

Does Antibiotic Coated Polyglactin Helps in Reducing Surgical Site Infection in Clean Surgery?

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ABSTRACT

Objective: To compare the frequency of surgical site infections in plain polyglactin versus Antibiotic (Triclosan) coated polyglactin suture material in benign clean breast diseases.

Study Design: Randomized Controlled Trial

Place and Duration of Study: This study was conducted at the Department of General Surgery, Breast Unit, Liaquat National Hospital. Karachi from Sep 2015 till Mar 2016.

Materials and Methods: A total number of 378 patient meeting in the inclusion criteria and consenting for the enrolment in the study for minor clean breast surgeries were randomly divided into two groups. In one group the wounds were closed subcutaneously with plain polyglactin suture, while in the second group triclosan coated polyglactin suture was used. The wounds were examined on the 3rd, 7th and 30th day post operatively, for signs of superficial surgical site infection (SSI). There was no use of antibiotics post-operatively. However, treatment was offered to patients who develop SSI.

Results: The frequency of SSI in the study group (triclosan coated polyglactin) was 5.8%(11 of 189 patients) while in the control group it was 3.7%(7 of 189). The difference between the two groups was not statistically significant (P-value= 0.507).

Conclusion: The study did not demonstrate a statistically significant reduction of superficial surgical site infection when triclosan coated polyglactin suture was used in clean wounds. More studies need to be conducted with larger sample size to look at its effects on other wound categories.

Key Words: Antibiotic coated polyglactin, triclosan coated polyglactin, Surgical Site Infection, Clean Wounds

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INTRODUCTION

Surgical Site infection (SSI) remains the most common problem faced by the surgeon¹. The surgeon not only has to reduce the SSI through meticulous surgical technique but also has to address the paraphernalia that could contribute to the SSI². Where Suture provides the tensile strength for the wound to heal, it also produces inflammatory response that can predispose the wound to develop delayed healing, necrosis and ultimately infection³.

Benign breast diseases are the one of the common reason for the females to attend the surgical OPD⁴. Besides them being classified as clean surgeries, they still pose a low incidence of <2 % of Surgical site infection besides complications like hematoma & seroma⁵.

According to Centre for Disease Control (CDC), surgical site infection commonly accounts for infections occurring within 30 days of the surgery with the exception of the implant surgeries which require a year follow-up to be declared as infection free. Wounds that have developed infection require further management in terms of wound care, antibiotics (systemic or topical) or surgical intervention⁶.

In order to minimize the surgical site infection, one must take into account concerns related to effective antiseptic preparations and universal precautions. Intraoperative tissue handling and prophylactic antibiotics are few of the most important considerations in preventing surgical site infection⁷.

As high as 66% of wound infections are contributed by the trauma from the incision. Hence the choice of suture used for wound closure has significant impact on causing SSI. Suture materials have been classified based on the mono and poly-filaments⁸. These poly-filaments commonly used to wound closure serve as a source or nidus that can cause colonization of the endogenous flora leading to infection⁹.

Triclosan or 5-chloro-2 (2, 4-dichlorophenoxy)phenol is widely used in industries for its antibacterial and antifungal properties¹⁰. From shampoo, house hold detergents, liquid soaps to scrub agents, the compound has been used extensively in many commercial

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brands¹¹. Recent researches have shown the effectiveness of Triclosan in reducing Methicillin Resistant Staph Aureus colonies hence it became a potential agent in suture materials where the common threat of infection is from MRSA¹².

Hence the purpose of the study is to compare the frequency of infection in simple polyglactin versus Antibiotic (Triclosan) coated suture material in benign breast surgeries.

MATERIALS AND METHODS

This randomized controlled study was conducted at the Department of General Surgery, Breast Unit, Liaquat National Hospital from Sep 2015 till Mar 2016.

Patients with benign breast pathologies admitted under Department of General Surgery & Breast Unit, Liaquat National Hospital & Medical College through Out patient services.

Inclusion Criteria:

1. Age between 20 to 35 years,
2. Benign breast diseases e.g. fibroadenoma

Exclusion Criteria:

Patients with;

1. Inflammatory and malignant breast diseases,
2. Known allergy or intolerance to Triclosan
3. Known chronic immune deficiency (for example diabetes, prolonged steroid use, AIDS)
4. Previous scar at operative site

Study was formally approved by the hospital research and ethics committee. Verbal and written consent was acquired from all patients meeting the inclusion criteria. Sample size was calculated by the statistician. Basic history and demographics were recorded by the principal investigator who was blinded with the type of the suture material being used on the patient. Patients

were further divided into 2 groups. In Group A, closure was done using plain polyglactin while wounds of participants in group B were closed using Triclosan coated polyglactin.

All wounds were prepped using povidone iodine scrub and solution. Prophylactic antibiotics were given to both the group using single dose of amoxicillin with clavulanic acid at the time of induction. Standard dressings were applied post operatively. Surgery was performed by the 3rd and 4th year residents to avoid surgeon bias. Standard post-operative instructions were given to all patients for wound care and analgesics. No post-operative antibiotics were given to both the groups. All postoperative patients were seen in the clinic on 3rd, 7th and 30 post-operative day for SSI and other related complications. Findings were recorded by the 2nd researcher. Data was compiled at the end of the completion of research.

Statistical software package (SPSS) version 20.0 was used for data analysis. Data was assessed for both descriptive and inferential statistics. Chi-square was used as a test of significance and P value of ≤ 0.05 was taken as significant.

RESULTS

A total of n=378 patients were selected which met the inclusion criteria. All patients were female with age ranging from 20-35 years. Mean age of group A was 25.86 ± 3.51 years while mean age of study subjects in Treatment Group or Group B was 25.70 ± 3.10 hence both groups were comparable for inference. SSI in group A was reported to be 5.8 % (11 patients) while in group B it was 3.7% (7 patients) with a p-value of 0.507 as shown in table 1.

Table No. 1: Frequency and association of wound infections

Total Patients = 378	Age mean	Wound Infection				Total	P-value
		Yes		No			
		(n)	%	(n)	%		
Group A Plain Polyglactin	25.70±3.10	11	5.8	178	94.2	189	0.507*
Group B (Triclosan Coated Polyglactin)	25.86±3.51	7	3.7	182	96.3	189	

DISCUSSION

Suture materials can function as a potential nidus/source to colonize endogenous organisms hence can predispose to Surgical Site Infection.¹³⁻¹⁶ Triclosan has been widely used commercially in households for many decades for disinfection. It is particularly known to destroy MRSA which is a serious threat for all patients.¹⁷

Our study was aimed to establish the frequency of wound site infection in patients whose wounds have

been closed using Triclosan coated Polyglactin sutures as oppose to simple polyglactin sutures.¹⁸ Since the cost of the antibiotics coated is high as oppose to plain sutures, it becomes a serious concern for the 3rd world countries where cost of delivery care really matters. Study conducted by Gómez-Alonso et al¹⁹ exhibited that antibiotic or Triclosan coated Polyglactin are superior to plain sutures in terms of preventing bacterial colonization and regulating the local inflammatory tissue response. Such measures lead to better wound healing.

Study by Deliaert AE et al.²⁰ have shared similar results showing a reduction of 30 % in SSI. Galal I et al.²¹ have also highlighted the strong relationship between the SSI and use of Triclosan coated sutures (TCS) across various surgical procedures.

Galal et al.^{Error! Bookmark not defined. Error! Bookmark not defined.} conducted a randomized double blind trial which showed a significant reduction in SSI with the use of the TCS. The infection rate dropped from 15 % to 7 %. Meta-analysis conducted by Frederic C et al.²². also concluded that TCS help in reducing SSI.

To address the concerns related to suture handling whether TCS coated sutures hamper the dexterity, Ford et al.²³. in his study showed that intraoperative handling of coated polyglactin sutures was indistinguishable from that with Triclosan.

Our study, we also witnessed decline in SSI from 5.8 to 3.7 %. Though the comparison was not statically significant and our choice of patients all belonged to NHSN (National Health and Safety Network) class 1. The strengths of the study were that it was a randomized controlled trial. Sample size was calculated which was not present in few of the earlier studies. We also did not take any financial support from any pharmaceuticals. However we did not include clean contaminated group in the study as group participants.

CONCLUSION

This study did not demonstrate a reduction of superficial surgical site infection when triclosan coated polyglactin suture was used in clean wounds. More studies need to be conducted with larger sample size to look at its effects on other wound categories.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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