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A Study To Evaluate The Effectiveness Of Iodine Impregnated Plastic Adhesive Drape During Abdominal Surgeries In Preventing Surgical Site Infections.

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Abstract:
BACKGROUND
Even though theoretically the use of plastic adhesive incise drapes are arguable, reports have been published regarding their usefulness in limiting bacteria around the surgical site and for preventing SSI are conflicting. In view of these controversies, and because their use is widespread, a systematic review of the possible usefulness of adhesive drapes is justified to guide clinical practice.
MATERIALS AND METHODS
Patients who were posted for emergency and elective laparotomies, (Clean-contaminated and contaminated surgeries) over a period of one year between July 2016 and June 2017 in our institution. Total 62 patients were divided in to two groups. Group 1 had iodine impregnated incise drape applied and Group 2 had no drape and were assessed pre-operatively, intra as well as post-operatively followed for 30 days for SSI. Descriptive analysis was performed using the X^2 or Fisher exact test or Student t-test or the Mann-Whitney U test as appropriate.
RESULTS
Total 62 patients were studied, 29 laparotomies patients with drape and 33 cases without drape. Overall incidence of SSI around 27% with more in emergency surgeries(35%) than elective surgeries(13.63%) with a relative risk of 2.5. In the drape group 7 patients developed SSI (incidence 24.13 in 100), and in no drape group, 10 patient developed surgical site infection (30.030 in 100), with no statistically significant difference in the incidence of SSI between two groups. SSI was higher in diabetic patients(15.4%) than non-diabetic patients(11%) with a relative risk of 68.24 and attributable risk of 0.58%.E-coli was found to be the most common organism(35.2%) causing SSI.

Key words: *Surgical site infection, plastic adhesive incise drapes*

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I. Introduction

Surgical site infection is a common malady mostly due to a healthcare-associated infection. Surgical site infection is defined by the Centre for Disease Control and Prevention (CDC)[1] as a proliferation of pathogenic micro-organisms which develops in incision site either within the skin and subcutaneous tissue (superficial) or musculofascial layers (deep) or in an organ or cavity, if opened during surgery.

Surgical site infections are one of the common post-operative complications and third most common hospital-acquiredinfection. It can occur after 3.03% of all clean and 22.41% of all clean-contaminated surgeries.[2] However prevalence studies tend to underestimate SSI because many of these infections occur after the patient has been discharged from the hospital. SSI associated with an increase in recovery time and hospital stay, thus significantly increases the morbidity and mortality associated with surgeries. The incidence of SSI depends on many factors like the definition of infection used, the intensity of surveillance, and the prevalence of risk factors in the population studied.

Surgical site infections are the major contributor of morbidity and mortality in postoperative patients. SSI is related to, almost one-third of postoperative deaths. Gram-positivecocci, especially staphylococci, cause many of these infections. SSI can range from a relatively mild wound discharge with no other complication to a life-threatening condition. Many risk factors are associated with surgical site infections. Strategies for prevention of SSI help to reduce morbidity, mortality and reduce hospital and save cost for the healthcare system. Many strategies are being implemented for reducing surgical site infections.

Different techniques are in practice to prevent bacteria from entering the surgical wound. Patient's skin flora micro-organisms are responsible for most of the SSIs. The causative bacteria mostly localizes on the hair follicles[3]. Anatomy of the skin makes it difficult to maintain the skin free of micro-organisms in the perioperative period. Antiseptics only incompletely reach these areas. Bacteria harbors in the hair follicles will come up to the skin after few hours of skin preparation. Antimicrobial impregnated incision drapes help in immobilizing these bacteria and preventing the upward movement of bacteria[4–6] from these areas and thus reduces the chance for SSIs.

Even though theoretically the usefulness of antimicrobial impregnated incision drapes is arguable, several studies show conflicting results about the usefulness in preventing SSI[7]. In view of these conflicting results, in this study, we will evaluate the usefulness of iodine impregnated incision drapes in preventing SSI

II. Material and Methods

The study population included were patients above 18 years of age who were posted for emergency and elective laparotomies. Clean-contaminated and contaminated surgeries were only included in our study. After giving a written informed consent, patients who were willing to participate in the study were studied over a period of one year between July 2016 and June 2017

STUDY DESIGN

This is a prospective cohort study.

PLACE OF STUDY

The study was conducted in the Department of General Surgery, Govt. Coimbatore Medical College Hospital,
Coimbatore, after obtaining permission from Heads of the concerned departments.

SAMPLE SIZE CALCULATION

Estimation of sample size with the difference between proportions.
According to a previous study [48] P1= 15 % P2= 1.6 %

$$N = \frac{2 \times P \times Q \times [(Z\text{-}\alpha/2) + (z\text{-}\beta)]^2}{(P_1 - P_2)^2}$$

Where
N = sample size
(Z – α) is α error and
(Z – β) is β error
(Z – α/2) = 1.96 (at 95 %)
(Z – β) = 0.84 (at 80%)
N = 66.46

Based on above calculation, by round it off to next 10,sample size required for this study was around 70 cases. Out of this 70 selected cases, 8 patientwas lost in follow-up and sample size (N) was recalculated as **62**

INCLUSION CRITERIA

Patients above 18 years of age, planned for emergency and elective laparotomy (clean-contaminated and contaminated surgeries), who were willing to participate in the study after giving written informed consent.

Exclusion criteria

- Morbidly obese patients
- Patients who have known allergy to providone iodine
- Patients unwilling to undergo the study.

ETHICAL CLEARANCE

The study was conducted after getting prior permission from the Department of General Surgery and the study proposal was approved by the ethics committee meeting conducted at Govt. Medical College, Coimbatore.
At the time of admission, patients were identified and informed consent was obtained. Patients were assigned to two groups.

Group 1 had the standard 5 minutes povidone iodine skin preparation, followed by surgical spirit followed by application of iodine impregnated incise drape.

Group 2 had standard 5 minutes provide iodine skin preparation, followed by the surgical spirit.
Immediately prior to operation, each patient will be randomly allocated either to receive the drape(group 1) or not to receive the drape (group 2). Randomization was achieved by sequential selection from a random number table.

Pre-operative shaving was done using shaving razor on the day of operation. Mupirocin ointment was applied to the nares of the patient prior to the surgery and a dose of prophylactic antibiotic was given prior to the surgery. An extra antibiotic dose was given in case the surgery was extended beyond 4 hours.

The drape used was iodine impregnated incise drape of 60×60 cm size. Patient's skin was prepared with routine skin preparation using povidone iodine and surgical spirit. Cloth side drapes were applied as usual and the skin has to become dry. Using two people the liner over the drape was removed, the incise drape was held over the proposed incision site with adequate tension. The drape was smoothened down, first along the intended incision line and then over the remaining areas

Theincision was made over the drape and surgery was proceeded. At the end of the procedure, before skin closure, the crease was created in the drape and drape separate drape from the skin surface and about 3 cm space created in the skin edge for skin suturing. After completion of skin closure, cover the suture site with sterile dressing and drapes were removed.

Patients were assessed pre-operatively, intra as well as post-operatively. Each patient was followed up from the time of admission and post-operatively at days 3, 5, 7 and weekly for 4 weeks (total 30 days).The surgical site was examined with regards to tenderness, purulent discharge, wound gaping, raised local temperature, local tenderness.
Wound infection was diagnosed only if following criteria were fulfilled.

- Signs and symptoms of inflammation like rubor,calor ,dolor, and edema around the wound covering the area.
- Purulent discharge from the wound site
- Fever > 38.5 degree Celsius on two consecutive occasions with a gap of fewer than 24 hours.

Stich abscess and seroma were excluded as they do not fulfill the criteria for diagnosing SSIs.
Wounds with purulent discharge were opened and swabs were taken under all aseptic precautions and sent for culture and sensitivity.
The following data were analyzed from all the subjects included in the study

- Age
- Sex
- Diabetes
- Obesity
- Smoking history
- Alcohol consumption
- Type of procedure
  - Emergency
  - Elective
- Complete blood count
- Blood sugar
- Renal function test
- Liver function test
- Day of identification of SSI
- Duration of hospital stay
- Signs of wound infection
  - Redness
  - Pain
  - Tenderness
  - Swelling
- Duration of surgery
- Microbiological spectrum

STATISTICAL ANALYSIS

Descriptive analysis was performed. Categorical variables were reported as frequencies or relative frequencies and compared using the X^2 or Fisher exact test as appropriate. Continuous variables were reported

as means with standard deviations and medians with minimum and maximum values and compared using the Student t-test or the Mann-Whitney U test if not distributed normally.

Null hypothesis: There is no significant difference in incidence of SSI between two groups
Alternate hypothesis: There is a statistically significant difference in incidence of SSI between two groups.
P <0.05 is taken as significant.

III. Result

SAMPLE SIZE N = 62
PERCENTAGE ANALYSIS
AGE DISTRIBUTION

AGE DISTRIBUTION	
AGE(YEARS)	**FREQUENCY**
21-40	20
41-60	32
61-80	10

Table 1 Age Distribution

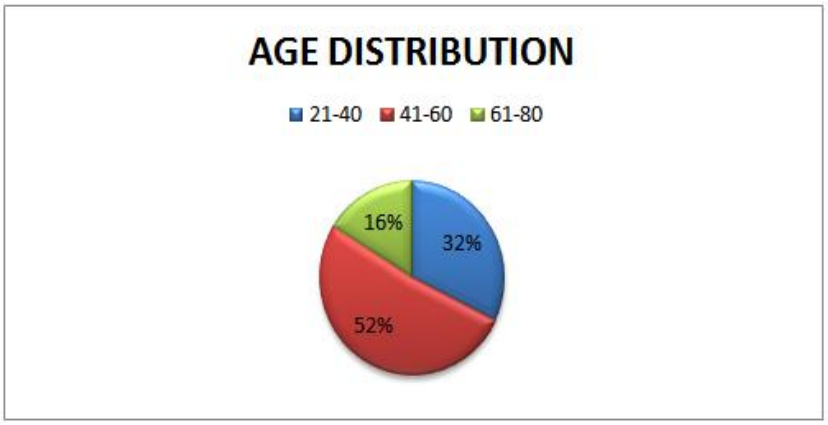


Chart 1 Age Distribution

Majority of study population belongs to 41-60 age group

SEX DISTRIBUTION

SEX DISTRIBUTION	
GENDER	**FREQUENCY**
MALE	35
FEMALE	27

Table 2 Sex Distribution

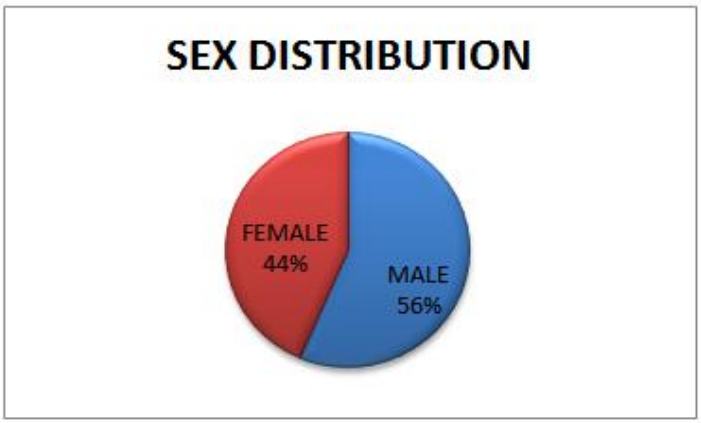


Chart 2 Sex Distribution
56% of study population were males

AGE AND SEX DISTRIBUTION

AGE AND SEX DISTRIBUTION	MALE	FEMALE
21-40	8	12
41-60	23	9
61-80	4	6

Table 3Age And Sex Distribution

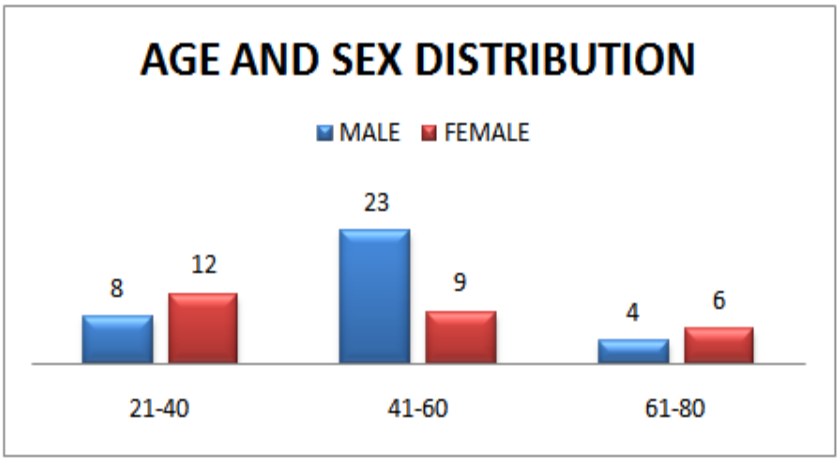


Chart 3 Age And Sex Distribution

BMI DISTRIBUTION

BMI	
UNDERWEIGHT	4
NORMAL	36
OVERWEIGHT	15
OBESE	7

Table 4 BMI distribution

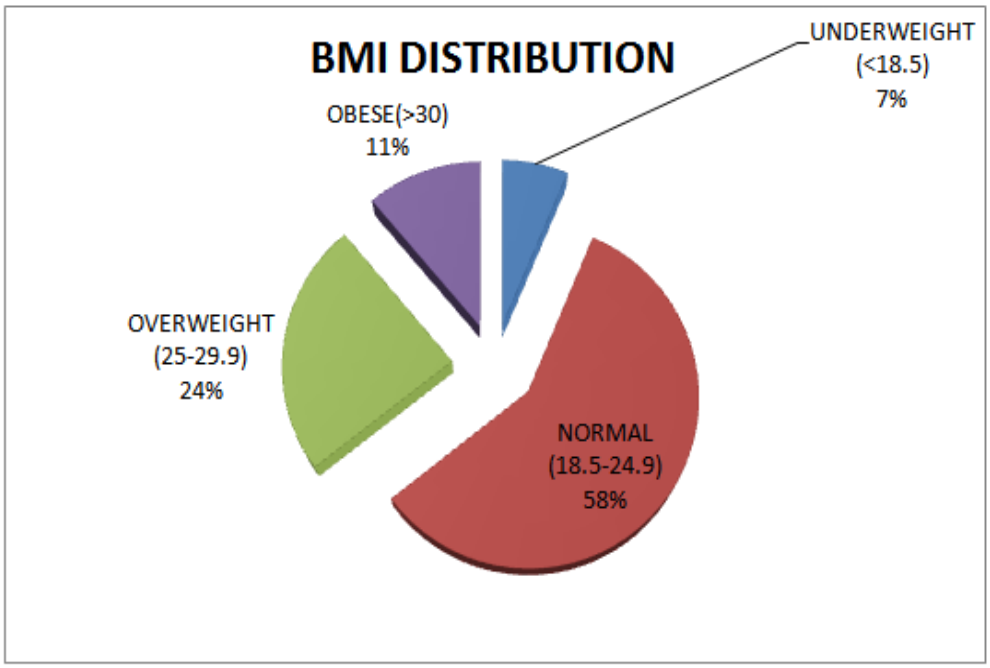


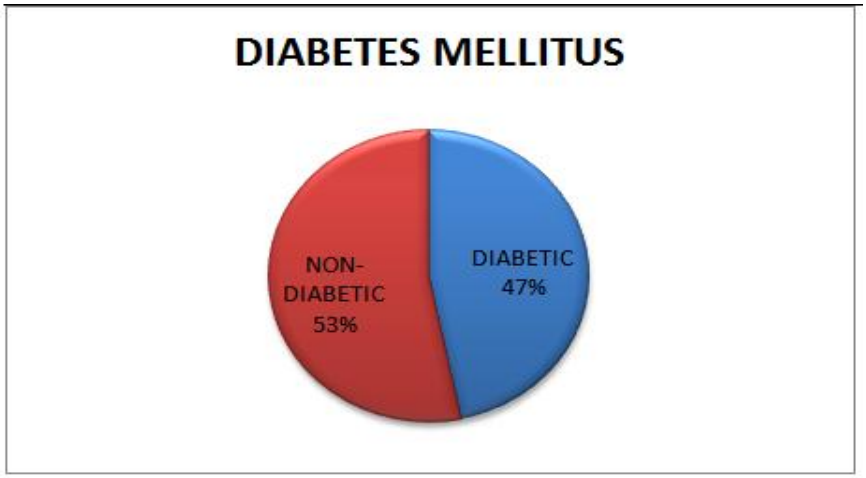
Chart 4 BMI Distribution

Majority (58%) of our study population belong to normal BMI group

DIABETES MELLITUS IN STUDY POPULATION

DIABETIC STATUS	FREQUENCY
DIABETIC	29
NON-DIABETIC	33

Table 5diabetes in study population



Around 47 % of the population under study were found to be diabetic

SMOKING IN STUDY POPULATION

SMOKING	
SMOKER	30
NON-SMOKER	32

Table 6 Smoking In Study Population

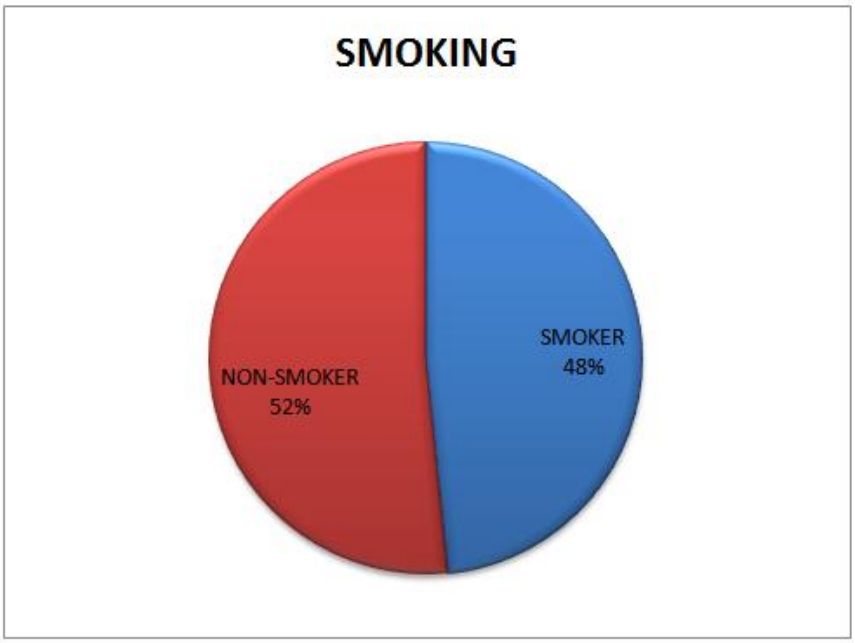


Chart 6 Smoking InStudy Populations

Around 48 % of the population used to smoke.

ALCOHOLISM AMONG STUDY POPULATION

ALCOHOL CONSUMPTION STATS	FREQUENCY
ALCOHOLIC	28
NOT ALCOHOLIC	34

Table 1 Alcoholism In Study Population

Chart 4 Alcoholism In The Study Population
45 % of the study population was found to consume alcohol

AGE DISTRIBUTION AMONG TWO GROUPS

AGE GROUPS	GROUP 1	GROUP 2	TOTAL
21-40	8	12	20
41-60	17	15	32
61-80	4	6	10
TOTAL	29	33	62

Table 92 Age Distribution Among Group 1 And Group 2

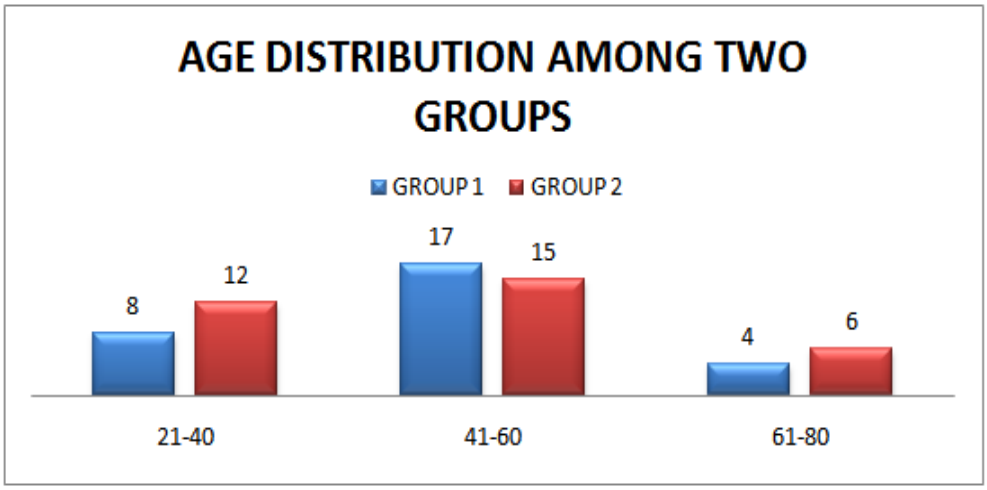


Chart 5 Age Distribution Among Group 1 And Group 2
$X^2 = 1.07 (< 5.99)$ $P > 0.05$ degree of freedom =2

Hence null hypothesis is accepted.There is no statistically significant difference in age distribution between Group 1 and Group 2. Both groups are identical and comparable.

SEX DISTRIBUTION AMONG TWO GROUPS

SEX	GROUP 1	GROUP 2	TOTAL
MALE	15	20	35
FEMALE	14	13	27
TOATAL	29	33	62

Table 10 Sex Distribution between Group 1 And Group 2

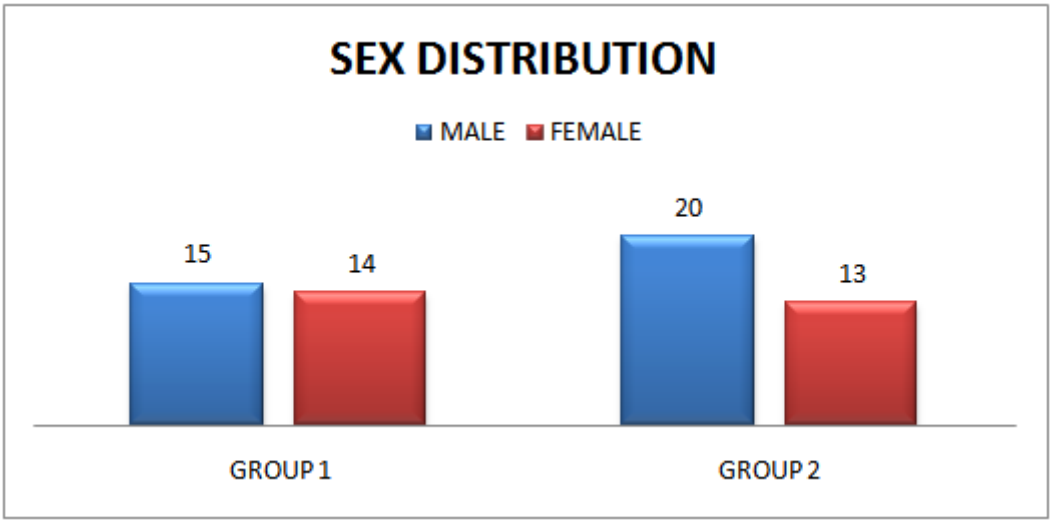


Chart 6 Sex Distribution Between Group 1 And Group 2
X^2= 0.49 (< 3.84) P > 0.05 Degree of freedom = 1

Hence null hypothesis is accepted. There is no statistically significant difference in sex distribution between group 1 and Group 2 Both groups are identical and comparable.

TYPE OF PROCEDURE

TYPE OF SURGERY	GROUP 1	GROUP 2	TOTAL
EMERGENCY	19	21	40
ELECTIVE	10	12	22
TOTAL	29	33	62

Table 11 Type Of Procedure Among Group 1 And Group 2

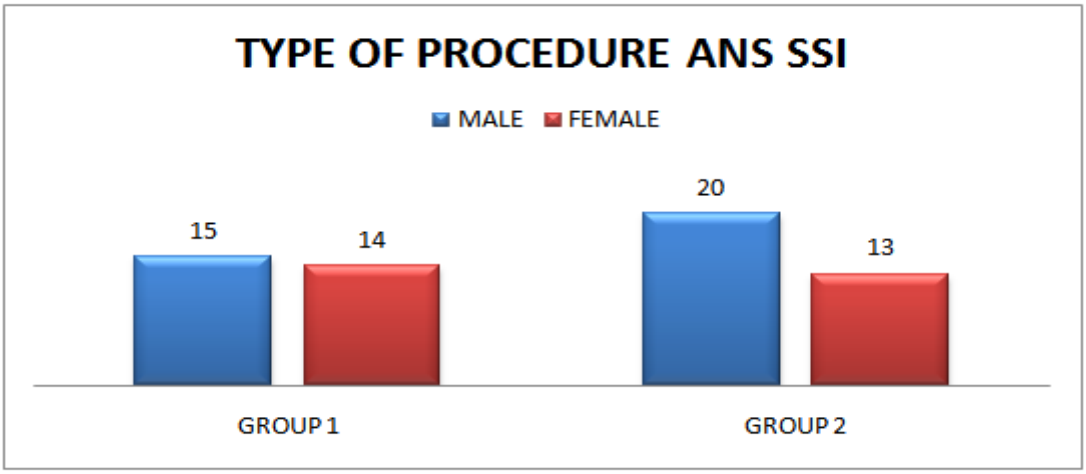


Chart11 Type Of Procedure Among Group 1 And Group 2
X^2= 0.02 (< 3.84) P > 0.05 Degree of freedom = 1

Hence null hypothesis is accepted. There is no statistically significant difference in distribution of emergency and elective procedures between two groups. Both groups are identical and comparable.

SURGICAL SITE INFECTION

SURGICAL SITE INFECTION	FREQUENCY
SSI	17
NO SSI	45

Table 12 Surgical Site Infection In Study Population

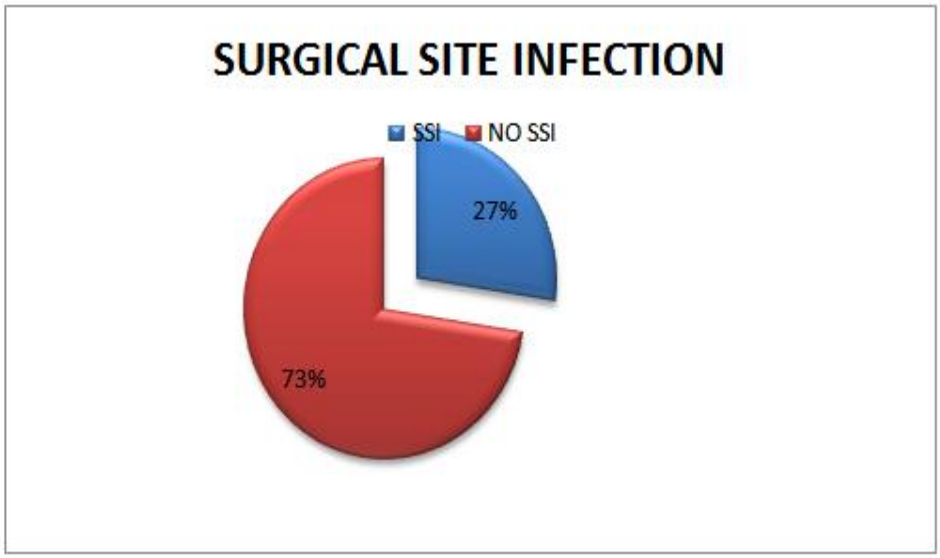


Chart 7 Surgical Site Infection In Study Population
Overall the incidence of SSI was found to be 27 %.

SSI AMONG EMERGENCY AND ELECTIVE PROCEDURES

PROCEDURE	SSI	NO SSI
EMERGENCY	14	26
ELECTIVE	3	19

Table 33 SSI among Elective And Emergency Procedure

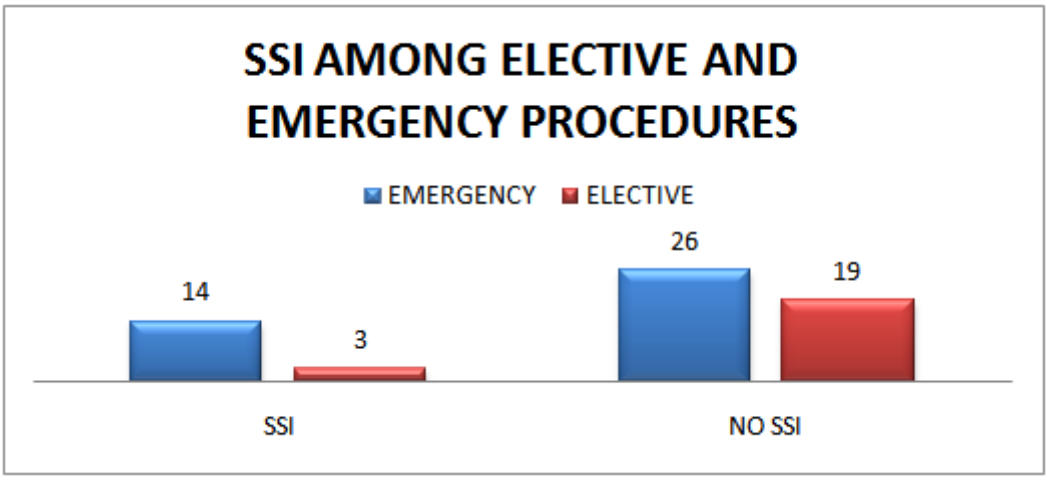


Chart 8 SSI Among Elective And Emergency Procedure
X^2= 10.72(>7.87) P < 0.05 Degree of freedom = 1

Hence alternate hypothesis is accepted There is a statistically significant difference in incidence of SSI between elective and emergency procedures. Relative risk = 2.5. As per our study emergency procedures have more risk of developing SSI.

DIABETES AND SSI

DM	SSI+	SSI-
DM+	12	17
DM-	5	28

Table 14 Diabetes and SSI

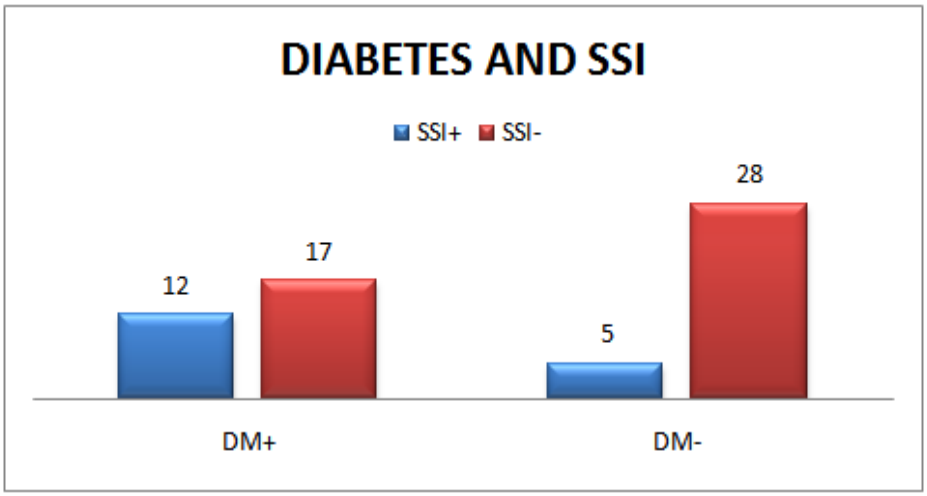


Chart 9 Diabetes and SSI

X^2= 4.63(>3.84) P > 0.05 Degree of freedom = 1

Hence alternate hypothesis is accepted There is a statistically significant difference in the incidence of SSI between diabetic and non-diabetic patients.
Relative risk = 68.24
Attributable Risk = 0.58
As per our study diabetes is a risk factor for SSI.

OBESITY AND SSI

OBESITY	SSI +	SSI -
OBESE	4	3
NON OBESE	13	42

Table 15 Obesity and SSI

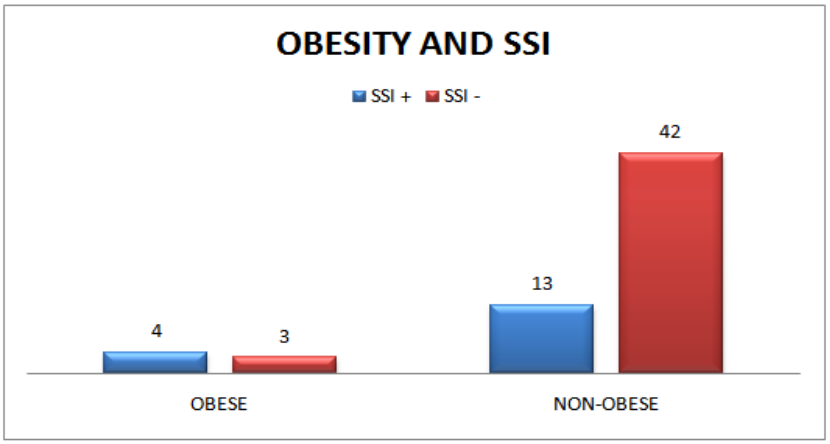


Chart 10 Obesity and SSI

X^2 =1.16 (< 3.84) P > 0.05 Degree of freedom = 1

Hence null hypothesis is accepted. There is no statistically significant difference in SSI between obese and non-obese patients Obesity does not influence the chance of devoloping SSI.

ANEMIA AND SSI

ANEMIA	SSI+	SS-
ANEMIA+	8	11
ANEMIA-	9	34

Table 16Anaemia and SSI

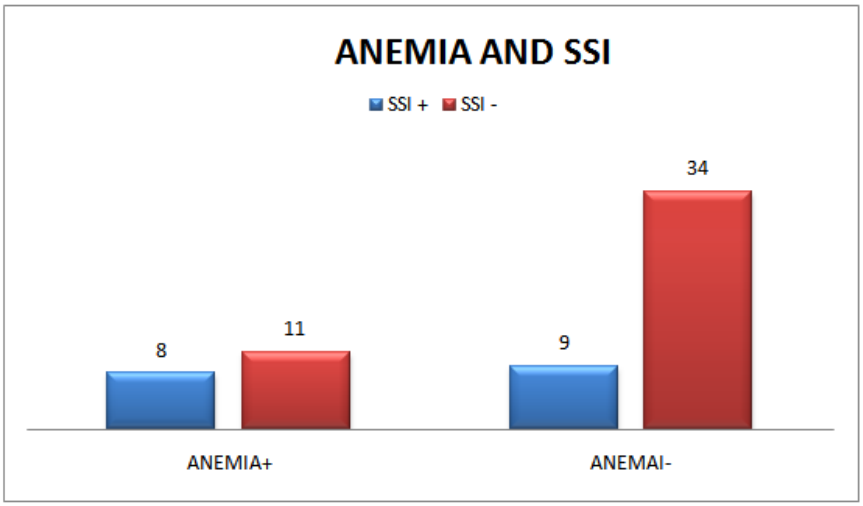


Chart 11Anemia and SSI

X^2 =2.96 (< 3.84) P > 0.05 Degree of freedom = 1

Hence null hypothesis is accepted There is no statistically significant difference in SSI between two groups. Anemia does not influencing the chance of developing SSI.

ALCOHOLISM AND SSI

ALCOHOL USAGE	SSI +	SSI -
ALCOHOLIC	11	17
NON-ALCOHOLIC	6	28

Table 174Alcoholism and SSI

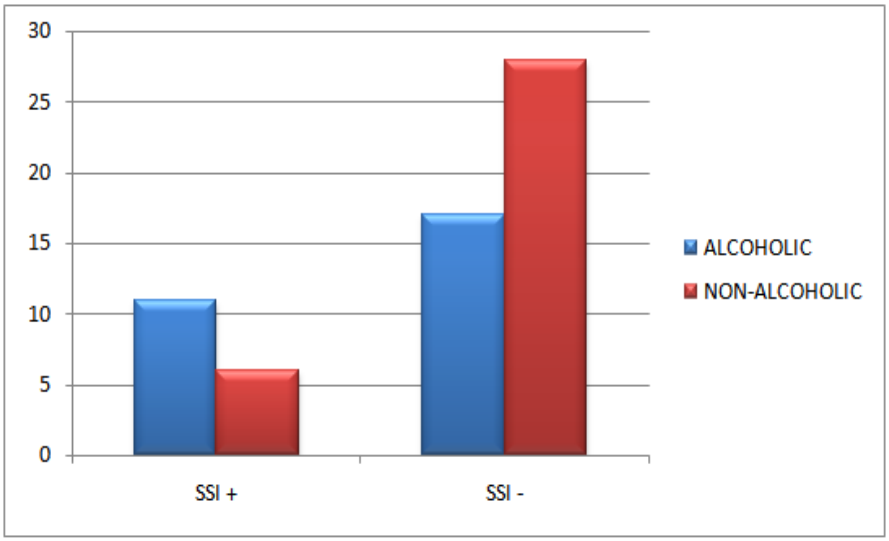


Chart 12Alcoholism and SSI

X^2 =3.61 (< 3.84) P > 0.05

Hence null hypothesis is accepted There is no statistically significant difference in SSI between two groups. Alcohol does not influence the chance of getting SSI.

SMOKING AND SSI

SMOKING	SSI +	SSI -
SMOKER	11	19
NON-SMOKER	6	26

Table 18 Smoking and SSI

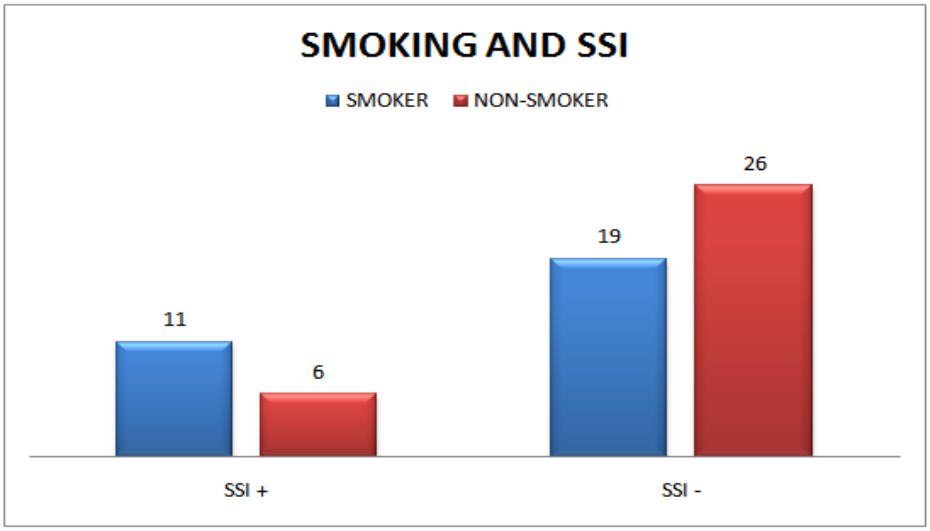


Chart 13 Smoking and SSI
X^2 = 2.49 (< 3.84) P > 0.05

Hence null hypothesis is accepted There is no statistically significant difference in SSI between two groups. Smoking is ruled out as a co-morbidity SSI.

DURATION OF SURGERY AND SSI

DURATION OF SURGERY	> 3HRS	<3 HRS
SSI +	5	12
SSI -	10	35

Table 19 Duration Of Surgery and SSI

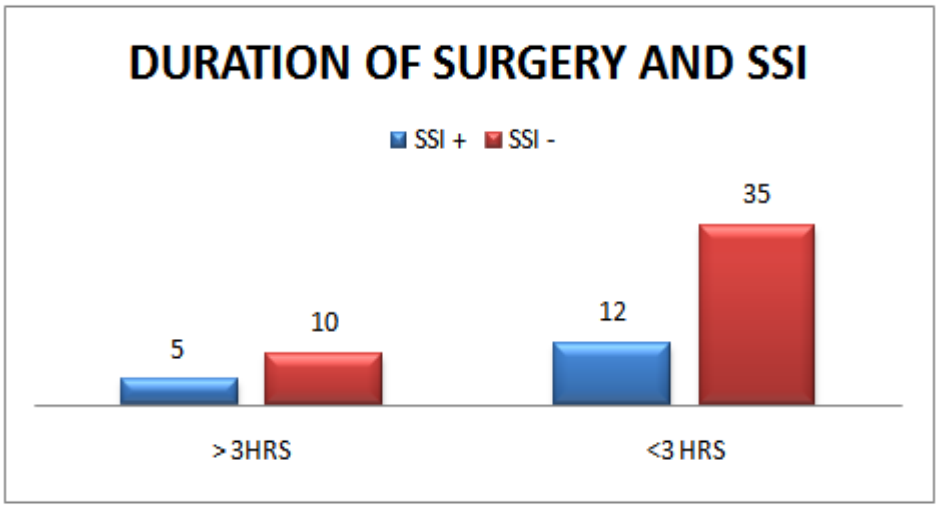


Chart 19 Duration Of Surgery and SSI
X^2 = 0.3477 (< 3.84) P > 0.05

Hence null hypothesis is accepted there is no statistically significant difference in SSI between two groups.

TIME OF ONSET OF SSI

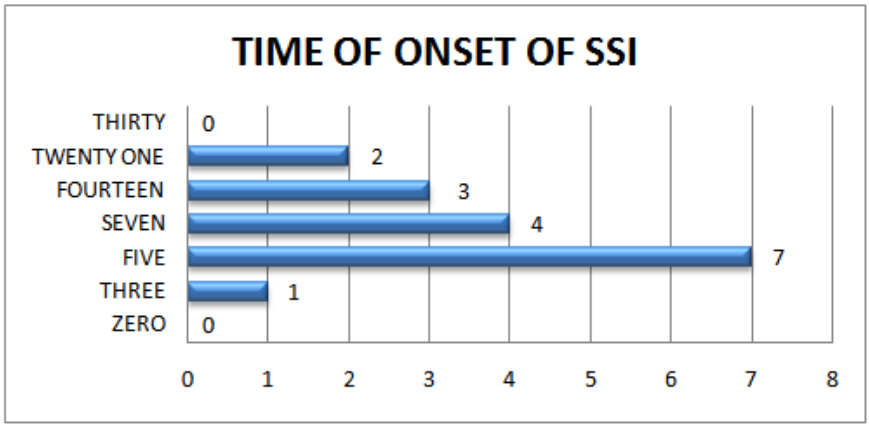


Chart 14Time of Onset of SSI

SIGNS AND SYMPTOMS OF SSI

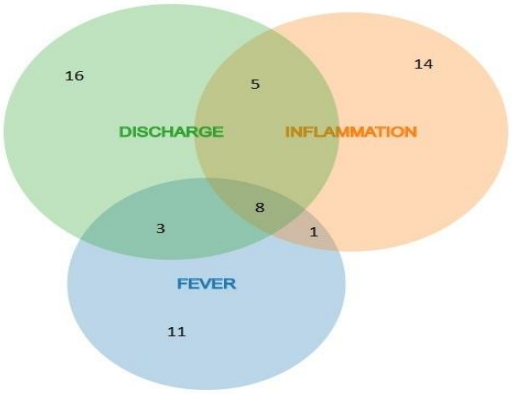


Chart 15 Signs And Symptoms Of SSI

16 patients had discharge from the wound, 14 patients developed signs of inflammation and 11 patients hadfever.

PROFILES OF PATIENTS WITH AND WITHOUT SSI

PARAMETER	SSI +	SSI -	P
	Mean (SD)	Mean (SD)	
AGE (yrs)	51.24(12.70)	47.44(12.04)	0.2105
BMI(KG/M^2)	24.18(4.46)	23.47(3.46)	0.506
Hb(g/dl)	8.97(2.61)	10.33(2.46)	0.061
TC($\times 10^3$)	13.47(1.50)	8.53(2.06)	0.0001
HOSPITAL STAY (DAYS)	10.35(0.61)	7.16(0.41)	0.0001
RBS(mg/dl)	164.47(73.41)	143.53(61.4)	0.2016

Table 5 Risk Factors for SSI

Total count and hospital stay are found to be extremely statistically significant.

PROFILES OF PATIENTS WITH OR WITHOUT DRAPES

PARAMETER	GROUP 1	GROUP 2	P
	Mean (SD)	Mean (SD)	
AGE (yrs)	48.75(11.89)	48.24(12.72)	0.8716
BMI(KG/M^2)	24.05(3.52)	23.32(3.93)	0.4467
TC($\times 10^3$)	9.91(2.43)	9.89(3.34)	0.9471
Hb(g/dl)	9.89(2.64)	10.04(2.58)	0.822
HOSPITAL STAY (DAYS)	7.8(1.53)	8.21(1.49)	0.29
TIME OF ONSET (DAYS)	7.2(6.1)	7.0(3.97)	0.8775

Table 21 Profiles of Patients Among Group 1 And Group 2

There IS no statistically significant difference in baseline characteristics of two groups.

DRAPES IN NON-DIABETIC PATIENTS

NON-DIABETIC	GROUP 1	GROUP 2
SSI +	0	5
SSI -	16	12

Table 6 Drape in Non-Diabetic Patients

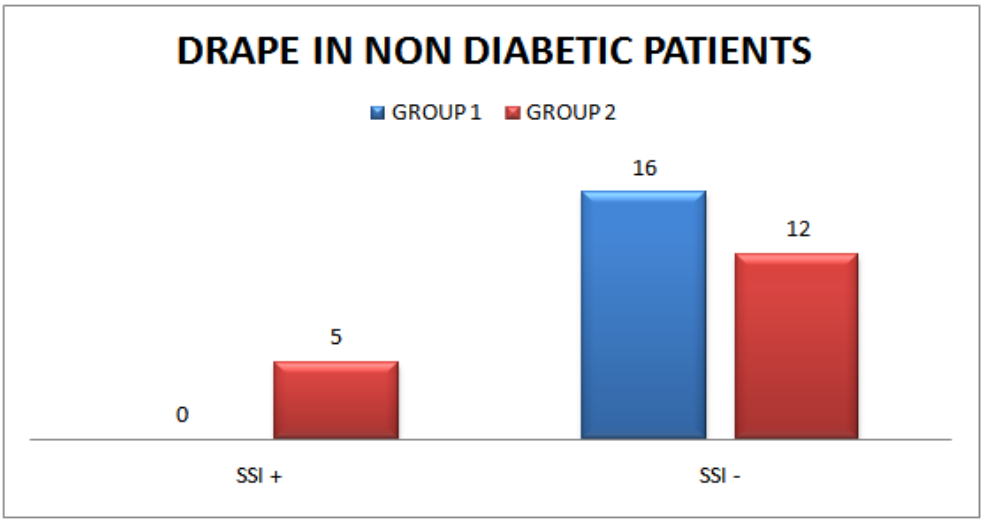


Chart 16 Drape in Non-Diabetic Patients

Fishers exact test value = 0.0444 which is significant at p <0.05

There is a significant difference in the incidence of SSI between two groups among non-diabetics. In non-diabetic patients, using iodine impregnated incise drape reduces the chance of getting surgical site infection.

SSI AMONG GROUP 1 AND GROUP 2

SURGERIES	GROUP 1	GROUP 2
SSI +	7	10
SSI -	22	23

Table 23 SSI among Group 1 and Group 2

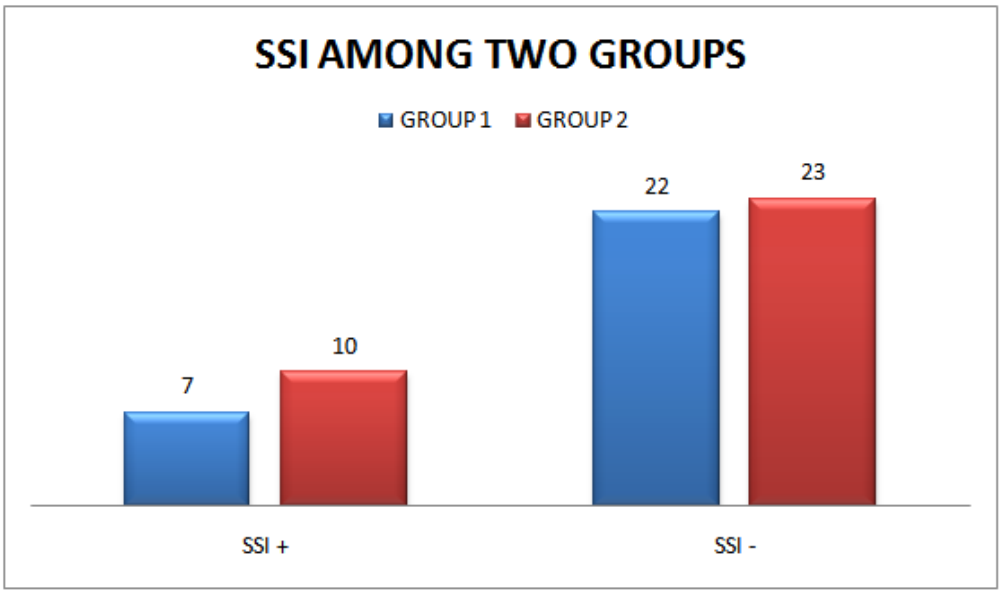


Chart 17 SSI Among Group 1 And Group 2

X^2 =0.2948 (< 3.84) P > 0.05 Degree of freedom = 1

Hence null hypothesis is accepted. There is no statistically significant difference in the incidence of SSI between Group 1 and Group 2. The use of drape does not alter the risk of developing SSI

SSI IN EMERGENCY SURGERIES AMONG GROUP 1 AND GROUP 2

EMERGENCYSURGERIES	GROUP 1	GROUP 2
SSI +	6	8
SSI -	13	13

Table 24 SSI in emergency surgeries among Group 1 and Group 2

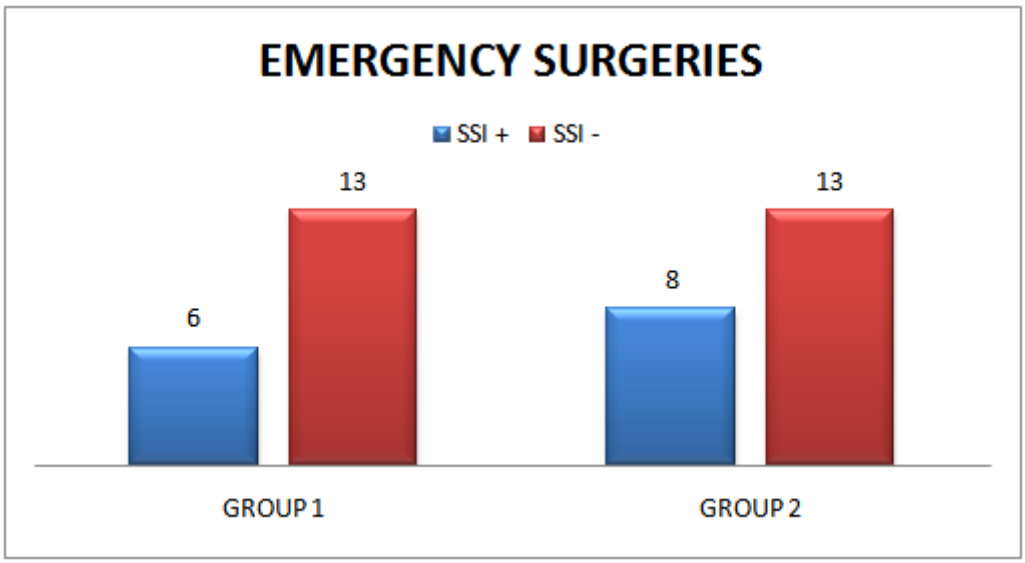


Chart 18 SSI in Emergency Surgeries Among Group 1 And Group 2

X^2 =0.17 (< 3.84) P > 0.05 Degree of freedom = 1

Hence null hypothesis is accepted. There is no statistically significant difference in incidence of SSI between two groups underwent emergency surgeries

SSI IN ELECTIVE SURGERIES AMONG GROUP 1 ANDGROUP 2

ELECTIVE SURGERIES	GROUP 1	GROUP 2
SSI +	1	2
SSI -	9	10

Table 7 SSI in Elective Surgeries Among Group 1 And Group 2

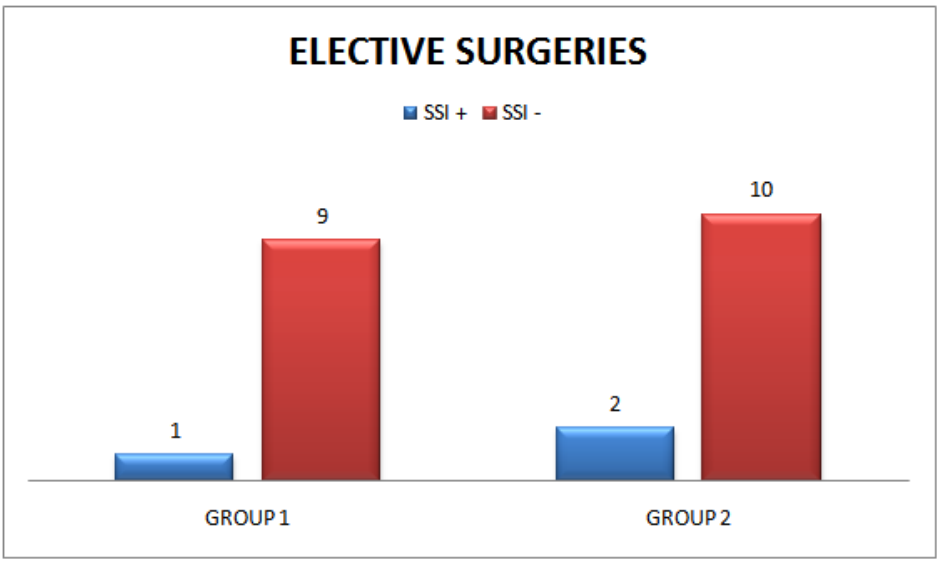


Chart 19 SSI In Elective Surgeries Among Group 1 And Group 2

Fishers exact test value = 0.43 P>0.05

Hence null hypothesis is accepted. There is no statistically significant difference in incidence of SSI between two groups underwent elective surgerie

DURATION OF SURGERY >3 HOURS

	GROUP 1	GROUP 2
SSI +	0	5
SSI -	6	4

Table 8 Duration Surgery > 3hours and SSI

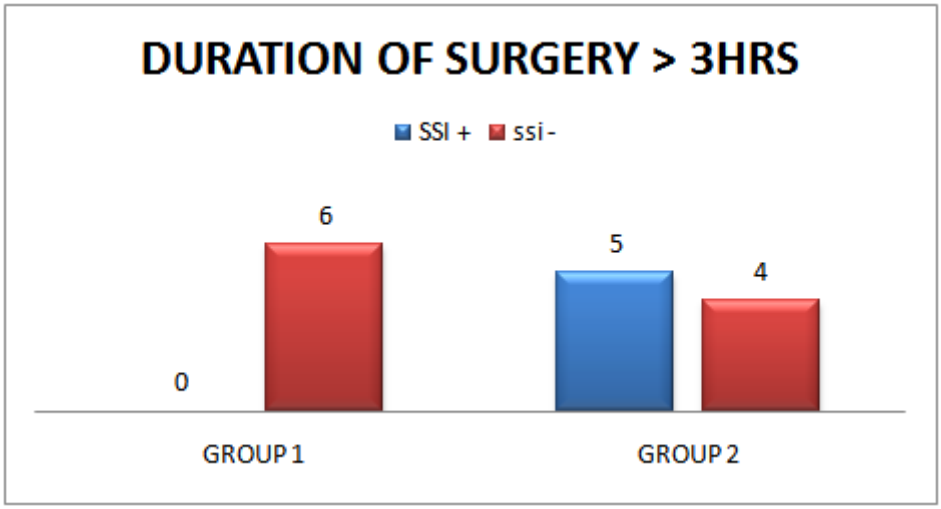


Chart 20 Duration Surgery > 3hours And SSI

Fishers exact test value = 0.0439 P <0.05

Hence alternate hypothesis is accepted.

There is the statistically significant difference in the incidence of SSI between two groups with surgeries more than 3 hours.

For procedures with longer duration, the drape group shows the lesser incidence of surgical site infections.

DURATION OF SURGERY < 3 HOURS

	GROUP 1	GROUP 2
SSI +	7	5
SSI -	16	19

Table 27 Duration Of Surgery < 3 Hrs And SSI

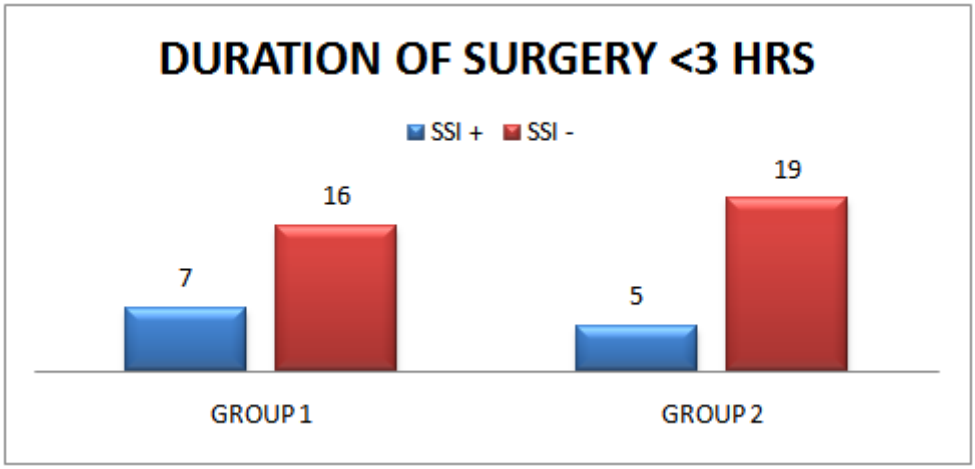


Chart 21Duration Of Surgery < 3 Hrs and SSI

X^2 =0.5695 (< 3.84) P > 0.05 Degree of freedom = 1

Hence null hypothesis is accepted.

There is no statistically significant difference in the incidence of SSI between two groups in surgeries lasting < 3 hours.

MICROBIOLOGICAL SPECTRUM

E-coli	Proteus Spp.	Klebsiellaspp.	S.aureus	Pseudomonas spp.
6	4	3	2	2

Table 28**Microbiological Spectrum**

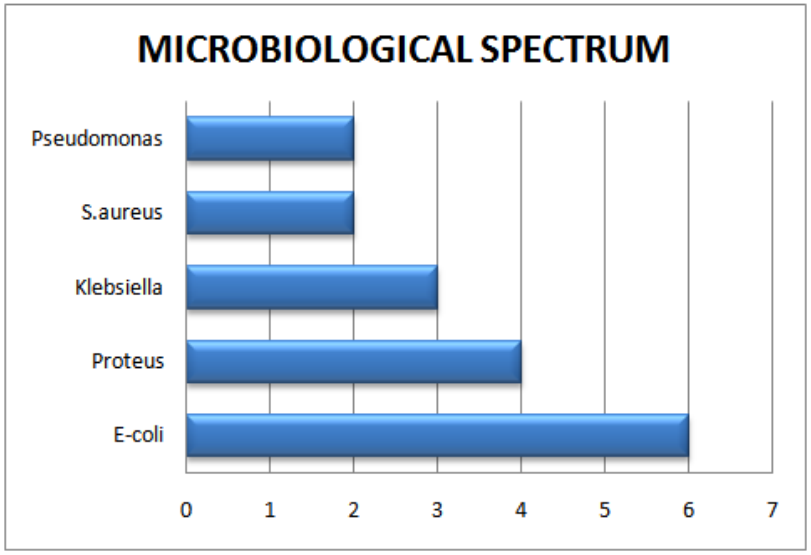


Chart 22 Microbiological spectrum

Most common organism isolated was *Escherichia coli* (35.2%) followed by Proteus mirabilis (23.5%).

IV. Discussion

Plastic adhesive drapes are used in various surgical fields for the past 20 years in an attempt to prevent surgical site infection, by preventing migration of organisms into the open surgical wound. Even though theoretically the use of plastic adhesive incise drapes are arguable, reports have been published regarding their usefulness in limiting bacteria around the surgical site and for preventing SSI are conflicting

A meta-analysis was done by Joan Webster, Abdullah Alghamdi, Centre for Clinical Nursing, Royal Brisbane and Women's Hospital, Brisbane, Australia., shows that a significantly higher proportion of patients developed SSI following use of incising drape[41].

Another study done by Yasuko Yoshimura,1 Shoji Kubo, M.D., Kazuhiro Hirohashi, M.D., Masao Ogawa, M.D., Ken Morimoto, M.D., KumikoShirata, Hiroaki Kinoshita, M.D. Osaka City University Graduate School of Medicine[49], shows that iodine impregnated plastic incise drape reduce the chance of SSI.

A study by Dewan et al. shows there is no significant difference in rates of SSI with the use of incising drapes[50].

In our study, in the drape group seven patients develop surgical site infection (incidence 24.13 in 100), and in no drape group, 10 patient developed surgical site infection(30.030 in 100). There is no statistically significant difference in the incidence of SSI between two groups. But only for surgeries lasting for a longerduration, there was a significant reduction in the incidence of surgical site infection in the drape group. Hence our study does not support the use of iodine impregnated incise drapes as a routine practice for reduction of SSI.

Table 21 compares the baseline profiles of patients with and without drapes and there was no statistically significant difference in profiles between two groups.

Surgical site infections are one of the common post-operative complications and it can occur 22.41% of all clean-contaminated surgeries[2] as per a study conducted by Lilani SP, Jangale N, Chowdhary A, Daver GB on Surgical site infection in clean and clean-contaminated cases published in Indian J Med. In our study, the overall incidence of surgical site infection is around 27%. Length of the hospital stay was similar in drape group and no drape group. In a similar study conducted by Webster et al, there was no significant reduction in the duration of hospital stay, when the iodine impregnated incise drape was used[51].

The incidence of Surgical Site Infection was more in emergency surgeries(35%) than elective surgeries(13.63%) with a relative risk of 2.5. As per a similar study was done by Manian FA and Mayer L[52]

patients undergoing elective surgery have much less incidence(4%) of surgical site infection than patients undergoing emergency surgery(13%) with a relative risk of 3.6%.

As per a study was done by David E Reichman et al; as the duration of surgery increases, the risk of surgical site infection increases.[52] As per our study surgeries lasting more than 3 hours has an incidence of SSI 33% compared to surgeries lasting for less than 3 hours (incidence 25.5 %). A similar study was done by VarshaSahane and SaikatBhawal[53] , Department of Microbiology Dr DY Patil Medical College, Pune ,also shows similar results. Table 25 compares the profile of patients with and without SSI. It shows elevated total leucocyte count and increased duration of hospital stay in patients who developed surgical site infection.

A study done by Valerian BT, Lee EC, Albany Medical College, New york shows incidence of SSI was higher in diabetic patients(15.4%) than non-diabetic patients(11%). As per this study also diabetes mellitus is a risk factor for developing SSI with a relative risk of 68.24 and attributable Risk = 0.58(Table19). Use of drapes in the non-diabetic population reduces the chance of SSI(Table 27). As per this study maximum number of cases first developed signs of surgical site infections during the 5th POD (41.17 %).

As per our study surgical site infections with *Escherichia coli* (35.2%) is found to occur in higher frequencies followed by *Proteus mirabilis* (23.5%). As per a similar study was done by David E Reichman et al[54]; gram-negative organisms such as E-coli was found to be the commonest organism causing Surgical Site Infection in cases were hollow viscera was opened during surgery, followed by enterococcus, and anaerobic organisms.

V. Conclusion

Findings from our study do not support the use of iodine impregnated incise drapes as a routine practice in laparotomies for preventing SSI. As the purpose of iodine impregnated incise drape is to prevent skin flora micro-organisms from causing SSI, its use should be limited to clean surgeries and long duration procedures. The incidence of surgical site infection was found to be higher in emergency surgeries than elective surgeries. As per our study diabetes mellitus and increased duration of surgery were found to be factors associated with the development of surgical site infection. Efforts should be taken to minimize the duration of surgery without affecting the quality of treatment.

Escherichia coli was found to be the most common organism causing Surgical Site Infection in abdominal surgeries.

Periodic surveillance of Surgical Site Infection will help in formulating strict guidelines, and hence reducing the incidence of Surgical Site Infections.

References

[1]. Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Grace Emori T. CDC definitions of nosocomial surgical site infections, 1992: A modification of CDC definitions of surgical wound infections. Am J Infect Control. 1992 Oct 1;20(5):271–4.

[2]. Lilani SP, Jangale N, Chowdhary A, Daver GB. Surgical site infection in clean and clean-contaminated cases. Indian J Med Microbiol. 2005 Oct 1;23(4):249.

[3]. Lange-Asschenfeldt B, Marenbach D, Lang C, Patzelt A, Ulrich M, Maltusch A, et al. Distribution of bacteria in the epidermal layers and hair follicles of the human skin. Skin Pharmacol Physiol. 2011;24(6):305–11.

[4]. Dohmen PM, Konertz W. A review of current strategies to reduce intraoperative bacterial contamination of surgical wounds. GMS Krankenhaushygiene Interdiszip. 2007 Dec 28;2(2):Doc38.

[5]. Wilson SE. Microbial sealing: a new approach to reducing contamination. J Hosp Infect. 2008 Nov;70:11–4.

[6]. Kramer A, Assadian O, Lademann J. Prevention of postoperative wound infections by covering the surgical field with iodine-impregnated incision drape (Ioban® 2). GMS Krankenhaushygiene Interdiszip [Internet]. 2010 Sep 21 [cited 2017 Sep 22];5(2). Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2951095/

[7]. Editors) JB (Ph D and IM (PhD F (on behalf of CCA. Can use of plastic adhesive drapes during surgery help prevent surgical site infection? In: Cochrane Clinical Answers [Internet]. John Wiley & Sons, Ltd; 2015 [cited 2017 Sep 22].

[8]. Kleisiaris CF, Sfakianakis C, Papathanasiou IV. Health care practices in ancient Greece: The Hippocratic ideal. J Med Ethics Hist Med [Internet]. 2014 Mar 15 [cited 2017 Sep 19];7. /

[9]. Williams WF. Encyclopedia of Pseudoscience: From Alien Abductions to Zone Therapy. Routledge; 2013. 445 p.

[10]. Koch's Postulates [Internet]. [cited 2017 Sep 18]. Available from: http://www.life.umd.edu/classroom/bsci424/BSCI223WebSiteFiles/KochsPostulates.htm

[11]. Information NC for B, Pike USNL of M 8600 R, MD B, Usa 20894. Historical perspective on hand hygiene in health care [Internet]. World Health Organization; 2009 [cited 2017 Sep 18]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK144018/

[12]. Louis Pasteur | Biography, Inventions, Achievements, & Facts [Internet]. Encyclopedia Britannica. [cited 2017 Sep 18]. Available from: https://www.britannica.com/biography/Louis-Pasteur

[13]. Worboys M. Joseph Lister and the performance of antiseptic surgery. Notes Rec R Soc Lond. 2013 Sep 20;67(3):199–209.

[14]. Park R. Aseptic and Antiseptic Surgery. Ann Surg. 1888 Jun;7(6):472–5.

[15]. Williams N, O'Connell PR. Bailey & Love's Short Practice of Surgery 26E. CRC Press; 2013. 1453 p.

[16]. Tan SY, Tatsumura Y. Alexander Fleming (1881–1955): Discoverer of penicillin. Singapore Med J. 2015 Jul;56(7):366–7.

[17]. Wound Infection Clinical Presentation: Definition and Classification, History and Physical Examination [Internet]. [cited 2017 Sep Available from: http://emedicine.medscape.com/article/188988-clinical

[18]. 9pscssicurrent.pdf [Internet]. [cited 2017 Sep 17]. Available from: https://www.cdc.gov/nhsn/pdfs/pscmanual/9pscssicurrent.pdf

[19]. 67-1471427374.pdf [Internet]. [cited 2017 Sep 19]. Available from: https://www.ejmanager.com/mnstemps/67/67-1471427374.pdf

[20]. Young B, Ng TM, Teng C, Ang B, Tai HY, Lye DC. Nonconcordance with Surgical Site Infection Prevention Guidelines and Rates of Surgical Site Infections for General Surgical, Neurological, and Orthopedic Procedures. Antimicrob Agents Chemother. 2011 Oct 1;55(10):4659–63.

[21]. Waton N. Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee [Internet]. Jason and Jarvis Associates, LLC. 1999 [cited 2017 Sep 18]. 22. Articulo_11.pdf [Internet]. [cited 2017 Sep 19]. Available from: http://paginas.facmed.unam.mx/deptos/cirugia/images/Articulos_casos/Tema_4/Articulo_11.pdf

[22]. Krizek TJ, Robson MC. Evolution of quantitative bacteriology in wound management. Am J Surg. 1975 Nov 1;130(5):579–84.

[23]. Berríos-Torres SI, Umscheid CA, Bratzler DW, Leas B, Stone EC, Kelz RR, et al. Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017. JAMA Surg. 2017 Aug 1;152(8):784–91.

[24]. Pryor KO, Fahey TJ, Lien CA, Goldstein PA. Surgical site infection and the routine use of perioperative hyperoxia in a general surgical population: a randomized controlled trial. JAMA. 2004 Jan 7;291(1):79–87.

[25]. Hopf HW, Hunt TK, West JM, Blomquist P, Goodson WH, Jensen JA, et al. Wound tissue oxygen tension predicts the risk of wound infection in surgical patients. Arch Surg Chic Ill 1960. 1997 Sep;132(9):997–1004; discussion 1005.

[26]. The effect of differing ambient oxygen tensions on wound infection. [Internet]. [cited 2017 Sep 22]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1343711/

[27]. Local Heat Increases Blood Flow and Oxygen Tension in Wounds | JAMA Surgery | The JAMA Network [Internet]. [cited 2017 Sep 22]. Available from: http://jamanetwork.com/journals/jamasurgery/article-abstract/592299

[28]. Kurz A, Sessler DI, Lenhardt R. Perioperative normothermia to reduce the incidence of surgical-wound infection and shorten hospitalization. Study of Wound Infection and Temperature Group. N Engl J Med. 1996 May 9;334(19):1209–15.

[29]. Saadat D, Lowenfels AB. Effect of preoperative warming on wound infection. The Lancet. 2002 Feb 2;359(9304):445.

[30]. Frisch A, Chandra P, Smiley D, Peng L, Rizzo M, Gatcliffe C, et al. Prevalence and Clinical Outcome of Hyperglycemia in the Perioperative Period in Noncardiac Surgery. Diabetes Care. 2010 Aug;33(8):1783–8.

[31]. Lazzeri C, Bevilacqua S, Ciappi F, Pratesi C, Gensini GF, Romagnoli S. Glucose metabolism in cardiovascular surgery. HSR Proc Intensive Care Cardiovasc Anesth. 2010;2(1):19–26.

[32]. Nash AG, Hugh TB. Topical ampicillin and wound infection in colon surgery. Br Med J. 1967 Feb 25;1(5538):471–2.

[33]. Post-operative Staphylococcal Enterocolitis During Antibiotic Therapy [Internet]. [cited 2017 Sep 22]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2062033/

[34]. Timing of preoperative antibiotic prophylaxis in 54,552 pati... : Medicine [Internet]. [cited 2017 Sep 22]. Available from: http://journals.lww.com/md-journal/Fulltext/2017/07210/Timing_of_preoperative_antibiotic_prophylaxis_in.1.aspx

[35]. Dellinger EP. Prophylactic Antibiotics: Administration and Timing before Operation Are More Important than Administration after Operation. Clin Infect Dis. 2007 Apr 1;44(7):928–30.

[36]. Ko W, Lazenby WD, Zelano JA, Isom OW, Krieger KH. Effects of shaving methods and intraoperative irrigation on suppurative mediastinitis after bypass operations. Ann Thorac Surg. 1992 Feb;53(2):301–5.

[37]. Mulholland MW, Lillemoe KD, Doherty GM, Maier RV, Simeone DM, Upchurch GR. Greenfield's Surgery: Scientific Principles & Practice. Lippincott Williams & Wilkins; 2012. 4760 p.

[38]. Reducing Surgical Site Infections: A Review [Internet]. [cited 2017 Sep 17]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2812878/

[39]. Herwaldt LA, Cullen JJ, Scholz D, French P, Zimmerman MB, Pfaller MA, et al. A prospective study of outcomes, healthcare resource utilization, and costs associated with postoperative nosocomial infections. Infect Control Hosp Epidemiol. 2006 Dec;27(12):1291–8.

[40]. Use of plastic adhesive drapes during surgery for preventing surgical site infection - Webster - 2015 - The Cochrane Library - Wiley Online Library [Internet]. [cited 2017 Sep 22]. 42. Artz CP, Conn JH, Howard HS. Protection of the Surgical Wound with a New Plastic Film. JAMA. 1960 Dec 3;174(14):1865–8.

[41]. appendix17.pdf [Internet]. [cited 2017 Sep 22]. Available from: http://www.who.int/gpsc/appendix17.pdf?ua=1

[42]. Falk-Brynhildsen K, Friberg O, Soderquist B, Nilsson UG. Bacterial Colonization of the Skin Following Aseptic Preoperative Preparation and Impact of the Use of Plastic Adhesive Drapes. Biol Res Nurs. 2013 Apr 1;15(2):242–8.

[43]. Falk-Brynhildsen K, Söderquist B, Friberg ö., Nilsson UG. Bacterial recolonization of the skin and wound contamination during cardiac surgery: a randomized controlled trial of the use of plastic adhesive drape compared with bare skin. J Hosp Infect. 2013 Jun;84(2):151–8.

[44]. Kramer A, Assadian O, Lademann J. Prevention of postoperative wound infections by covering the surgical field with iodine-impregnated incision drape (Ioban ® 2) [Internet]. 2010 [cited 2017 Sep 22]. Available from: http://www.egms.de/en/journals/dgkh/2010-5/dgkh000151.shtml

[45]. Anderson DJ, Kaye KS, Classen D, Arias KM, Podgorny K, Burstin H, et al. Strategies to Prevent Surgical Site Infections in Acute Care Hospitals. Infect Control Hosp Epidemiol. 2008 Oct;29(S1):S51–61.

[46]. A Dewan P, van Rij A, G Robinson R, B Skeggs G, Fergus M. The use of an iodophor-impregnated plastic incise drape in abdominal surgery - A controlled clinical trial. Aust N Z J Surg. 1987 Dec 1;57:859–63.

[47]. Yoshimura Y, Kubo S, Hirohashi K, Ogawa M, Morimoto K, Shirata K, et al. Plastic iodophor drape during liver surgery operative use of the iodophor-impregnated adhesive drape to prevent wound infection during high risk surgery. World J Surg. 2003 Jun;27(6):685–8.

[48]. Dewan PA, Rij AMV, Robinson RG, Skeggs GB, Fergus M. The Use of an Iodophor-Impregnated Plastic Incise Drape in Abdominal Surgery—A Controlled Clinical Trial. J Urol. 1989 Jan 1;141(1):220.

[49]. Use of plastic adhesive drapes during surgery for preventing surgical site infection | Cochrane [Internet]. [cited 2017 Sep 22]. Available from: /CD006353/WOUNDS_use-of-plastic-adhesive-drapes-during-surgery-for-preventing-surgical-site-infection

[50]. Manian FA, Meyer L. Surgical-site infection rates in patients who undergo elective surgery on the same day as their hospital admission. Infect Control Hosp Epidemiol. 1998 Jan;19(1):17–22.

[51]. Shahane V, Bhawal S, Lele U. Surgical site infections: A one year prospective study in a tertiary care center. Int J Health Sci. 2012 Jan;6(1):79–84.

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