ORIGINAL RESEARCH PAPER
Volume - 11 | Issue - 10 | October - 2022 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

AN OBSERVATIONAL STUDY ON THE PERIOD PREVALENCE OF SURGICAL SITE INFECTION

General Surgery

Dr. Vajrang Akula Post Graduate, Department Of General Surgery, Yenepoya Medical College Hospital, Mangalore.

Dr. Vijeth Rai B Assistant Professor, Department Of General Surgery, Yenepoya Medical College Hospital, Mangalore.

Dr. Gagandeep Shetty Senior Resident, Department Of General Surgery, Yenepoya Medical College Hospital, Mangalore.

Dr. Austin Titus Senior Resident, Department Of General Surgery, Yenepoya Medical College Hospital, Mangalore.

Dr. P. S. M. Ameer Ali Professor, Department Of General Surgery, Yenepoya Medical College Hospital, Mangalore.

KEYWORDS

INTRODUCTION

The infection of a wound can be defined as the invasion of organisms through tissues following a breakdown of local and systemic host defences, leading to cellulitis, lymphangitis, abscess and bacteraemia. Surgical site infection (SSI) has always been a major complication of surgery and trauma and has been documented for 4000-5000 years.

Galen recognized that localization of infection in wounds, inflicted in the gladiatorial arena, often heralded recovery particularly after drainage. Louis Pasteur recognized that micro-organisms were responsible for spoiling wine, turning it into vinegar. Microbes had been seen under microscope, but Koch laid down the first definition of infective disease known as Koch's postulates.

Surgical Site Infections (SSIs), previously called post-operative wound infections, result from bacterial contamination during or after a surgical procedure. Surgical site infections are the third most common hospital associated infection, accounting for 14-16 per cent of all infections in hospitalized patients. Among surgical patients, surgical site infections are the most frequent cause of such infections, accounting for 38 per cent of the total.

Despite every effort to maintain asepsis, most surgical wounds are contaminated to some extent. However, infection rarely develops if contamination is minimal, if the wound has been made without undue injury, if the subcutaneous tissue is well perfused and well oxygenated and if there is no dead space.

The criteria used to define surgical site infections have been standardized and described three different anatomic levels of infection: superficial incisional surgical site infection, deep incisional surgical site infection and organ/space surgical site infection. (Doherty and Way 2006).

According to the degree of contamination wounds may be classified as clean, potentially contaminated, contaminated, and dirty. The incidence of infection, morbidity and mortality increases from clean to dirty. The risk of infection is greater in all categories if surgery is performed as an emergency (Kirk and Ribbans 2004).

The risk of wound infection is influenced but not entirely determined by the degree of contamination. Multiple risk factors and perioperative characteristics can increase the likelihood of superficial surgical site infections.

Important host factors include – diabetes mellitus, hypoxemia, hypothermia, leucopenia, nicotine, long term use of steroids or immunosuppressive agents, malnutrition, nares contaminated with *Staphylococcus Aureus* and poor skin hygiene.

Perioperative / environmental factors are operative site shaving, breaks in operative sterile technique, early or delayed initiation of antimicrobial prophylaxis, inadequate intraoperative dosing of antimicrobial prophylaxis, infected or colonized surgical personnel, prolonged hypotension, poor operative room air quality, contaminated operating room instruments or environment and poor wound care postoperatively (Doherty and Way 2006).

Wound infections usually appear between fifth and tenth post-operative day, but they may appear as early as first post operative day or even years later. The first sign is usually fever, and post operative fever requires inspection of the wound. The patient may complain of pain at the surgical site. The wound rarely appears severely inflamed, but edema may be obvious because the skin sutures appear tight (Doherty and Way 2006).

Advances in the control of infection in surgery have occurred in many ways, such as, aseptic operating theatre techniques have replaced toxic antiseptic techniques, antibiotics have reduced post operative infection rates, delayed primary or secondary closure remains useful in contaminated wounds.

When enteral feeding is suspended during the peri-operative period, and particularly with underlying disease such as immunosuppression, cancer, shock or sepsis bacteria tend to colonize the normally sterile upper gastrointestinal tract. They may then translocate to the mesenteric lymph nodes and cause the release of endotoxin, which further increases the susceptibility to infection and sepsis, through activation of macrophages and pro-inflammatory cytokine release. The use of selective decontamination of the digestive tract (SDD) is based on the prevention of this colonization (Williams *et al.* 2008).

According to the sources, infection may be classified into two types, primary and secondary or exogenous. Primary infections are those acquired from community or endogenous source. Secondary or exogenous infections are acquired from operating theatre or the ward or from contamination at or after surgery. According to severity, surgical site infections can be divided into two types, major and minor. Criteria of major SSI are — significant quantity of pus, delayed return home and Patients are systemically ill.

Minor SSI may discharge pus or infected serous fluid but should not be associated with excessive discomfort, systemic signs or delay in return home (Williams *et al.* 2008).

METHODOLOGY

This is a prospective study design. A total of 175 patients admitted under general surgery and underwent different surgical procedures in a tertiary health institute, between the years 2018 to 2019.The patients will be selected by convenience sampling. A detailed datawill becollected since the time of admission to discharge. Relevant history will be collected from all the patients and preoperative findings included preoperative bath, type of skin preparation, time and type of preparation (24 hours) preparation of bowel, preoperative antibiotics used and steroids if used will be noted. Operative findings such as wound irrigation, drain and its type (open / closed) will be noted.

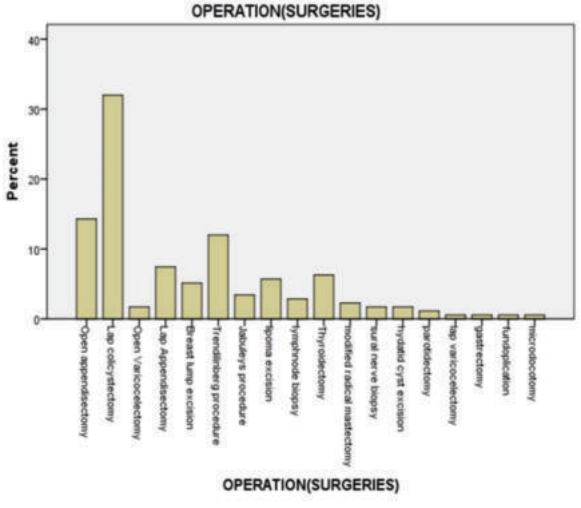
Postoperative findings included the day of opening the dressing after surgery, the day in which infection was noticed, frequency of the dressings, use of antibiotics both topical and intravenous, constitutional symptoms such as fever and cough. Wound infection was diagnosed as per criteria defined in oxford textbook of surgery. three pus swabs for culture and sensitivity was collected and sent to laboratory. All data will be analysed using Statistical Package for the Social Sciences (SPSS) for Windows, Version 22.0. Chi square test will be used to study the association between the variables.

RESULTS

OPERATION(SURGERIES)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Open appendicectomy	25	14.3	14.3	14.3
Lap cholicystectomy	56	32.0	32.0	46.3
Open Varicocelectomy	3	1.7	1.7	48.0
Lap Appendicectomy	13	7.4	7.4	55.4
Breast lump excision	9	5.1	5.1	60.6
Trendelenberg procedure	21	12.0	12.0	72.6
Jaboulays procedure	6	3.4	3.4	76.0
Lipoma excision	10	5.7	5.7	81.7
Lymphnode biopsy	5	2.9	2.9	84.6
Thyroidectomy	11	6.3	6.3	90.9
Modified radical mastectomy	4	2.3	2.3	93.1
Sural nerve biopsy	3	1.7	1.7	94.9
Hydatid cyst excision	3	1.7	1.7	96.6
Parotidectomy	2	1.1	1.1	97.7
Lap varicocelectomy	1	0.6	.6	98.3
Gastrectomy	1	0.6	.6	98.9
Fundoplication	1	.6	.6	99.4
Microdocotomy	1	.6	.6	100.0
Total	175	100.0	100.0	

Out of the total 175 surgeries performed 56(32%) were lap cholecystectomy, 25(14.3%) were open appendicectomy, 21(12%) were trendelenberg procedure, 13(7.4%) were lap appendicectomy , 11(6.3%) were thyroidectomy, 10(5.7%) were lipoma excision, 9(5.1%) were breast lump excision,6(3.4%) jaboulays procedure, 5(2.9%) were lymph node biopsy, 4(2.3%) were modified radical mastectomy, open varicocelectomy, sural nerve biopsy and hydatid cyst excision were 3(1.7%) each, 2(1.1%) were parotidectomy, and lap varicocelectomy gastrectomy, fundoplication, microdocotomy were 1(0.6%) each.

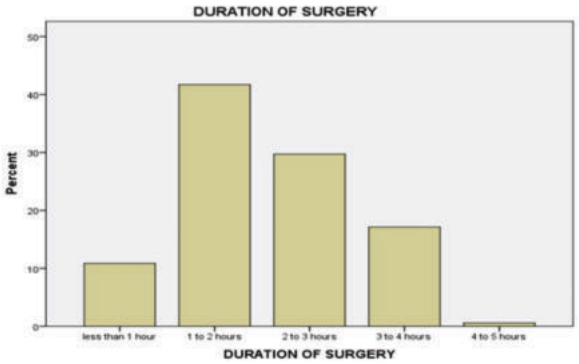


Above is a graphical representation of the above statistics

DURATION OF SURGERY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 1 hour	19	10.9	10.9	10.9
	1 to 2 hours	73	41.7	41.7	52.6
	2 to 3 hours	52	29.7	29.7	82.3
	3 to 4 hours	30	17.1	17.1	99.4
	4 to 5 hours	1	.6	.6	100.0
	Total	175	100.0	100.0	

Out of the 175 surgeries performed 73(41.7%) were performed within the duration of 1 to 2 hours,52(29.7%) were performed between 2 to 3 hours, 30(17.1%) were performed between 3 to 4 hours, 19(10.9%) were performed in less than one hour and 1(0.6%) was performed between 4 to 5 hours.

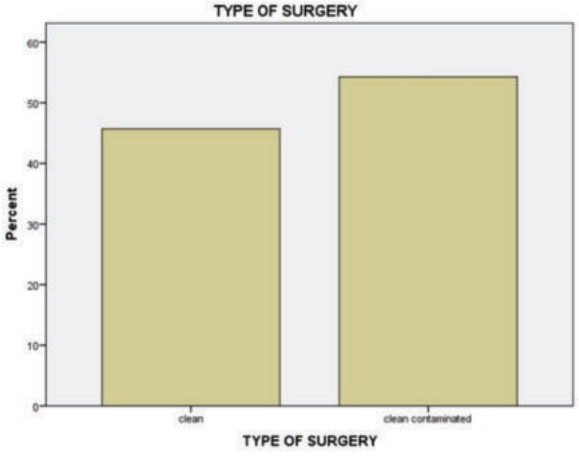


Above is a graphical representation of the above statistics

TYPE OF SURGERY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	clean	80	45.7	45.7	45.7
	cleancontaminated	95	54.3	54.3	100.0
	Total	175	100.0	100.0	

Out of the 175 surgeries performed 95(54.3%) were clean contaminated and 80(45.7%) were clean.



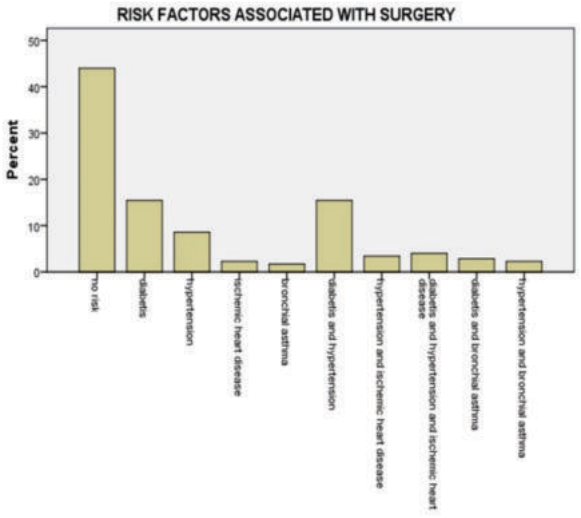
Above is a graphical representation of the above statistic

RISK FACTORS ASSOCIATED WITH SURGERY

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid no risk	77	44.0	44.0	44.0
diabetes hypertension ischemic	27	15.4	15.4	59.4
heart disease bronchial asthma	15	8.6	8.6	68.0
diabetes and hypertension	4	2.3	2.3	70.3
hypertension and	3	1.7	1.7	72.0
ischemic heart disease	27	15.4	15.4	87.4
diabetes and hypertension and	6	3.4	3.4	90.9
ischemic heart disease diabetes	7	4.0	4.0	94.9
and bronchial asthma	5	2.9	2.9	97.7
hypertension and	4	2.3	2.3	100.0
bronchial asthma	175	100.0	100.0	
Total				

Out of the 175 surgeries performed 77(44%) were associated with no risk, 27(15.4%) surgeries had diabetes and diabetes with hypertension as associated risks, 15(8.6%) were associated with hypertension, 7(4%) were associated with diabetes mellitus, hypertension and ischaemic heart disease, 6(3.4%) were associated with diabetes and ischaemic heart disease, 5(2.9%) were associated with diabetes and bronchial asthma, 4(2.3%) were associated with hypertension with bronchial asthma and ischaemic heart disease each and 3(1.7%) were

associated with bronchial asthma.

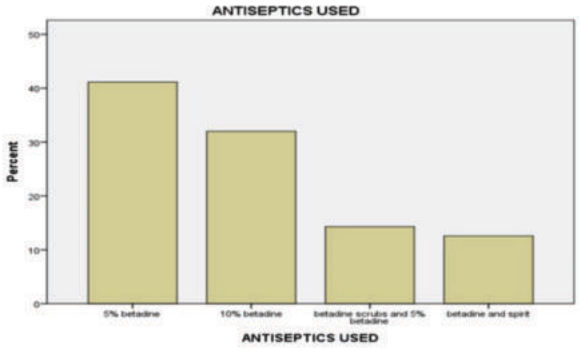


Above is a graphical representation of the above given statistics

ANTISEPTICS USED

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
5% betadine	72	41.1	41.1	41.1
10% betadine betadinescrubs	56	32.0	32.0	73.1
and 5% betadine betadine and	25	14.3	14.3	87.4
spirit	22	12.6	12.6	100.0
Total	175	100.0	100.0	

Out of the 175 surgeries performed for 72(41.1%) 5% betadine antiseptic was used, for 56(32%) 10% betadine was used, for 25(12.6%) betadine scrubs and 5% betadine was used and for 22(12.6%) betadine and spirit was used.



Above is a graphical representation of the above given statistics

ASA CATEGORY

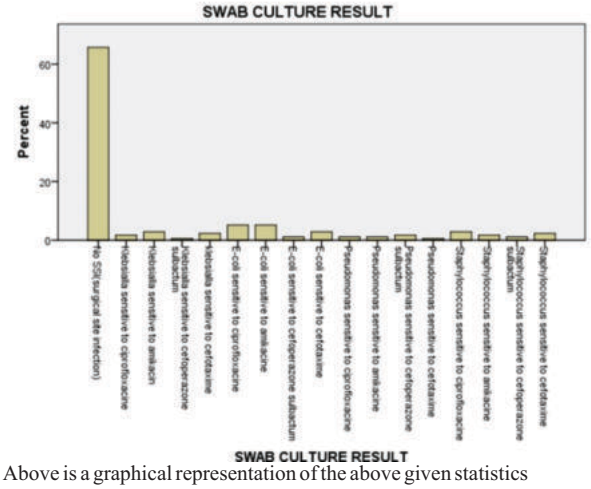
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ASA CLASS I	78	44.6	44.6	44.6
	ASA CLASS II	43	24.6	24.6	69.1
	ASA CLASS III	54	30.9	30.9	100.0
	Total	175	100.0	100.0	

Out of the 175 surgeries performed 78(44.6%) fall under the ASA class I category, 54(30.9%) fall under ASA class III category and 43(24.6%) fall under the ASA class III category.

SWAB CULTURE RESULT

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid No SSI(surgical site infection)	115	65.7	65.7	65.7
Klebsiella sensitive to ciprofloxacin	3	1.7	1.7	67.4
Klebsiella sensitive to amikacin	5	2.9	2.9	70.3
Klebsiella sensitive to cefoperazone sulbactam	1	.6	.6	70.9
klebsiella sensitive to cefotaxime	4	2.3	2.3	73.1
E-coli sensitive to ciprofloxacin	9	5.1	5.1	78.3
E-coli sensitive to amikacin	9	5.1	5.1	83.4
E-coli sensitive to cefoperazone sulbactam	2	1.1	1.1	84.6
E-coli sensitive to cefotaxime	5	2.9	2.9	87.4
Pseudomonas sensitive to ciprofloxacin	2	1.1	1.1	88.6
Pseudomonas sensitive to amikacin	2	1.1	1.1	89.7
Pseudomonas sensitive to cefoperazone sulbactam	3	1.7	1.7	91.4
Pseudomonas sensitive to cefotaxime	1	.6	.6	92.0
Staphylococcus sensitive to ciprofloxacin	5	2.9	2.9	94.9
Staphylococcus sensitive to amikacin	3	1.7	1.7	96.6
Staphylococcus sensitive to cefoperazone sulbactam	2	1.1	1.1	97.7
Staphylococcus sensitive to cefotaxime	4	2.3	2.3	
Total	175	100.0	100.0	100.0

Out of the 175 surgeries performed 115(65.7%) had no evidence of surgical site infection, 9(5.1%) showed E Coli, sensitive to Ciprofloxacin and Amikacin each, 5(2.9%) Showed klebsiella sensitive to Amikacin, E Coli sensitive to Cefotaxime, Staphylococcus sensitive to ciprofloxacin each, 4(2.3%) showed Klebsiella sensitive to Cefotaxime, and Staphylococcus sensitive to cefotaxime, 3(1.7%) Klebsiella sensitive to ciprofloxacin, Pseudomonas sensitive to Cefoperazone sulbactam, staphylococcus sensitive to amikacin, 2(1.1%) Staphyloccus sensitive to Cefoperazone sulbactam, E Coli sensitive to Cefoperazone sulbactam, Pseudomonas sensitive to Amikacin and pseudomonas sensitive to ciprofloxacin. And 1(0.6%) showed Klebsiella sensitive to toCefoperazone sulbactam and pseudomonas sensitive to cefotaxime.



Above is a graphical representation of the above given statistics

CORRELATIONS

Correlations

Correlating Swab Culture Report And Risk Factors Associated With Surgery.

		SWAB CULTURE RESULT	RISK FACTORS ASSOCIATED WITH SURGERY
SWAB CULTURE RESULT	Pearson Correlation	1	.029
	Sig. (2-tailed)		.825
	N	60	60

RISK FACTORS ASSOCIATED WITH SURGERY	Pearson Correlation	.029	1
	Sig. (2-tailed)	.825	
	N	60	60

It is not significant.

Correlations
Correlating Swab Culture Result And Antiseptics Used.

		SWAB CULTURE RESULT	ANTISEPTICS USED
SWAB CULTURE RESULT	Pearson Correlation	1	.237
	Sig. (2-tailed)		.069
	N	60	60
ANTISEPTICS USED	Pearson Correlation	.237	1
	Sig. (2-tailed)	.069	
	N	60	60

It is not significant

Correlations
Correlating Swab Culture Report And ASA Category.

		SWAB CULTURE RESULT	**ASA CATEGORY**
SWAB CULTURE RESULT	Pearson Correlation	1	.106
	Sig. (2-tailed)		.421
	N	60	60
ASA CATEGORY	Pearson Correlation	.106	1
	Sig. (2-tailed)	.421	
	N	60	60

It is not significant.

Correlations
Correlating Type Of Surgery And Swab Culture Report.

		TYPE OF SURGERY	**SWAB CULTURE RESULT**
TYPE OF SURGERY	Pearson Correlation	1	-.320*
	Sig. (2-tailed)		.013
	N	60	60
SWAB CULTURE RESULT	Pearson Correlation	-.320*	1
	Sig. (2-tailed)	.013	
	N	60	60

*. Correlation is significant at the 0.05 level (2-tailed).

Cross Tabulation Of SWAB Culture Result And Type Of Surgery

			TYPE OF SURGERY		**Total**
				clean	**clean contaminated**	
SWAB Culture Result	Klebsialla sensitive to ciprofloxacine	Count	1	2	3
		% of Total	1.7%	3.3%	5.0%
	Klebsialla sensitive to amikacin	Count	1	4	5
		% of Total	1.7%	6.7%	8.3%
	Klebsialla sensitive to cefoperazonesulbactum	Count	1	0	1
		% of Total	1.7%	0.0%	1.7%
	klebsialla sensitive to cefotaxime	Count	2	2	4
		% of Total	3.3%	3.3%	6.7%
	E-coli sensitive to ciprofloxacine	Count	2	7	9
		% of Total	3.3%	11.7%	15.0%
	E-coli sensitive to amikacine	Count	1	8	9
		% of Total	1.7%	13.3%	15.0%
	E-coli sensitive to cefoperazonesulbactum	Count	1	1	2
		% of Total	1.7%	1.7%	3.3%
	E-coli sensitive to cefotaxime	Count	0	5	5
		% of Total	0.0%	8.3%	8.3%
	Pseudomonas sensitive to ciprofloxacine	Count	2	0	2
		% of Total	3.3%	0.0%	3.3%
	Pseudomonas sensitive to amikacine	Count	1	1	2
		% of Total	1.7%	1.7%	3.3%
	Pseudomonas sensitive to cefoperazonesulbactum	Count	1	2	3
		% of Total	1.7%	3.3%	5.0%
	Pseudomonas sensitive to cefotaxime	Count	1	0	1
		% of Total	1.7%	0.0%	1.7%
	Staphylococcus sensitive to ciprofloxacine	Count	2	3	5
		% of Total	3.3%	5.0%	8.3%
	Staphylococcus sensitive to amikacine	Count	2	1	3
		% of Total	3.3%	1.7%	5.0%
	Staphylococcus sensitive to cefoperazonesulbactum	Count	1	1	2
		% of Total	1.7%	1.7%	3.3%
	Staphylococcus sensitive to cefotaxime	Count	4	0	4
		% of Total	6.7%	0.0%	6.7%
	Total	Count	23	37	60
		% of Total	38.3%	61.7%	100.0%

From this cross tabulation it is found that E-coli is the most common organism involved.

Cross Tabulation Of Antiseptics Used And SWAB Culture RESULTS

SWAB Culture Result		**Antiseptics Used**				**Total**
		5% betadine	**10% betadine**	**betadine scrubs and 5% betadine**	**betadine and spirit**	
Klebsialla sensitive to ciprofloxacine	Count	2	0	1	0	3
	% of Total	3.3%	0.0%	1.7%	0.0%	5.0%
Klebsialla sensitive to amikacin	Count	5	0	0	0	5
	% of Total	8.3%	0.0%	0.0%	0.0%	8.3%
Klebsialla sensitive to cefoperazonesulbactum	Count	0	0	1	0	1
	% of Total	0.0%	0.0%	1.7%	0.0%	1.7%
klebsialla sensitive to cefotaxime	Count	2	0	2	0	4
	% of Total	3.3%	0.0%	3.3%	0.0%	6.7%
E-coli sensitive to ciprofloxacine	Count	8	1	0	0	9
	% of Total	13.3%	1.7%	0.0%	0.0%	15.0%
E-coli sensitive to amikacine	Count	7	1	1	0	9
	% of Total	11.7%	1.7%	1.7%	0.0%	15.0%
E-coli sensitive to cefoperazonesulbactum	Count	1	0	1	0	2
	% of Total	1.7%	0.0%	1.7%	0.0%	3.3%
E-coli sensitive to cefotaxime	Count	5	0	0	0	5
	% of Total	8.3%	0.0%	0.0%	0.0%	8.3%
Pseudomonas sensitive to ciprofloxacine	Count	1	0	1	0	2
	% of Total	1.7%	0.0%	1.7%	0.0%	3.3%

PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr

Pseudomonas sensitive to amikacine	Count	2	0	0	0	2
	% of Total	3.3%	0.0%	0.0%	0.0%	3.3%
Pseudomonas sensitive to cefoperazones ulbactum	Count	2	0	1	0	3
	% of Total	3.3%	0.0%	1.7%	0.0%	5.0%
Pseudomonas sensitive to cefotaxime	Count	1	0	0	0	1
	% of Total	1.7%	0.0%	0.0%	0.0%	1.7%
Staphylococcus sensitive to ciprofloxacine	Count	3	0	2	0	5
	% of Total	5.0%	0.0%	3.3%	0.0%	8.3%
Staphylococcus sensitive to amikacine	Count	3	0	0	0	3
	% of Total	5.0%	0.0%	0.0%	0.0%	5.0%
Staphylococcus sensitive to cefoperazones ulbactum	Count	0	0	1	1	2
	% of Total	0.0%	0.0%	1.7%	1.7%	3.3%
Staphylococcus sensitive to cefotaxime	Count	2	0	1	1	4
	% of Total	3.3%	0.0%	1.7%	1.7%	6.7%
	Count	44	2	12	2	60
	% of Total	73.3%	3.3%	20.0%	3.3%	100.0%

From this cross tabulation it is found that the percentage of surgical site infection by E-coli came down on using 10% betadine solution.