

**Evaluation of Surgical Site Infection in Breast Cancer Surgery: An Observational Study**Sanjay Choudhuri<sup>1</sup>, Sridhar Panda<sup>2</sup>, Chandan Das<sup>3</sup>, Sujit Kumar Mohanty<sup>4</sup><sup>1</sup>Assistant Professor, Department of Urology & Kidney Transplantations, SCB Medical College & Hospital, Cuttack<sup>2</sup>Assistant Professor, Department of General Medicine, SCB MCH, Cuttack<sup>3</sup>JR, Department of Plastic and Reconstructive Surgery, SCB MCH, Cuttack<sup>4</sup>Assistant Professor, Department of General Surgery, SCB Medical College & Hospital, Cuttack

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Conflict of interest: Nil

**Abstract:****Background:** The purpose of this study was to evaluate postoperative site infections in breast cancer surgery patients.**Materials and Methods:** The current investigation was carried out in the Departments of General Surgery, Department of plastic and reconstructive surgery and Microbiology at SCB Medical College and Hospital, Cuttack. A total of 100 participants were registered. The participants were divided into four groups based on the type of breast surgery they had: mastectomy (without breast-saving techniques), breast-conserving surgery, breast reconstruction using the Lattismus Dorsi (LD) flap method, and subcutaneous amputation with simultaneous reconstruction using an artificial prosthesis. The surgical site infection was assessed. All of the findings were analyzed using SPSS software.**Results:** Overall, 11 percent of participants had SSI. The proportion of patients identified with surgical site infection (SSI) in each treatment group showed that those who had subcutaneous amputation with contemporaneous repair using an artificial prosthesis had a significantly higher incidence (27.2%).**Conclusion:** Surgical site infection (SSI) offers a substantial issue, justifying a focus on preventative measures.**Keywords:** Breast Cancer, Surgical Site, Infection.

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**Introduction**

Surgical site infection (SSI) is a frequent and dangerous consequence of surgery. The frequency of SSIs varies depending on the kind of surgery, wound cleanliness, and operating area. This consequence might result in extended hospitalization, increasing the expense of therapy. [1,2] SSI is common after breast surgery since the procedure is primarily used to treat breast cancer, and the tissue is then treated to chemotherapy and/or radiation. [3]

Current surgical alternatives include breast-saving treatments, mastectomy, autograft techniques, the use of an acellular dermal matrix, the insertion of breast implants, and a combination of these approaches. [4,5] The kind of breast surgery used and whether or not breast reconstruction is undertaken influence the likelihood of complications, including SSI. Older age, obesity, alcohol abuse, smoking, diabetes, malignancy, previous open biopsy, breast-conservation surgery, previous radiation therapy or chemotherapy, surgeon experience, seroma development,

prolonged duration of drainage, immediate reconstruction, and a lack of antibiotic prophylaxis at the time of surgery have all been linked to SSI after breast cancer surgery. [6] Surgical site infections (SSI) have an influence on the oncologic treatment of breast cancer patients by causing delays in further therapy in certain situations, increasing the expense of care, failing reconstructions, and perhaps increasing cancer recurrence rates. [7]

The reported rates of SSI following breast surgery in the literature vary drastically from 0.8 to 26%. [8-10] SSIs are feared complications of breast cancer surgery (BCS), with an incidence ranging from 0.8% to 26%. [11- 14] As a result, this research was undertaken to evaluate surgical site infection in breast cancer surgery individuals.

**Materials and Methods**

The current investigation was carried out in the Departments of General Surgery, Plastic and reconstructive surgery and Microbiology at SCB

Medical college and Hospital, Cuttack. A total of 100 participants were registered. The participants were divided into four groups based on the type of breast surgery they had, which included classic breast surgery (without breast-saving techniques), breast-conserving surgery, breast reconstruction using the Lattismus Dorsi (LD) flap method, and subcutaneous amputation with simultaneous reconstruction using an artificial prosthesis. SSI was defined as any episode of clinical signs of infection occurring after surgery or when the surgeon identified SSI. Antibiotic usage was at the surgeon's discretion. Early and late SSI were characterized as symptoms appearing within 30 days or more than 30 days following surgery, respectively. The age, BMI, hospitalization length, the smoking status and comorbidities of individuals diagnosed with SSI were evaluated. Cases with mild erythema treated with outpatient antibiotics were not classified as SSI under either the old or new criteria. Samples were collected from these

patients for microbiological analysis. The germs responsible for SSI were identified. Categorical data were analyzed using the chi-squared and Fisher's exact tests. Statistical significance was considered as p-values < 0.05. The complete statistical analysis was carried out using SPSS software.

### Results

Overall, 11 percent of patients had SSI. The number of patients diagnosed with surgical site infection (SSI) in each treatment group showed a significantly higher incidence in those who underwent subcutaneous amputation with simultaneous reconstruction using an artificial prosthesis (27.2%) and breast reconstruction using the LD flap method (22.2%) compared to the other two groups. Gram-positive bacteria caused the majority of illnesses, with Staphylococcus strains being the most common isolates.

**Table 1: Surgical site infection in breast cancer subjects who underwent breast surgery**

SSI	Mastectomy (n=30)	Breast conserving surgery (n=50)	Breast reconstruction via the LD flap method (n=9)	Subcutaneous amputation with simultaneous reconstruction (n=11)	P value
AllSSI	2 (6.7%)	4(8%)	2 (22.2%)	3(27.2%)	0.001*
EarlySSI	1(3.4%)	3 (6%)	1(11.1%)	2(18.1%)	0.003*
Late SSI	1(3.4%)	1 (2%)	1(11.1%)	1(9.1%)	0.001*

\*: Significant, SSI: Surgical site infection, LD: Lattismus Dorsi

**Table 2: Microorganisms responsible for surgical site infection in breast cancer subjects**

Microorganism	Mastectomy(n=30)	Breast conserving surgery (n=50)	Breast reconstruction via the LD flap method (n=5)	Subcutaneous amputation with simultaneous reconstruction (n=15)	P value
MSSA	1(50%)	1(25%)	1(50%)	1(33.4%)	0.61
CNS	0	0	0	1(33.3%)	0.52
Enterococcusfaecalis	0	1(25%)	1(50%)	0	0.02*
Enterobacteriaceae	1 (50%)	1(25%)	0	1(33.3%)	0.02*
Anaerobes	0	1(25%)	0	0	0.47

\*: Significant, MSSA, methicillin-susceptible Staphylococcus aureus; CNS, coagulase-negative Staphylococcus.

### Discussion

Although the majority of breast surgeries are deemed clean, the SSI rates reported in particular studies are greater than predicted. Olsen et al. found that SSI rates in mastectomy without immediate reconstruction, mastectomy with implant reconstruction, and mastectomy with autologous flap reconstruction were between 3%-18%, 0.4%-17%, and 1%-12%, respectively. 6 Staphylococci are the most often identified organisms in SSI following breast surgery (60%), followed by Gram-negative bacilli and anaerobes (40%). [15] Susceptibility testing of staphylococcal isolates revealed antibiotic resistance in 63%. [15] In patients with breast implant infection, the vast majority of isolates are Gram-positive microorganisms (83%), with 49% methicillin-sensitive staphylococci and a much lower proportion of infections caused by methicil-

lin-resistant vs. susceptible Staphylococcus aureus (3.5% vs. 30.6%, respectively). [16] As a result, this research was undertaken to evaluate surgical site infection in breast cancer surgery individuals. Overall, 11 percent of the participants in this research had SSI. The number of patients diagnosed with surgical site infection (SSI) in each treatment group showed a significantly higher incidence in those who underwent subcutaneous amputation with simultaneous reconstruction using an artificial prosthesis (27.2%) and breast reconstruction using the LD flap method (22.2%) compared to the other two groups. A study by Palubicka A et al, aimed to assess SSI after breast surgery over five years in a single center in Poland. They determined that reconstruction with an artificial prosthesis or the LD flap approach is associated with an increase in SSI incidence. Further research is needed to avoid SSI

after breast surgery. [17] Gram-positive bacteria caused the majority of illnesses in this investigation, with Staphylococcus strains being the most common isolates. Louis MY et al. conducted a research to analyze the incidence of SSI in BCS and find certain risk variables. The data collection involved BCS, defined as I or II in the Altemeier classification, and whether or not it was related with urgent breast reconstruction.

The study included at least 100 consecutive BCS conducted in each of the 15 participating comprehensive cancer centers during the first semester of 2011. Data was gathered for 2883 BCS, including 2766 original BCS. The kind of surgery offered for 2731 first BCS was: 1527 (56%) lumpectomies, 563 (21%) mastectomies, 143 (5%) and 170 (6%) immediate and secondary reconstructions, 35 (1%) node dissections, and 293 (11%) breast mammaplasty procedures. The SSI incidence rate was 2.86%, compared to 4.1% in 2008, a 30% drop. *S. aureus* was detected in 58 instances. [18] Cappelli S et al. performed a prior research to assess how SARS-CoV-2 containment methods influenced the risk of surgical site infections (SSIs) in patients undergoing nondeferrable breast cancer surgery (BCS).

They found that patients who had received breast reconstruction had significantly greater SSIs, both in terms of CDC and ASEPSIS score, than individuals who did not have immediate repair. The limiting measures used during the lockdown period seemed to reduce the incidence of SSIs in patients having nondeferrable BCS. [19]

### Conclusion:

Surgical site infection (SSI) is a serious problem that requires preventative measures. The use of artificial prosthesis or the LD flap approach in reconstruction is linked with a greater risk of SSI.

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