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Incidence and Microbiology of Surgical Site Infection (SSI) after Breast Surgery

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Introduction

- The National Healthcare Safety Network (NHSN) classifies breast operations as clean procedures with an expected incidence of surgical site infections (**SSI**) of 1–2%.
- The incidence of SSI reported by the NHSN after breast operations from 2006–2008 was 2.3% for inpatient and 0.6% for outpatient breast operations.
- Gram positive organisms were isolated most commonly in SSI after breast surgery (60%), whereas Gram-negative bacilli and anaerobes account for 40% from prior studies.

Objectives

To determine the:

- incidence of SSI following breast surgery at our institution.
- risk factors associated with SSI following breast surgery.
- microbiology of SSI following breast surgery.

Methods

- Historical cohort study of all (≥ 18 y) females who had surgery from 1/1/2014 - 3/31/2019 and subsequent SSI within 90 days of the procedure.
- Two controls, matched for surgery type, were selected per case.
- Data were collected on demographic and clinical characteristics, surgery type, microbiology and antibiotics.
- Data were analyzed using the χ^2 test, Student's t-test and multivariable logistic regression with a forward likelihood ratio algorithm.

Results

321 Patients Screened → **284** patients Included: **95 Cases** and **189 Controls**; Microbiological data available for 84 Cases

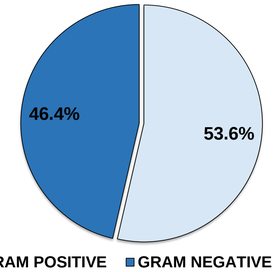
37 patients excluded due to insufficient data

Table 1. **Characteristics of Cases and Controls**

Characteristics	Cases (n= 95)	Controls (n=189)	*p* value
Age years (mean ± sd)	53.9 ± 12.4	58.3± 13.7	0.01
Body mass index (kg/m^2)	31.2±7.4	29.5±7.1	0.05
Congestive heart failure	1 (1.1%)	55 (29.1%)	<0.0001
Peripheral vascular disease	3 (3.2%)	39 (20.6%)	<0.0001
Peptic ulcer disease (PUD)	2 (2.1%)	16 (8.5%)	0.04
Chronic obstructive pulmonary disease	2 (2.1%)	16 (8.5%)	0.04
Charlson weighted index of comorbidity	2.5 ± 1.7	2.7 ± 1.1	0.3
Type of Surgery Lumpectomy Mastectomy	 6 (6.5%) 87 (93.5%)	 15 (7.9%) 174 (92.1%)	0.7
Tissue Expanders	65 (68.4%)	11 (5.8%)	<0.0001
Post operative Antibiotics	50 (52.6%)	72 (38.1%)	0.02

- The 90-day incidence of SSI was 3.5%.
- Tissue expanders were placed in 65 (68.4%) cases versus 11 (5.8%) controls p <0.0001 (Table 1).
- After controlling for age, BMI, comorbidities and post-operative antibiotics, only tissue expanders were associated with infection (OR=35.1, p<0.0001, 95% CI: 16.6, 74.0).

Figure 1. **Percentage of Gram-positive and Gram-negative Organisms**



- Gram-positive organisms accounted for 53.6% infections
- *Staphylococcus aureus* was the most frequently isolated pathogen: 57.7%
- Gram-negative organisms accounted for 46.4% infections; *Pseudomonas* sp. predominating in 22.0%.

Table 2. **Predictors of Gram-negative SSI after Breast Surgery**

Predictor	Odds Ratio	p-value	95% Confidence interval
Diabetes Mellitus	7.34	0.004	1.90, 28.3
Postoperative Antibiotics	5.35	0.001	1.93, 14.86

Conclusions

- Patients with tissue expanders had a higher incidence of SSI after breast surgery.
- Tissue expander removal was often required in Gram-negative infections.
- Diabetes and post-operative antibiotics were significant predictors of Gram-negative infections.
- Knowledge of local epidemiology is a key factor in deciding empiric therapy for SSI.

References

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