

## A Clinical Incidence of Wound Infection in Clean & Potentially Contaminated Surgical Procedures After Use of Only Povidone Iodine (5%)



### Medical Science

**KEYWORDS :** Povidone-iodine, wound infection, contamination

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### ABSTRACT

**Introduction:** Surgical-site infection (SSI) represents a major source of morbidity and mortality among surgical patients with skin as a major source of infection. Povidone-iodine (Betadine) is an antiseptic solution which is bactericidal against a large array of pathogens and used for skin preparation since 1955.

**Materials and Methods:** Data collected from 70 patients undergoing clean and potentially contaminated operations. Skin prepared with 5% Povidone-iodine. All age groups undergoing open-access elective procedures without infection at the operative site were included. All the patients were assessed for surgical site infection post-operatively. Culture & antibiotic sensitivity was done.

**Results:** 2 out of 70 patients had surgical site infection. Culture and antibiotic sensitivity was negative.

**Conclusion:** For cutaneous antisepsis, only 5 % Povidone-iodine is best in terms of efficacy, cost or side-effects.

### INTRODUCTION

Surgical-site infection (SSI) represents a major source of morbidity and mortality among surgical patients. Patient's skin is a major source of pathogens that cause SSI.[8]

The sources of SSI causative micro-organisms are varied and not always possible to identify. The main source is the direct inoculation of the patient's own microflora, especially the skin and manipulated site.[13] It is known that the prophylaxis for this is based on the antisepsis of hands and forearms, sterilization of materials and preparing of the patient's skin, including hygiene with antiseptic degerming chemicals and antiseptic solutions.[1]

Povidone Iodine (5%) is been used for preoperative skin preparations in surgeries since 1955 and is preferred universally. Povidone-iodine (Betadine) is an antiseptic solution consisting of polyvinyl pyrrolidone with water, iodide and 1% available iodine; it has bactericidal ability against a large array of pathogens.[10]

Integral to the prevention of SSI is the adherence to aseptic techniques, one of which is the preoperative preparation of the operative site. Infection of the surgical wound can prolong hospitalization, increase the rate of intensive care unit admission, and significantly increase the cost of treatment.[2]

### AIMS & OBJECTIVES

The present study aimed to analyze the incidence of SSI in procedures classified as clean and as potentially contaminated when the preoperative skin preparation was performed with 5% Povidone-iodine only.

### MATERIALS & METHODS

This study project was approved by the Ethical Committee at our institute.

Data were collected from 70 patients undergoing clean and potentially contaminated operations in the period from February 2012 to September 2014 at our hospital.

Those involved in the study had the skin prepared with 5% povidone-iodine. Data relating to the clinical profile were analyzed for age, gender and presence of associated surgical illness and surgical procedure performed.

We included patients of all age groups undergoing open-access elective procedures without infection at the operative site. Surgical procedures were either clean cases or clean contaminated. Patients were excluded if there breaches in the rules of antisepsis and asepsis, changing the classification of the surgical site, and if they abandoned follow-up.

### EXCLUSION CRITERIA:

- History of infection 60 days prior to surgery
- Known history of Povidone iodine allergy
- Current infection of surgical wound or prior history of surgical wound infection
- Receiving antibiotic therapy 1 week prior to surgery
- Evidence pre-operative of any of the following: sepsis, abdominal wall infection, septic shock
- History of diabetes, bleeding disorders
- History of Aspirin intake 8 days prior to surgery

We conducted the training of professionals who would be involved in skin antisepsis in order to standardize the process.

For preparation of the skin patients, shaving of the surgical site was done one night prior to the surgery. Antibiotics prophylaxis was given 1 hour prior to surgery. Afterhand hygiene and gloving, with a cotton swab soaked in 20ml povidone-iodine (5%), we vigorously rubbed the area for five minutes. This procedure was intended to remove dirt, sebum, sweat and epithelial cells as well as the transitional skin bacteria. The area was then cleaned with another sterile compress. Post operatively all the patients in study group received antibiotics for 3 days ( Cefotaxim 1gm Bid).

The study participants were examined by an observer in three stages: the fifth, second and eighth postoperative day and follow up after 2 weeks.

For the diagnosis of probable SSI was required the presence of at least one of the following signs: fever, without other apparent cause, pain, rise in local temperature, swelling, or confluent erythema around the incision and extrapolating the boundaries of the wound, pus in the incision site or in the deep soft tissue, or in organ/cavity handled during operation; presence of abscesses or, in the case of deep tissues, histological or radiological evidence suggestive of infection; isolated microorganism from theo-

retically sterile source or harvested with aseptic technique from a previously closed site, and spontaneous dehiscence of deep tissues.

When there was secretion, it was sent to identification of the germ by Gram stain and culture for aerobic microorganisms.

Results were expressed as mean, median, minimum and maximum values and standard deviations (quantitative variables) or as frequencies and percentages (qualitative variables). P values < 0.05 were considered statistically significant.

## RESULTS

We included 70 patients in the study. Only two of them had post-operative infection.

Patients from age 2 to 86 were involved in this study. The mean age of patients with infection was 42 yrs.

Regarding gender, 55 men and 15 women were involved in this study. 1 male and 1 female had infection.

The average hospital preoperative stay was 3 days for the study participants who developed infections, and 2.1 days for those who had not infection.

Those who developed infection had the following surgical accesses: one inguinal and other midline abdominal incisions.

There were no intraoperative complications in the 2 patients who developed infection ( $p = 1$ ).

Mean operative time for these patients was 40 mins, with a maximum time of 60 mins.

Two patients who developed infections also received antibiotic prophylaxis and post-operative antibiotics. Routine dressing and drainage of collection was required. In both the cases wound healed in next two weeks period.

## DISCUSSION

Considering literature, the techniques practiced universally like chlorhexidine preparation techniques or three stage skin preparation technique with spirit, we have found that povidone iodine preparation is equally effective.

Povidone-iodine irrigation is a simple and inexpensive solution with the potential to reduce surgical site infection. Proper skin preparation before surgery has positive impact on rates of SSI and can eliminate of the extra costs associated with this often preventable event.[5]

Although statistical difference existed regarding age, it is not real, since they were in the same physiological age. The mean age in was 42 years. Additionally, age is not a factor that influences the incidence of SSI.

It is known that the longer the period of preoperative hospitalization, the greater the risk of the patient to be colonized with hospital microbiota, thus contributing to increased rates of infection.[6,12].

Petrosillo et al. conducted a prospective multicenter surveillance study in general and gynecological units in 48 Italian hospitals involving 4665 patients and considered preoperative hospitalization as a risk factor for SSI.[11]

Interestingly, Ercole et al. studied the risk for SSI in orthopedic operations and found no relationship between lengths of preoperative hospitalization with the incidence of SSI.[10] One possi-

ble explanation for this finding is the clean nature of orthopedic surgical procedures that, although involving more destruction of the soft tissues, rarely enter into potentially contaminated areas. [9]

The type of incision was not related to the incidence of either. As different kind of incisions and procedures were conducted in this study no significant findings were observed. Changes in the healing process can happen if blood circulation is poor on the site, hampering the synthesis of collagen and the formation of epithelial cells[7]. According to Fernandes et al., patients with anemia have a relative risk of infection two times higher than non-anemic [4].

It can be noticed that SSI prevention strategies have focused mainly on other variables such as prophylactic antibiotics, whereas the role of antiseptics in the decontamination of the skin have not attracted much attention.[7]

The results of this study showed that most patients who participated in the research progressed without SSI. Patients who developed infections, one was superficial incisional infection and one was deep incisional infection.

This finding corroborates studies that describe the superficial incisional infection as the most common SSI [1]. Thus, skin antiseptics before surgery can result in clinical benefit.

SSI rates found in clean operations exceeded values considered acceptable by the literature (5%), and rates presented in potentially contaminated procedures were within the acceptable range (3-11%)

In the course of this study, we could observe that SSI is a common event, which results in more recovery time, higher hospital costs and other undesirable factors.

Knowledge of the pathways of contamination, types of microorganisms involved and the predisposing risk factors for SSI allow the development of daily practices in order to reduce the occurrence and severity of these infections.

The identification of an SSI involves clinical and laboratory interpretation and it is essential that the definitions used in surveillance programs are coherent and uniform; otherwise incorrect rates will be calculated and published.

## CONCLUSION

We found that for cutaneous antiseptics, only 5% povidone iodine is best in terms of efficacy, cost or side-effects. Due to its significantly shorter contact time, may be of value in emergency situations. The epidemiology of device related infections, prolonged residual effect and better bactericidal effect of Povidone iodine against various microorganisms, makes it a preferable agent for cutaneous antiseptics.

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