

## IMPLEMENTING “BUNDLED INTERVENTIONS” IN REDUCING SURGICAL SITE INFECTIONS AMONG PATIENTS UNDERGOING SURGERY FOR GYNECOLOGICAL INDICATIONS – A PROSPECTIVE STUDY

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### ABSTRACT

**Objective:** Surgical site infection (SSI) is the most common infection among surgical patients. This study evaluated the impact of bundled interventions in reducing SSI rates in gynecological surgery. Therefore, it is a vital tool to improve patient safety.

**Methods:** One hundred study participants were taken in the tertiary care hospital and divided into Group I and Group II. In Group I, 50 patients were involved in elective OT with bundled interventions, and in Group II, 50 controls operated in identical OT without bundled intervention. Incidence of SSI, type of SSI, antibiotic usage, need for secondary suturing, duration, etc., was noticed.

**Results:** Our findings showed that six out of fifty cases developed the symptoms with a 10% SSI rate. Two had superficial SSI, and three had deep SSI. None of the patients had organ space SSI. In the control group, the SSI rate was 12%. The bundled intervention was associated with a significant reduction in infection rate.

**Conclusion:** The study indicates that SSIs are associated with severe morbidity and mortality. It is a straightforward, feasible approach to the reduction of the SSI rate.

**Keywords:** Surgical site infection, Care bundled intervention, Prevention of surgical site infection.

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### INTRODUCTION

Surgical site infections (SSIs) are a common complication of surgery. According to the Centers for Disease Control, SSI is the most common health-care-associated infection. It reduces the quality of life due to prolonged stay in the hospital, increased morbidity and mortality, re-admission, and re-interventions [1]. The study revealed that more maternal deaths documented even in a developed country, and SSI is a serious problem with adverse outcomes [2]. Sometimes, it can be superficial infections [1]. SSI accounts for 15% of all infections and contributes significantly to surgical morbidity and mortality. Body mass index and obesity, diabetes mellitus, and anemia associated with increased risk of SSI. Wound complication rates due to obesity in some procedures range from 7% to 23% [3]. Anderson *et al.* have defined the optimal SSI prevention bundle. Numerous studies emphasize that implementing elements of an SSI bundle enhance patient outcomes [4]. Hence, this study aimed to evaluate the effects of the implemented bundled intervention on the SSI rate and its role in reducing SSI in gynecological surgeries.

### METHODS

A prospective study was performed in the Noida International Institute of Medical Sciences. Fifty women were posted for gynecology surgery through the abdominal route in elective OT with bundled intervention in Group I and compared with 50 women without bundled intervention as control. The Ethics Committee took ethical approval before starting the study. Informed consent was taken. The instructions for bundle intervention were as follows:

Before surgery – A soap bath on the morning of surgery and a single shot of ceftriaxone 2 g intravenously 30 min before incision, cleaned with

Savlon, dried, and a clipper was used for hair remove 0.50 cc normal saline used to clean wound and suturing done by mattress sutures.

### Statistical analysis

The percentage (%) and mean±SD were done using SPSS software. The  $p < 0.05$  value is taken as significant.

### RESULTS

The study was conducted in the Department of Obstetrics and Gynecology. A total of 100 patients were categorized into Groups I and II. In Group I, 50 women taken for gynecologic surgery through the abdominal route in elective OT and bundled intervention followed were recruited as cases, compared with Group II with 50 women for surgery without bundled intervention as control. All the parameters were analyzed as follows:

In the present study, the mean age of women in the bundled group was  $44.30 \pm 7.36$  years. There was no statistically significant difference seen in risk factors. The incidence of SSI was 10% in this bundled study and 12% in the routine care group (Table 1). This incidence is comparable to the SSI incidence in studies done by Anderson *et al.* and Lake *et al.*, which quote an incidence of 6–11% [5,6].

Table 2 shows the practice of some preventive measures for SSI-pre-operation baths, vaginal cleaning, higher in the bundled group. Same findings observed by Pop-Vicas *et al.* [7].

Table 3 observed that out of 10 cases of the bundled group, 4 (40%) cases were superficial SSI, whereas 6 (60%) cases were deep SSI. None of the cases of the bundled group had organ space SSI.

**Table 1: Number of cases with and without risk factors in both groups**

| Risk factor         | Bundled n=(50) | Without bundled n=(50) |
|---------------------|----------------|------------------------|
| With risk factor    | 26             | 38                     |
| Without risk factor | 24             | 12                     |

**Table 2: Number of prevention factors to reduce SSI**

| Parameters                | Bundle group n=(50) |      | Without bundle n=(50) |     | p>value |
|---------------------------|---------------------|------|-----------------------|-----|---------|
|                           | Cases               | %    | Cases                 | %   |         |
| Pre-operative bath        | 48                  | 95   | 42                    | 80  | 0.60    |
| Vagina cleaning           | 50                  | 100  | 40                    | 75  | 0.38    |
| Avoiding hair removal     | 45                  | 87.5 | 50                    | 100 | 0.67    |
| Pre-operative antibiotics | 50                  | 100  | 50                    | 100 | 0.87    |
| Part preparation          | 50                  | 100  | 50                    | 100 | 0.87    |

**Table 3: Type of SSI in both groups**

| Types of SSI    | Bundled group n=(10) |    | Without bundled n=(10) |    | p>value |
|-----------------|----------------------|----|------------------------|----|---------|
|                 | Cases                | %  | Cases                  | %  |         |
| Superficial SSI | 4                    | 40 | 6                      | 60 | 0.71    |
| Deep SSI        | 6                    | 60 | 4                      | 40 | 0.71    |
| Organ SSI       | 00                   | 00 | 00                     | 00 |         |

**Table 4: Types of surgery and SSI**

| Types of surgery                               | Bundle group n=(10) |    | Without bundle n=(10) |    | Total (n=20) |    | p>value |
|--|---------------------|----|-----------------------|----|--------------|----|---------|
|  | Cases               | %  | Cases                 | %  | Cases        | %  |         |
| Panhysterectomy                                | 4                   | 40 | 6                     | 60 | 10           | 50 | 0.71    |
| Type II radical hysterectomy                   | 4                   | 40 | 2                     | 20 | 6            | 30 | 0.61    |
| Panhysterectomy with peritoneal/omental biopsy | 2                   | 20 | 2                     | 20 | 4            | 20 | 1       |
| TAH  | 00                  | 00 | 00                    | 00 | 00           | 00 |         |

**Table 5: Treatment of SSI in both groups and comparison**

| Treatment        | Bundle group n=(5) |    | Without bundle n=(5) |     | p>value |
|------------------|--------------------|----|----------------------|-----|---------|
|                  | Cases              | %  | Cases                | %   |         |
| I.V. antibiotics | 3                  | 60 | 5                    | 100 | 0.59    |
| Dressing         | 4                  | 80 | 5                    | 100 | 0.80    |
| Re-suturing      | 3                  | 60 | 2                    | 40  | 0.71    |

Table 4 also tried to evaluate the difference in the type of surgery among patients with SSI of the bundled group. There were 40% Type II radical hysterectomy and 20% cases of panhysterectomy with peritoneal/omental biopsy. One study observed [8] problems to associated with SSI reduction.

In Table 5, IV antibiotics were used in a higher proportion of subjects without the bundled care group (100%) compared to the bundled

group (60%), p=0.059. Re-suturing in a higher proportion of patients in the bundled group (60%) compared to those without bundle care group (40%). Nisha *et al.* revealed that this technique is simple and feasible, 3 extra min of the surgery play a role in SSI [9].

## CONCLUSION

Our study revealed that critical components such as pre-operative antibiotics, chlorhexidine wash, and hair clipping are important in SSI. The findings also suggest that the sterile surgical closure technique is useful. Hence, the implementation of bundled intervention is a safe approach to reducing SSI rates among gynecological surgeries.

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## AUTHORS CONTRIBUTIONS

The writing was done by Dr. Puja Jain Dewan. The sample collection and analysis were done by Dr. Puja and Dr. Rashmi. The research was reviewed and edited by Dr. Rohini and Dr. Monika. The paper was submitted for publication by Dr. Puja.

## CONFLICT OF INTEREST

None declared.

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