surgical procedure was made by the operating surgeon. When decision was taken about open abdomen then the abdomen cavity was closed temporarily by skin only subcuticular method with prolene 2/0. After 24 hours planned re-laparotomy was done and operating surgeon decided for fascial closure or again skin only closure method. Further laparotomies were decided by operating surgeon. In case of fascial closure skin was dissected from anterior rectus sheath and proper abdominal fascial closure was performed and if closure was not possible then skin was closed only.

Data will be analysed by SPSS version 16. Mean and standard deviation of numerical data like age

and duration of hospital stay were measured. Frequency and percentages were determined for qualitative variables like gender, number of relaparatomies, fascial closure and mortality.

RESULTS

We had total of 80 patients out of which 55 (68.8%) were male and 25 (31.2%) female with male to female ratio of 2.2:1. The age of patients ranged from 18 to 65 years. The mean age was 37.83 ± 1.194 . The ranged of re-operations were 1 to 4 with mean 2.06 ± 0.785 .

The ranged of hospital stay was 9 - 50 days with mean 21 ± 7.719 .

Table - 1
Fascial closures among age groups were shown in table 1.

Fascial Closure	Age Range in Years						Total
	< 20	21 - 30	31 - 40	41 - 50	51 - 60	> 60	
No	0 (0%)	1 (1.2%)	5 (6.2%)	4 (5.0%)	4 (5.0%)	0 (0%)	14 (17%)
Yes	5 (6.2%)	19 (23.8%)	17 (21.2%)	16 (20.0%)	8 (10.0%)	1 (1.2%)	66 (82.5%)
Total	5 (6.2%)	20 (25.0%)	22 (27.5%)	20 (25.0%)	12 (15.0%)	1 (1.2%)	80 (100.0%)

Table-2.
Fascial Closure among sex were shown in table 2.

Fascial Closure	Sex		Total
	Male	Female	
No	12 (15.0%)	2 (2.5%)	14 (17.5%)
Yes	43 (53.8%)	23 (28.8%)	66 (82.5%)
Total	55 (68.8%)	25 (31.2%)	80 (100.0%)

Table-3
Fascial Closure among number of operations were shown in table 3.

Fascial Closure	Number of Operations				Total
	2	3	4	5	
No	0	4	5	5	14
% of Total	(.0%)	(5.0%)	(6.2%)	(6.2%)	(17.5%)
Yes	15	19	17	16	66
% of Total	(18.8%)	(23.8%)	(21.2%)	(20.0%)	(82.5%)
Total	15	23	22	21	80
% of Total	(18.8%)	(28.8%)	(27.4%)	(26.2%)	(100.0%)

Table- 4
Mortality among age groups were shown in table 4.

Mortality	Age Range in Years						Total
	<20	21 - 30	31 - 40	41 - 50	51 - 60	>60	
Yes	0(0%)	2(2.5%)	2(2.5%)	3(3.7%)	3(3.7%)	1(1.2%)	11(13.8%)
No	5(6.2%)	18(22.4%)	20(24.9%)	17(21.2%)	9(11.5%)	0(0%)	69(86.2%)
Total	5(6.2%)	20(24.9%)	22(27.4%)	20(24.9%)	12(15.2%)	1(1.2%)	80(100%)

Table-5
Mortality among sex were shown in table 5.

Mortality	Sex		Total
	Male	Female	
Yes	9 (11.2%)	2 (2.5%)	11 (13.8%)
No	46 (57.5%)	23 (28.8%)	69 (86.2%)
Total	55 (68.8%)	25 (31.2%)	80 (100%)

Table-6
Mortality among number of operations were shown in table 6.

Mortality	Number of Operations				Total
	2	3	4	5	
Yes	3 (3.8%)	6 (7.5%)	2 (2.5%)	0 (0%)	11 (13.8%)
No	17 (21.2%)	31 (38.8%)	19 (23.8%)	2 (2.5%)	69 (86.2%)
Total	20 (25%)	37 (46.2%)	21 (26.3%)	2 (2.5%)	80 (100%)

DISCUSSION

Secondary peritonitis is notorious for high mortality (20-60%), long hospital stays and high mortality due to development of sepsis with multiple organ failure¹¹⁻¹⁴.

There is continuous argument about application of different treatment strategies, but in consideration of high mortality rate due to on going sepsis in patients of secondary peritonitis effective treatment strategies need to be developed to improve overall outcome. The decision whether and when to perform a relaparotomy in secondary peritonitis is largely subjective and no existing scoring system aids in this decisional process^{15,16}.

At the end of most laparotomies, the abdominal fascia can be closed primarily. However, sometimes full fascial closure is not possible and the operating surgeon is forced to leave the abdomen open. The open abdomen is associated with mortality rates of >30%¹⁷⁻¹⁹. In these situations a temporary closure device is used to contain and protect the exposed viscera. Several techniques have been described to assist temporary abdominal closure. Their safety and effectiveness are under considerable debate²⁰.

In our study we performed skin only abdominal closure in which fascial closure was 82.5% and mortality was 13%, while a study conducted by Smith PC in which mortality was 3 and fascial closure was 6 out of 8 patients which may be due

to number of patients were not sufficient²¹.

In another study by Tremblay found that mortality was 40% and fascial closure was also 40% in 93 patients²².

In our study mortality was 13.8% and fascial closure was 82.5% in 80 patients. our results are good as compared to other studies. It may be due to our pre-planned strategy and repeated peritoneal wash. No local study is available on skin only abdominal closure in the management of secondary peritonitis.

In the planned strategy, a relaparotomy is performed every 36 to 48 hours for inspection, drainage, and peritoneal lavage of the abdominal cavity until findings are negative for ongoing peritonitis. The planned strategy may lead to early detection of persistent peritonitis or a new infectious focus but harbors the risk of potentially unnecessary re-explorations in critically ill patients, while the on-demand strategy harbors the risk of a potentially harmful delay in the detection of ongoing infectious sources²³.

In our study we performed planned relaparotomy after 24 hours and further decision was made by operating surgeon to perform fascial or skin only closure and further peritoneal wash.

Over the last two decades of the 20th century, besides other conservative therapy agents, new, more "aggressive" surgery techniques and approaches were introduced, some of which represent the support and "the most powerful weapon" in the fight against peritonitis today: postoperative continuous lavage and planned multiple relaparotomies with temporary closing of the abdomen^{25,26}.

Several large studies about planned multiple relaparotomies with temporary closing of the abdomen method resulted in satisfactory average mortality of 28.5% (Teichmann 1986, Wittmann 1990, Schein 1991)^{27,28}. In 1988, Garcia-Sabrido also showed that planned relaparotomies reduce mortality to 1/3 of patients with secondary peritonitis²⁹. In 1990, Wittmann observed a lower

mortality because of the application of planned relaparotomies method (24%) when compared to the classic approach (30%) in patients with the same risk of mortality, especially in patients at high risk²³.

In our study the mortality was 13.8%. From the results of our study and compare with other studies, it appears that skin only abdominal closure and repeated peritoneal wash in the management of secondary peritonitis is safe and can be achieved with an acceptably low fascial closure failure and mortality rate. Most complications would not have been avoided if the patient had been discharged earlier. Our results would suggest that both techniques should be encouraged after ensuring the availability of postoperative support and access to services.

We are unable to study various patients characteristics, co-morbidities considered a potential risk factors for postoperative outcome including BMI, and ASA score. Furthermore, it is not linked to a pre-determined standard protocol. We recommend a large multicenter prospective trial to confirm our findings.

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