JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Incidence of SSI and its correlation with BMI: An open prospective observational study

Rabia Riaz[1],Iqbal Aziz[2],Tafseer Ali[2],Fatima Khan[3],Rahida Hilal[1]

1. Assistant Professor, Department of Jarahat, A. K. Tibbiya College, AMU, Aligarh
2. Professor, Department of Jarahat, A. K. Tibbiya College, AMU, Aligarh
3. Associate Professor, Department of Microbiology, J. N. Medical College, AMU, Aligarh

ABSTRACT

INTRODUCTION: Surgical site infection (SSI) is third most commonly reported Nosocomial infection accounting for 5 to 34% globally. It is a major cause of postoperative morbidity and is the commonest and most troublesome complication of wound healing. There are many factors that influence healing of surgical wound and determine the potential for infection. It includes patients related or procedure related variables that affects a patient's risk of developing SSI. Some of the risk factors are increasing age, smoking, tobacco chewing, high glycaemic index, nutritional status, BMI, duration of pre operative hospital stay and sterilization of surgical field etc. Some of this factors are non modifiable for example age but others can be improved to increase a positive outcome. This study was conducted to assess the relationship between one of the risk factor that is basal metabolic rate with surgical site infection.

OBECTIVES: To assess the rate and relation of Surgical Site Infection (SSI) with Body Mass Index (BMI) .

MATERIAL and Methods: It is a prospective observational study conducted at Ajmal Khan Tibbiya College in collaboration with Department of microbiology Jawahar Lal Nehru AMU, on 200 patients who underwent elective abdominal surgeries as per inclusion and exclusion criteria. Patients were stratified into 4 categories according to BMI : Class I(<18.5), Class II (18.5-24.9),Class III (25-29.9)and Class IV(>30). SSI assessed as per criteria established by CDC and WHO and then relation between BMI and SSI was established.The chi square has been applied and the results were analyzed statistically

RESULTS: Total 200 different elective surgeries were analysed, out of which maximum patients with SSI were found in category III. Among 200 patients 26 patients were lie in category III.A trend of increasing risk of SSI when BMI increased from normal to obese was observed.

CONCLUSION: This study demonstrated that there is increase in SSI with increase BMI. Thus we concluded that by reducing weight we can prevent surgical site infection which leads to decrease hospital stay and ultimately it is more cost effective.

KEY WORDS: Surgical Site Infection (SSI), Body Mass Index(BMI), CDC, WHO

INTRODUCTION: Nosocomial infections are a major problem through out the world[1] and Surgical site infections (SSIs) are ranked among the most common Nosocomial infection along with pneumonia, urinary tract infection, and blood stream infections[2]. It is one of the most important cause of post operative morbidity[3,4].Globally rate of SSI is found to be 2.5 to 41.9%[5,6,7].

The surgical site infection is defined as an infection that occur at or near the site of surgical site within 30 days of operation and or after 1 year if implant is placed[5,8,9].

Once SSI occurs it increases the post operative hospital stay and cost of treatment. It causes $1.6 billion excess cost annually[5,10,11] .It increases the risk of death 2-11 times more as compared to the patient having no SSI[12,13].

There are many factors that influence healing of surgical wound and determine the potential for infection[14,15]. It includes patients related or procedure related variables that affects a patient's risk of developing SSI [16,1718,19]. Some of the risk factors are increasing age, smoking, tobacco chewing, high glycaemic index, nutritional status, BMI, duration of pre operative hospital stay and sterilization of surgical field etc.Some of this factors are non modifiable for example age but others can be improved to increase a positive outcome.

This study was conducted to assess the relationship between one of the risk factor that is body mass index with surgical site infection.

OBECTIVES: To assess Surgical Site Infection (SSI) in relation to Body Mass Index(BMI)

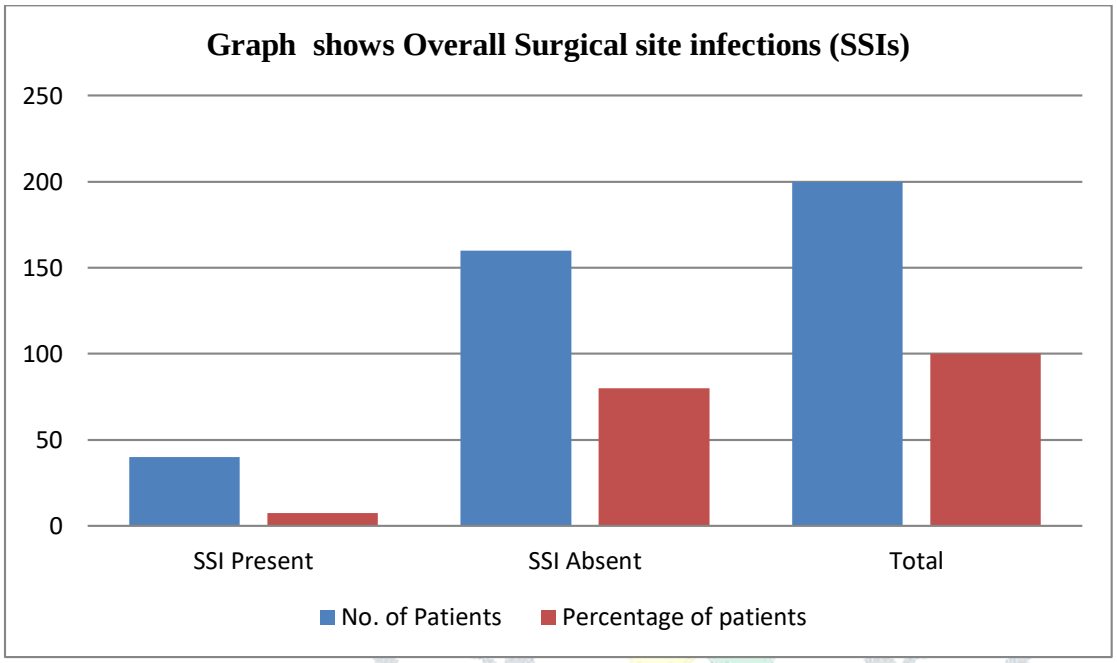
MATERIAL and Methods: It is a prospective observational study conducted at Ajmal Khan Tibbiya College in collaboration with Department of microbiology Jawahar Lal Nehru AMU. The patients were enrolled after taken approval by institutional ethical committee.200 patients were enrolled who underwent different elective surgeries as per inclusion and exclusion criteria. Patients were stratified into 4 categories according to BMI : Class I(<18.5), Class II (18.5-24.9),Class III (25-29.9)and Class IV(>30). SSI assessed as per criteria established by CDC and WHO and then relation between BMI and SSI was established. The chi square has been applied and the results were analyzed statistically.

Inclusion criteria: Patients who underwent different elective surgeries in department of Surgery Ajmal Khan Tibbiya College

Exclusion criteria

- HIV positive patients
- HBsAg positive patients
- Patients not willing for consent
- IV grade wound
- ASA class more than II

RESULTS: During the study, a total of 200 patients with different elective surgeries were analyzed, out of which 40 (20%) patients were diagnosed with SSI as per the criteria and a higher incidence of SSI was noted in over weight 30.8% and obese patients 22.2% as compared to normal patients(18.3%). The observations drawn out from the study are depicted in Table and graph No. 1.

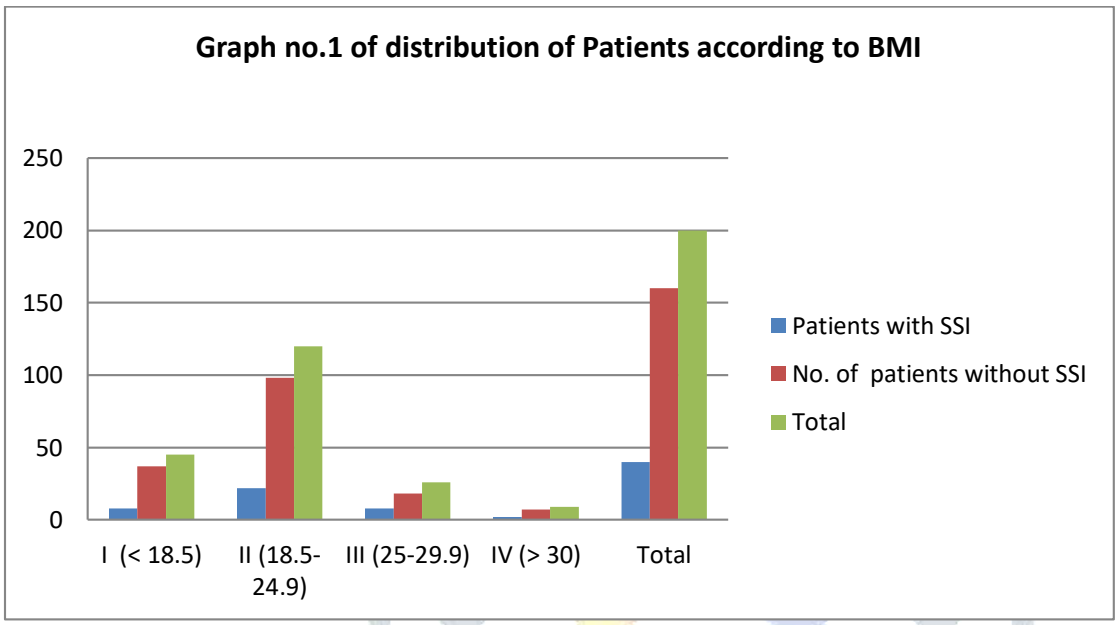


Distribution of Patients according to BMI (Table- 1)

BMI	Patients with SSI N (%)	No. of patients without SSIN(%)	Total
I (< 18.5)	8(17.8)	37(84.2)	45
II (18.5-24.9)	22(18.3)	98(81.7)	120
III (25-29.9)	8(30.8)	18(69.2)	26
IV (> 30)	2(22.2)	7(77.8)	9
Total	40(20.0)	160(200)	200
Mean±SD	22.5±3.7	21.8±3.4	21.9±3.7
χ^2 =2.6			

Categorical data has been presented as number and percentage.

According to BMI, patients were categorized into four classes. The maximum number of patients were found in group II i.e. 120 (60%) followed by group I; 45 (22.5%), group III;26 (13%) and group IV; 9 (4.5%). The maximum number of SSI were found in group III of BMI i.e. 30.8% (8/26), while group IV had second highest number of SSI i.e. 22.2% (2/9) followed by group II patients who had 18.3% (22/120)SSI and only 17.8% (8/45) patients of group I developed SSI. The mean and standard deviation of patient's BMI in patients with SSI and patients without SSI group was 22.5±3.7 and 21.8±3.4 respectively. The chi square has been applied on the above mentioned data which is considered statistically insignificant.



DISCUSSION: Obesity increase the risk of SSI nearly 4 folds among patients who underwent surgeries in the United kingdom from 2006 to 2010 [20]. **Noorit P.*et al*.,2018** mentioned in his study that the maximum number of patients developing SSI were having BMI of more than 24.5±0.48 while observation drawn from our study also suggest that the mean ±SD of BMI was 22.5±2.7 which is found statistically insignificant and our study was coherent with this study.[16]**Berger RL.*et al*., 2013,Meena R.et al.,2023** stated that the incidence among the individual who have higher BMI was statistically significant risk factor to develop SSI. The association between obesity and post operative infection is well established in the surgical literature. Obese individual have higher BMI which leads to development of more risk factor associated with SSI.[21]

Conclusion: From the observation, results and discussion it was concluded that, the overall incidence rate of SSI in our study was 20%. An important risk factors that is BMI more than 25 contribute in the development of SSI. It demonstrated that there is increase in SSI with increasing BMI. Thus we concluded that by reducing weight we can prevent surgical site infection which leads to decrease hospital stay and ultimately it is more cost effective also prevention, extensive diagnosis, and appropriate treatment as well as follow-up are mandatory for surgical

site infection, whereas most surgical site infections can be prevented if appropriate strategies are implemented i.e. aggressive surgical debridement and antibiotic agents remain a standard of care for infection prevention after open surgery.

Conflict of Interest: Nil

References

1. Ganguly P.S, Khan.M.Y, Malik.A. Nosocomial infections and hospital procedures. Indian Journal of communitymedicine vol.XXV.No.1.jan-mar 2000.
2. Hernandez K, Ramos E, Seas C, Henostroza G, Gotuzzo E. Incidence of and risk factors for surgical-site infections in a Peruvian hospital. Infection Control & Hospital Epidemiology. 2005 May;26(5):473-7.
3. Pathak.A, Mahadik.K, Swami.M.B, Roy.K.P, Sharma.M, Vijay K.M, Lundborg.CS, Incidence and risk factors for surgical site infections in obsretric and gynecological surgeries from a teaching hospital in rural India.Antimicrobial Resistance and Infection Control(2017) 6:66
4. World Health Organisation Obesity: preventing and managing the global epidemic. Report of a WHO consultation. *World Health Organ Tech Rep Ser.* 2000;894(i–xii):1–253.
5. Laloto TL, Gemeda DH, Abdella SH. Incidence and predictors of surgical site infection in Ethiopia: prospective cohort. BMC infectious diseases. 2017 Dec;17(1):1-9.
6. Singh R, Singla P, Chaudhary U,.Surgical site infections:classification,risk factors ,pathogenesis and preventive management: review article. Int J Pharma Research Health Sci. 2014;2(3):203-14
7. Alan R S, Kavitha C.Antibiotic prophylaxis to prevent surgical site infection.Am Fam Physician. 2011;83(5)585-90
8. Larson EL, York N, York N, Pearson ML, Lee JT, Adams AB, et al. Guideline for prevention of surgical site infection. Infect Control Hospital Epidemiol. 1999;20(4):247–77.
9. Tietjen L, Bossemeyer D, McIntosh N. Infection Prevention: Guidelines for Healthcare Facilities with Limited Resources. Baltimore: JHPIEGO; 2003.
10. Kirkland KB, Briggs JP, Trivette SL, Wilkinson WE, Sexton DJ. The impact of surgical site infections in the 1990s: Attributable mortality, excess length of hospitalization and extra costs. Infect Control Hosp Epidemiol. 1999;20(11):725–30.
11. Gagliardi AR, Fenech D, Eskicioglu C, Nathens AB, Mcleod R. Factors influencing antibiotic prophylaxis for surgical site infection prevention in general surgery: a review of the literature. Can J Surg. 2009;52(6):481–9.

12. Tariq A, Ali H, Zafar F, Sial A, Hameed K, Naveed S. A systemic review on surgical site infections: classification, risk factors, treatment complexities, economical and clinical scenarios. J Bioequiv Availab. 2017;9(1):336-40.

13. Engemann JJ, Carmeli Y, Cosgrove SE, Fowler VG, Bronstein MZ, et al. (2003) Adverse clinical and economic outcomes attributable to methicillin resistance among patients with Staphylococcus aureus surgical site infection. Clin Infect Dis. 36: 592-598

14. Goyal V, Kaushal R. Exploration of epidemiologic profile and strategic prevention framework for surgical site infection rates in a tertiary care hospital of Bhopal city. International Journal of Community Medicine and Public Health. 2018 Feb;5(2):784.

15. Horan TC,Gaynes RP,Martone WJ,Jarvis WR,Emori TG,CDC definitions and Nosocomial surgical site infections, 1992: A modification of CDC definitions of surgical wound infections.Infect Control Hosp Epidemiol 1992:13(10):606-08

16. Noorit P, Siribumrungwong B, Thakkinstian A. Clinical prediction score for superficial surgical site infection after appendectomy in adults with complicated appendicitis. World Journal of Emergency Surgery. 2018 Dec;13(1):1-7.

17. Ejaz A, Schmidt C, Johnston FM, Frank SM, Pawlik TM. Risk factors and prediction model for inpatient surgical site infection after major abdominal surgery. J Surg Res. 2017;217:153–9.

18. Pedroso-Fernandez Y, Aguirre-Jaime A, Ramos MJ, Hernandez M, Cuervo M, Bravo A, Carrillo A. Prediction of surgical site infection after colorectal surgery. Am J Infect Control. 2016;44:450–4.

19. Alavi K, Sturrock PR, Sweeney WB, Maykel JA, Cervera-Servin JA, Tseng J, Cook EF. A simple risk score for predicting surgical site infections ininflammatory bowel disease. Dis Colon rectum. 2010;53:1480–6.

20. Meena R,Chakravarti S,Agarwal S,Jain A,Singh S,Dey S,A prospective study of surgical site infection with its risk factors and their correlation with the NNIS Risk index.J West Afr Coll Surg 2023;13:26-33

21. Berger RL, Li LT, Hicks SC, Davila JA, Kao LS, Liang MK. Development and validation of a risk-stratification score for surgical site occurrence and surgical site infection after open ventral hernia repair. Journal of the American College of Surgeons. 2013 Dec 1;217(6):974-82.