COMPARISON OF HYDROCOLLOID WITH CONVENTIONAL GAUZE DRESSING IN PREVENTION OF WOUND INFECTION AFTER CLEAN SURGICAL PROCEDURES

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ABSTRACT

Objective: To compare hydrocolloid with conventional gauze dressing in prevention of infections after clean surgical procedures.

Study Design: Randomized controlled trial.

Place and Duration of Study: Department of Surgery, CMH Rawalpindi from 22 Jan 2010 to 22 Aug 2010.

Patients and Methods: A total of 400 patients undergoing clean surgical procedures were randomly allocated in two equal groups, A and B by lottery method. In group A, simple gauze dressing was applied after clean surgical procedures while in group B hydrocolloid dressing was used. On 7th post operative day, patients were observed for presence of infection.

Results: Mean age of sample was 42.08 ± 11.112 years. In group A out of 200 Patients, 14(7.0%) while in group B 10(5%) developed infection postoperatively (p=0.709).

Conclusion: There is no difference in the rate of infection when using a gauze dressing or a hydrocolloid dressing after clean surgical procedure.

Keywords: Wound infection, Hydrocolloid, Bandages.

INTRODUCTION

Over the past three decades, clinicians have been exposed to many new advanced wound dressings. The moist dressing revolution began in the 1970s with the introduction of film and hydrocolloid dressings[1], and today these dressings are considered to be traditional types of the advanced dressing categories. Hydrocolloid dressings are impermeable in nature and this property helps patients in a way that it not only provides a protective covering which helps prevent the spread of pathogenic microorganisms, but also enables patients to take shower without fear of contamination. There also appear to be significant cost-benefits associated with the use of hydrocolloids[2] as they do not require frequent changing, thus reducing the nursing cost significantly.

Although many publications worldwide emphasize the benefits of moist environment for wound healing, the use of woven gauze as dressing material still prevails in many countries of the world[3]. Gauze dressings are the traditional dressings applied commonly. However they cause pain on removal and particulate matter may be left in the wound. They are permeable to fluids and bacteria[4]. The incidence of surgical site infection in clean surgical procedures reported in a Pakistani study is 7.2% in which simple gauze dressing was used and was changed on third post operative day[5].

Occlusive dressings like hydrocolloids also have an additional advantage that they promote early wound healing[5] and the risk of wound infection as it was once thought does not increase when compared to gauze dressing[6-7]. This dressing does not require frequent changes and this property helps reducing the cost of wound management[6] which is an added benefit. The purpose of this study was to identify the frequency of surgical site infection after clean surgical procedures in Armed Forced hospital and to compare hydrocolloid with simple gauze dressing in prevention of wound infection after clean surgical procedures.

PATIENTS AND METHODS

Study was conducted in Combined Military Hospital Rawalpindi from 22 Jan 2010 to 22 Aug

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2010. Patients undergoing clean surgical procedures between ages 15 to 55 years were included. Only non smoker male patients were included in study. Patients having bleeding diathesis, diabetes mellitus, history of any chemotherapy or radiotherapy and any history of repeated infections were excluded from the study. Surgical procedure consent of RCT was taken from all the patients who participated in the study. Patient's name, age, address and hospital registration numbers were recorded. General physical examination and systemic examination was then performed. Laboratory investigations including blood complete picture, urine routine examination, liver function test, blood sugar random, prothrombin time and activated partial thromboplastin time were done in all cases thus selecting healthy individuals who were free from any systemic illness. Prophylactic antibiotic was given to all cases. After surgery, the wound was closed using polypropylene suture. Wound was then cleaned with methylated spirit afterwards. The patients were then divided in two groups by random allocation with ratio 1:1. In group A, gauze dressing was applied while in group B, hydrocolloid dressing was used as dressing material. The wound was then inspected on 7th post operative day for wound infection.

Data was analyzed using SPSS. Mean and SD were calculated for age. Chi square test was used to compare the wound infection following use of gauze dressing (group A) and hydrocolloid dressing (group B). A p value < 0.05 was taken as significant.

RESULTS

A total of 400 cases were included in the study. Study was restricted only to the admitted patients as follow-up was easy.

The mean age in group A was found to be 42.19 ± 11.17 years while in groups B it was 41.97 ± 11.08 years (p = 0.08). The mean age and standard deviation for the total patient sample was 42.08 and 11.112 respectively.

Out of the 400 patients 24 (6.0%) developed infection post operatively. In group A 7.0% patients (14 out of 200) developed infection post operatively while out of 200 patients in group B 5% patients (10 out of 200) developed infection (p=0.709, table-1).

DISCUSSION

Millions of surgical procedures are performed globally each year. Majority of procedures result in wounds in which the edges are brought together to heal using stitches, staples, clips or glue - this is called as 'healing by primary intention'. Afterwards, wounds are often covered with a dressing that acts as a barrier, protecting the wound from outside environment. One of the advantages of this may be to protect the wound from micro-organisms, and thus infection. Many different types of dressing are available for use on surgical wounds, however, it is not clear whether one type of dressing is better than any other at preventing surgical site infection, or, indeed, whether it is better not to use a dressing at all. The situation is more confusing especially when clean surgical wound is considered. The reason for this is obvious , the rate of infection in these wounds are inherently very low i.e.3% to 5% , when compared with other surgical wounds like contaminated where it is almost 10% to 30%[8].

Surgical site infection (SSI) not only causes morbidity to the patient but is also a huge drain on hospital resources[9]. Therefore there is ever increasing interest in methods that can prevent it even further. It starts from selecting a patient who is fit to undergo elective surgical procedure, having a good state of health at the time of surgery. Then comes the surgical technique, tissue handling and operation theatre protocols to prevent any contamination during surgical procedure. Following which comes the care of the wound with the help of various antibiotics and dressings.

Many studies have been conducted in recent years to show the effectiveness of new more advance dressing materials in preventing SSI in

various surgical wounds. The results of these studies are often conflicting, especially when clean surgical wounds are considered. So far no dressing material has proven to be superior over the other in these wounds. It is difficult to prove as the rate of infection is so low that a large sample size is required to support the results.

Table-1: Comparison of postoperative infection rates in both study groups.

Presence of Infection	Gauze vs Hydrocolloid		Total n (%)	*p*-value
	Group A n (%)	Group B n (%)		
Yes	14 (7)	10 (5)	24 (6)	0.709
No	186 (93)	190 (95)	376 (94)	

In literature, there are many studies conducted in this regard considering various surgical wounds. The first study conducted was by Michie et al[10] in 1994 in USA. Participants in the study were those undergoing elective plastic surgical procedures. None of the patients who participated developed SSI. Although he measured other parameters like post operative pain and pain upon dressing removal as well.

In 1995, Persson et al[11] conducted a similar study in Sweden. The participants in the study were those patients that were operated for benign gastrointestinal diseases. Sixty eight participants took part in the study. The results of his study also showed no advantage of hydrocolloid over gauze dressing. Although it showed some benefit of hydrocolloid as regards to pain on removal of dressing.

Holm et al[12], in 1998 considered abdominal incision wounds that were more that 5cm in size. Seventy three patients were included in the study with gauze dressing changed on 2nd post operative day and hydrocolloid dressing on 10th post operative day. This study was unique in a sense that it clearly showed the advantage of hydrocolloid over the gauze dressing in prevention of wound infection.

All the studies conducted previously had one basic problem i.e. the small sample size. Wynne et al[13] in 2004 conducted a study in Australia using a large sample size. He included patients who underwent cardiac surgery, in his study 243 patients were applied gauze dressing, while 267 patients hydrocolloid dressing. The results of his study showed no benefit of one over the other in terms of SSI rate.

Shinohara et al[7] in Japan conducted a study in which he considered those patients who underwent abdominal surgery, both clean and clean contaminated. Results of his study showed no major difference in terms of wound infection. His study showed cost benefit in favour of hydrocolloid dressing material as it does not require frequent changing, hence reducing nursing care cost.

The advantage of having a younger population group is that older patients have a weak immune system and healing is also relatively slow in them. Only male patients were considered, so as to eliminate gender bias in the results. Out of 400 patients 24 (6.0%) developed SSI. Patients in Group A in which gauze was applied post operatively, 14 (7.0%) out of 200 developed infection. This was almost comparable with hydrocolloid in which 10 (5.0%) developed SSI ($p = 0.709$). Hence the benefit of hydrocolloid in terms of preventing SSI was not proven. The benefit of using hydrocolloid is only in terms that patient can take a bath while the dressing is in place as they are inherently waterproof dressings. Some of the studies like the one conducted by Shinohara et al[7], show that cost of dressing is reduced when using hydrocolloid, as they do not require frequent change. However this has been disproved by some of the other studies, especially the one conducted by Ubbink et al[15], which claim that cost of dressing material outweighs the nursing cost of frequent dressing change.

CONCLUSION

Gauze dressing is a safe and effective dressing material. It can be recommended as the

first choice in clean surgical wounds. Hydrocolloid is equally effective and safe, so that the lower cost and easy availability of the former favours its use, especially where resources are limited.

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