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Contents

Editorial

- ▶ Learning environment and its impact on students' learning. 5-6
Dr. Hafiza Arjuman, Dr. Md. Azfarul Habib.

Original Articles

- ▶ Comparison of widal test and blood culture in the diagnosis of enteric fever in febrile patients. 7-13
Dr. Abu Bakar Siddique, Dr. Ripa Kundu, Dr. Md. Abdul Motaleb, Dr. Alok Kumar Sorker, Dr. Mirza Ruhul Amin, Dr. Shamima Akhter.
- ▶ Plasmid detection in uropathogenic Escherichia coli of urine of suspected urinary tract infection cases and its association with drug resistance. 14-21
Dr. Mst. Jeneya Afrin, Dr. Md. Abdullah Siddique, Dr. Arefa Akter, Dr. Taslima Yasmin, Dr. Farzana Afroz, Dr. Shamima Akhter.
- ▶ Pattern of chest X-ray in smear positive tuberculosis patient. 22-28
Dr. A.K.M. Towfiqul Alam, Dr. Debashis Kumar Gupta, Dr. Md. Moshir Rahman, Dr. A.K.M. Ahsan Habib, Dr. Md. Rezaul Alam, Dr. A.K.M Anowar Hossain.
- ▶ Subcutaneous antiseptic wick drain to prevent surgical site infections following acute & complicated appendectomy. 29-32
Dr. Md. Sayeedur Rahman, Dr. Md. Shariful Alam Khan, Dr. Md. Shaharul Alam Mondol, Dr. Iftekhar Md. Kudrat-e-Khuda.
- ▶ Association between duration of hypertension, level of systolic blood Pressure and ECG. 33-36
Dr. Md. Mahfuzul Islam, Dr. Mohammad Mahbub-ur Rahim, Dr. Md. Kamrul Islam, Dr. Md. Yunus Ali.
- ▶ Role of myringoplasty in hearing Improvement. 37-41
Dr. Md. Saiduzaman, Dr. Md. Nurul Islam, Dr. Md. Hasan Ali.

Case Report

- ▶ Cystic hygroma of breast in a child. 42-43
Dr. Md. Rezaul Islam



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Address of Correspondence

Executive Editor, TMSS Medical College Journal, TMSS Medical College
 Rangpur Road, Thengamara, Bogura, Bangladesh.
 Phone: 051-61830, Fax : 051-61830
 e-mail: editortmcjournal@gmail.com, Web: www.tmssmedicalcollege.com

Original Article

Subcutaneous antiseptic wick drain to prevent surgical site infections following acute & complicated appendectomy

Rahman MS^{1*}, Khan SA², Mondol SA³, Khuda IK⁴

1. Dr. Md. Sayeedur Rahman, Assistant Professor, Department of Surgery, Jashore Medical College, Jashore.
2. Dr. Md. Shariful Alam Khan, Assistant Professor, Department of Surgery, Jashore Medical College, Jashore.
3. Dr. Md. Shaharul Alam Mondol, Assistant Professor, Department of Surgery, Shaheed Ziaur Rahman Medical College, Bogura.
4. Dr. Iftekhar Md. Kudrat-e-Khuda, Junior Consultant, Department of Surgery, Rajshahi Medical College Hospital, Rajshahi.

* Corresponding author

Abstract

Background: Surgical site infections are most common in case of acute & complicated appendectomy. In some cases, percentage of infections is very high. By taking a simple measure we can reduce the infection rate very easily. **Objective:** The aim of our study was to find out whether insertion of a sub cutaneous antiseptic wick drain can reduce the SSIs in acute and complicated appendectomy. **Materials & Methods:** A hospital based randomized control study was performed in the department of surgery 250 Bedded Sadar Hospital, Jashore. Patients who has definitive acute & complicated appendicitis and undergone appendectomy were included. A total of 60 patients were included among them 30 patients in study group and 30 patients in control group. In study group the wound wick was soaked in 10% povidone iodine and placed in the wound, one end of wick was kept outside the caudal part of wound. Wicks were inspected daily. On 4th post-operative day wick was removed. All the patients received antibiotics prophylaxis. They were reviewed while in hospital and after 4 weeks following operation in outdoor basis for evidence of any wound infection. **Results:** Overall infection of study group was 03(10%) patients and control group was 22(73%) patients. The main outcome measures were wound infection, wound discomfort and cosmetic result. The P value of the result is <0.001 which is statistically significant. **Conclusion:** We concluded that the use of wound wick drain was associated with decreased wound infection rates following appendectomy. So, this simple measure is therefore appropriate in view of its greater convenience and safety.

Key words: SSIs, Complicated appendicitis, Sub cutaneous wick drain.

Introduction

Surgical site infections (SSIs) are defined as wound infection following invasive surgical procedure. Surgery for complicated appendicitis is associated with highest rate of infective complications specially (SSIs). In this type of operation wound infection rate is 9 to 53 %¹. SSIs lead to increased morbidity alongside increasing unnecessary patients suffering and decreased quality of life². Recently, so many studies show that average hospital stay is (15-18) days in patients who developed SSIs after complicated appendectomy. If post appendectomy SSIs does not develop then average hospital stay only (3-5) days. Longer hospital stay decrease quality of life of patient as well as huge cost for the patient and also for the country. Several risk factors for developing SSIs have been identified. Such as current smoking, BMI,

obesity, depth of subcutaneous fat, nutritional status, diabetes mellitus, sudden co-morbidities, ASA class and operation time but single most risk factor is complicated appendicitis. Complications are gangrenous appendicitis and perforated appendicitis. Various interventions have been proposed to reduce SSIs³. A number of them are used to routine practice. Hand washing, minimizing shaving, skin preparation and pre-operative antibiotics have all gained acceptance in the surgical community but use of antiseptic wick drain is a new concept to reduce SSIs. It has been found that hematoma, serous fluid and dead space in surgical incisional wound increases the risk of infection as these acts as a culture medium. Subcutaneous drain soaked with antiseptic solution reduces the risk of infection⁴. However, the use of

post-operative subcutaneous wound drainage is not universally accepted. In addition, drains may not efficacious and cause discomfort⁵. The aim of our study is use of antiseptic wick drain to reduce appendectomy wound infection.

Materials & Methods

A hospital based randomized control study was performed in the department of surgery, 250 Bedded Sadar Hospital, Jashore, between January 2018 to June 2018. Thirty patients in each group were included. Group -1 was study group (with wick drain) and group-2 was control group (without wick drain).

Table-I: Types of appendicitis with relation of SSIs

Degree of appendicitis	With wound wick n=30	Without wound wick n=30
Acute inflammation	6(20%)	5(17%)
Gangrenous	17(57%)	16(53%)
Perforated/ free pus	7(23%)	9(30%)

Patients were admitted with a presumptive diagnosis of acute appendicitis and gave informed consent to enter the study. Intravenous antibiotics were given during introduction of general anesthesia and it was continued per-operative and post-operative period. Antibiotics comprised ceftriaxone and metronidazole. Various parameters like Age, Sex, Diabetes mellitus, ASA score, Duration of symptoms, Pre-operative hemoglobin level and Intra operative variables like site of perforation, type of surgery, duration of surgery, intra operative hypotension, nature and output of intra peritoneal drain in the post-operative period were observed. Appendectomy was done by grid iron, lower midline and lower right para- median incision. In all patients with pus in the peritoneal cavity, was lavage with sufficient amount of normal saline. The wound wick was soaked in 10% povidone iodine and placed in the wound; one end of wick was kept out side in the caudal part of wound. Skin was closed by few interrupted sutures. All post-operative wounds were inspected daily for evidence of wound infection. Wound infection was diagnosed clinically mainly by absence or presence of pus, excessive wound pain, wound swelling. On 4th post-operative day wick was removed. Patients were discharged on 7th post-operative day. They were reviewed on 4th week after appendectomy in outdoor basis for any evidence of wound infection during intervening period which was recorded.

Results

A total of 60 patients under went appendectomy during six months. Of this 11 patients had acute appendicitis, 33 patients had gangrenous appendicitis and 16 patients had perforated appendicitis. Overall infection of study group was 3(10%) patients and control group was 22(73%) patients. The difference of SSIs is statistically significant.

Table-II: Age and Sex distribution of Group 1 (n=30).

Sex	Age	SSI Factors
Male - 18(60%), Female - 12(40%)	18-25yrs =13(43%) 26-35yrs =8(27%) 36-45yrs =5(17%) Above 45yrs =4(13%)	SSI occurs= 03(10%) SSI does not Occurs=27(90%)

Table-III: Age and sex distribution of Group 2 (n=30).

Sex	Age	SSI Factors
Male - 20(67%) Female - 10(33%)	18-25yrs =12(40%) 26-35yrs =9(30%) 36-45yrs =6(20%) Above 45yrs =3(10%)	SSI occurs= 22(73%) SSI does not Occurs=8(27%)

Most of the SSIs in control group (without drain) were managed by opening the wound, regular dressing and antibiotics. These resulted in increased morbidity, hospital stay, cost, and poor cosmesis, in these cases. On the other hand, cases with wick drain who developed SSIs was easily managed without the need of opening the wound resulting in reduction in complications like wound disruption, patients' discomfort, bad cosmesis and prolonged hospital stay.

In the study conducted by Ahamed et.al in colorectal surgeries SSIs rate was found to be (13.6%). They find out that insertion of subcutaneous drains provided effective drainage of the collection without the need of open drainage.

Table- IV: Infection rate among study group & control group

	Study group	Control group			
SSIs	Wick drain n(%)	No wick drain n(%)	Total n(%)	P value	significance
No	27(90%)	08(27%)	35(58%)	<0.001	Significant
Yes	03(10%)	22(73%)	25(42%)		
Total	30(100%)	30(100%)	60(100%)		

There are some reports in the literature suggesting that placement of drain pre disposes the area to infection and prolonged hospital stay. This may be true in clean surgeries. However, it is not found to be true for non-complicated and complicated appendicitis surgery in our study.

Discussion

SSI has been reported to be one of the most common causes of nosocomial infections worldwide⁶. Infections leads to prolonged requirement of analgesics and antibiotics, increase length of hospital stay, delay return to regular activity and increase complications rate⁷. Globally surgical site infection rates have been reported to range from 2.5% to 41.9 %⁽⁸⁻¹⁴⁾. Chiang et al. has reported that the presence of appendix perforation is the most important factor associated with the development of post-operative wound infection. There are reports in literature suggesting that placement of drains pre-disposes the area of infection and prolongs hospital stay¹⁵. This may true in clean surgery. But it is not true in case of surgery for acute and complicated appendicitis. Keya et al in a randomized clinical trial comprising of 210 patients undergoing elective abdominal surgeries evaluated whether subcutaneous wick drainage affects surgical site infection rate. The SSI rate was found to be comparable with overall rate of 7.7%. SSI rate of drain and non-drain group was found to be 5.7% and 9.9% respectively. Though there was a decrease in SSI rate, it was not statistically significant. For most surgical site infections, the source of pathogen is the endogenous flora of the patient skin, mucous membrane or hollow viscera. When the gastrointestinal tract is opened during an operation and is the source of pathogens, gram negative bacilli (e.g., *E. coli*), gram positive organisms (e.g., *Enterococci*) and sometimes anaerobes (e.g., *Bacillus fragilis*) are the typical SSI

isolates. Exogenous sources of SSI pathogens include surgical personnel (especially members of the surgical team), the operating room environment (including air), and all tools, instruments and materials brought to the sterile field during operation. Exogenous flora is primarily aerobes, especially gram positive organisms. Use of subcutaneous drain prevents formation of seroma and hematoma and also eliminates the dead space occurring in relatively obese patients having thick subcutaneous fat tissue¹⁶. It has been shown that use of wick drain post-operatively does not interfere formation of granulation tissue resulting faster wound healing. My findings can be compared with the study of Baraga P, et. al., they studied in State-Run Hospital in India, pre-existing malnutrition and anemia with late presentation, septicemia and gross peritoneal contamination lead to a very high wound infection rate despite the use of systemic antibiotics. The wound infection rate of subcutaneous antiseptic solution versus irrigation with normal saline in patients undergoing exploratory laparotomy for perforation peritonitis with pyoperitoneum was shown. Study included 30 patients in each groups. In control group 66.6% of the patients develop wound infection, whereas in study group 26.6% only develops wound infection. This difference was statistically significant. There was no local complication in study group. They concluded that local use of antiseptic solution at the incision site is safe and effective measure to control wound infection in case of perforation peritonitis with pyoperitoneum.

Conclusion

Use of a subcutaneous wick drain result in statistically significant reduction in wound infection (73% vs 10%, $p < 0.001$). It also results in reduction in SSIs related complications like wound disruption, patients' discomfort, bad cosmesis, prolonged hospital stays, prolonged antibiotics use and increased cost.

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