International Surgery Journal
Farzipour S et al. Int Surg J. 2022 May;9(5):951-955
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20221139

Original Research Article

Evaluation of demographic characteristics and comorbidities in patients with surgical site infection after gynecological surgeries, 2016-2020

Shahla Farzipour[1], Faranak Jalilvand[1]*, Afshan Sharghi[2], Ehsan Mostafaei-Aghah[3]

[1]Department of Pediatrics, School of Medicine, Ardabil University of Medical Science, Ardabil, Iran
[2]Department of Community Medicine, School of Medicine, Ardabil University of Medical Science, Ardabil, Iran
[3]School of Medicine, Ardabil University of Medical Science, Ardabil, Iran

Received: 15 March 2022
Revised: 04 April 2022
Accepted: 05 April 2022

***Correspondence:**
Dr. Faranak Jalilvand,
E-mail: faranak.jalilvand@arums.ac.ir

ABSTRACT

Background: Surgical site infection (SSI) is one of most common infections in the hospital and complications in patients admitted to the surgical ward or outpatient surgery, which increases the duration of treatment, delays wound healing, increases the use of antibiotics, causes unnecessary pain and in severe cases death and imposes a lot of costs on the health care system. The aim of this study was to determine the demographic characteristics and comorbidities in patients with SSI.
Methods: The study population included 92 patients who referred to Alavi hospital in Ardabil for gynecological surgeries from June 2016 to the end of April 2020. Their complete hospital records were extracted through the hospital archive system and carefully studied. A special checklist was filled out for each patient. The information in the checklist included age, occupation, place of residence, marriage, education, type of surgery performed, presence or absence of underlying disease, cancer, smoking and alcohol consumption and presence or absence of a history of abdominal and pelvic surgery. All data analyzed by statistical methods in SPSS.
Results: Most of patients with SSI were between 30 to 40, rural, married and housewives. Of all patients, 22.8% had diabetes and 13% had hypertension. The type of surgery was caesarean section in 85.9%, laparatomy 8.7% and cystectomy/aforectomy in 5.4% and 18.5% of patients had a history of previous surgery.
Conclusions: Due to the high rate of comorbidities and predisposing factors in patients with SSI, control of these factors can play an important role in preventing infection.

Keywords: Obstetric surgery, Postoperative infection, Caesarean section

INTRODUCTION

Surgical site infection (SSI) is one of the 4 most common infections in the hospital and is one of the most common complications in patients admitted to the surgical ward or outpatient surgery, which increases the duration of treatment, delays wound healing and increases the use of antibiotics, unnecessary pain and death of the patient in severe cases and imposes a lot of costs on the health care system. Therefore, prevention of SSI is one of the key goals in health services and its prevention requires the integration of a wide range of measures before, during and after surgery. SSI is the most common complication of gynecological surgeries and leads to significant complications in patients. Obstetric surgery is a unique challenge in that potentially pathogenic microorganisms may migrate to surgical sites from the skin or vagina and endocrine and leading to vaginal cuff cellulitis, pelvic cellulitis and pelvic abscesses. Multiple host and surgical factors are known as the risks increase infectious complications after pelvic surgery. Many cases can be corrected and care must be taken to reduce the risk of

these factors.[1] Extensive implementation of preoperative antibiotic prophylaxis as well as the identification of modifiable risk factors for postoperative infection, leads to a significant reduction in the rate of postoperative infection. Risk factors that increase the risk of postpartum infection are included low socioeconomic status, black race, twins, young age, frequent vaginal examinations, maternal obesity, maternal anemia and internal fetal monitoring.[2] The Centers for Disease Control (CDC) defines SSI as an infection that occurs in one of these three places within 30 days after surgery: partial at the incision site, deep at the incision site and in other organs or open spaces during surgery.[5] Obesity significantly affects the risk of obstetric SSI, especially in patients with a BMI of more than 30 or with a depth of subcutaneous tissue greater than 2 cm. Diabetes mellitus is associated with an increased risk of postoperative infection, especially in patients with postoperative serum glucose levels greater than 150 mg/l and preoperative hemoglobin HbA1c levels greater than 6.5. Patients with diseases such as diabetes should be clinically fit before surgery. Preoperative anemia and a history of cerebrovascular lesions were also associated with SSI.[3] There are several important and documented risk factors including smoking, corticosteroid use, malnutrition and aging are defined to SSI in the surgical literature.[4-9] The aim of this study was to determine the demographic characteristics and comorbidities of patients with SSI at Alavi hospital in Ardabil city.

METHODS

Study design

This cross-sectional descriptive study was performed between 2016-2020 in Alavi hospital of Ardabil city in the department of obstetrics and gynecology.

Inclusion criteria

Women with confirmed SSI were included in the study.

Exclusion criteria

Women who were referred to hospital with other surgeries or diseases were excluded in the study.

Data collection

The sample consisted of 92 women who had referred to Alavi hospital in Ardabil city for gynecological surgeries from June 2016 to the end of April 2020. Complete information about these patients including personal details, date of referral and discharge, hospital record number and other pre-registered items and data available at the infection control office of the hospital. All 92 patients with SSI were selected as the study sample. For each patient, a checklist including information on age, occupation, place of residence, marriage, education, type of performed surgery, presence of underlying disease, cancer, smoking and alcohol use and history of abdominal and pelvic surgery were completed.

Statistical analysis

Data were analyzed in SPSS version 26 by using descriptive statistical methods in the form of tables, graphs and statistical indices.

Ethical approval

This study was approved in the ethics committee of Ardabil university of medical sciences and registered by code IR.ARUMS.REC.1399.246.

RESULTS

All of patients with postoperative infection who referred to Alavi hospital in Ardabil from 2016 to 2020 were studied. Accordingly, 92 people were included in the study. During this period, the number of cesarean section surgeries was 15931, laparotomy surgeries were 627 and 87 cases cystectomy or aforectomy and therefore, the prevalence of infections after cesarean section was 0.5%, after laparotomy 1.28% and after cystectomy or aforectomy was 5.7%. The overall prevalence of SSI after gynecological surgeries was 0.55%.

The age group of 30 to 40 years with 38% had the highest and the age group under 20 years with 7.6% had the lowest number of postoperative infections. The average age of the study participants was 38.77±13.96. Of all patients, 21.7% had university education and 18.5% were illiterate. 44.6% of patients were from urban, 68.5% were housewives and 92.4% were married (Table 1).

Table 1: Frequency of demographic variables among women.

Variables		N	%
Age (in years)	<20	7	7.6
	20-30	18	19.6
	30-40	35	38.0
	40-50	11	12.0
	50-60	12	13.0
	>60	9	9.8
Level of education	Unlettered	17	18.5
	Primary	19	20.7

Continued.

Variables		N	%
	Middle school	19	20.7
	Diploma	17	18.5
	College education	20	21.7
Residence place	City	41	44.6
	Village	51	55.4
Job	Employee	19	20.7
	Freelance	10	10.9
	Housewife	63	68.5
Marital status	Married	85	92.4
	Single	7	7.6

Table 2: Frequency of each of the clinical variables in the studied women.

Clinical variables		N	%
Type of surgery	Delivery C/S	79	85.9
	Laparatomy	8	8.7
	Cystectomy or aforectomy	5	5.4
Previous surgical history	Yes	17	18.5
	No	75	81.5
Malignancy	Endometrium	3	3.3
	Cervix	2	2.2
	Ovary	3	3.3
	No	84	91.3
	Total	92	100.0
Alcohol consumption	Yes	1	1.1
	No	91	98.9
Smoking	Yes	8	8.7
	No	84	91.3
Underlying disease	Diabetes	21	22.8
	Hypertension	12	13.0
	Heart failure	7	7.6
	Kidney failure	10	10.9
	Liver disease	4	4.3
	Immunodeficiency	4	4.3
	COPD	6	6.5
	Without Diseases	28	30.4

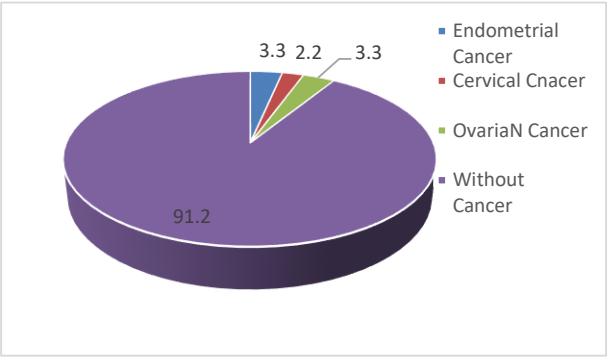

Figure 1: Malignancy in patients participating in the study.

Of all women, 85.9% had a cesarean section, 8.7% a laparotomy and 4.5% a cystectomy or aforectomy. 22.8% of women had diabetes, 13% hypertension and 10.9% kidney failure. Of the total number of women, 1.1% of the participants consumed alcohol and 8.7% smoked. 18.5% of patients had no previous history of surgery other than cesarean section and 81.5% no history of surgery (Table 2). Of all patients, 3.3% had endometrial cancer (Figure 1).

DISCUSSION

SSI is one of the most important nosocomial infections. In the present study, the prevalence of SSI was 0.55%, which was in the defined range of SSI prevalence between 0.1% and 50.4%. Infection at the site of surgery was generally reported to be about 1 to 5 percent (average 3.7 percent). Therefore, the prevalence in our study was lower than the average of previous studies which one of the reasons can be that in our study, cases that were

readmitted to the same hospital due to a site infection were considered as data it can also be concluded from this that the treatment of SSI was more outpatient and did not lead to hospitalization and or patients did not go to the same center after a SSI and chose other treatment centers to continue their treatment. However, in specific populations such as patients with cancer or other risk factors, this rate was much higher. In a prospective study, the results showed that the frequency of SSI in patients was 2.2%.[10] In a study in Tabriz 79 (25.1%) participants had SSI whose its risk factors included gestational age, number of previous pregnancies and cesarean sections, rupture of the bladder, emergency cesarean section, gestational diabetes and BMI.[11] The reason for the difference can be that patients with postoperative infections who were in good general condition were mostly managed on an outpatient basis or other patients were referred to other medical centers however, in the present study, only cases admitted to Alavi hospital were investigated.

Underlying factors such as underlying diseases and cancer have been studied in similar studies to increase the risk of postoperative infection. In the present study, 8.7% of patients reported malignancy, 69.6% reported underlying disease, 1.1% occasional alcohol consumption and 8.7% regular smoking however, the high prevalence of cancer among these patients may be due to surgery to treat gynecological cancers among these women. From this perspective, the results of the present study were in line with various studies in this field including the study of Arabshahi et al that the prevalence of SSI was 8.4% which was similar to SSI estimation at world. Also, the prevalence of smoking in infected people was 19.8%.[12] There was no doubt that smoking and alcohol were an important and proven risk factor for SSI, however due to the fact that the number of female patients who smoked and drank in our study was relatively small, so at present in the studied city and hospital there was not much concern about the effect of smoking and alcohol on infection at the operation site. However, awareness of the side effects of smoking and alcohol should continue in the community and wound care in patients who smoked and alcohol should be done more seriously and preventive measures should be considered in terms of full observance of sterile conditions during surgery. In our study, similar to previous studies, people with low socioeconomic status were more likely to develop infection at work which one of the reasons can be the effect of attitude in wound care and dressing and the implementation of medication instructions and cooperation in the treatment process. They may also be prone to postoperative infections due to nutritional issues and poor hygiene.

Limitations

The cases registered as SSI included all people who had to returned to Alavi hospital after the onset of the complication. A number of patients may have referred to other medical centers after the operation site infection or have been treated on an outpatient basis, which may indicate that the reported statistics on the prevalence of SSI were lower than the actual rate. Due to some cultural and social constraints, a number of patients may conceal alcohol and smoking, which can affect the reported outcome. Also, due to the fact that the study was retrospective and the patients files had already been completed, there was a possibility of errors in the registration of patients' files and information and obtaining a history and registration of comorbidities.

CONCLUSION

Due to the high rate of comorbidities and the presence of predisposing factors in patients with SSI, control of these factors can play an important role in preventing infection. It is suggested that patients admitted to private wards be examined in similar studies for a more complete review. The effect of different types of antibiotics in response to treatment and prevention of SSI and length of hospital stay and reduction of complications of SSI should be studied. Common microorganisms should be identified and reported in SSI. Complications of SSI, including the need for frequent hospitalizations, increased length of hospital stay, incidence of mortality, increased economic costs and psychological complications should be discussed in future.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Lachiewicz MP, Moulton LJ, Jaiyeoba O. Pelvic surgical site infections in gynecologic surgery. Infect Dis Obstet Gynecol. 2015;2015.
2. Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG. CDC definitions of nosocomial surgical site infections, 1992: a modification of CDC definitions of surgical wound infections. Infect Control Hosp Epidemiol. 1992;13(10):606-8.
3. James RC, MacLeod CJ. Induction of staphylococcal infections in mice with small inocula introduced on sutures. Br J Exp Pathol. 1961;42(3):266.
4. Lake AG, McPencow AM, Dick-Biascoechea MA, Martin DK, Erekson EA. Surgical site infection after hysterectomy. Am J Obstet Gynecol. 2013;209(5):490-1.
5. Spelman DW, Russo P, Harrington G, Davis BB, Rabinov M, Smith JA, et al. Risk factors for surgical wound infection and bacteraemia following coronary artery bypass surgery. Aust N Z J Surg. 2000;70(1):47-51.
6. Karim H, Chafik K, Karim K, Moez H, Makki AM, Adnen H, et al. Risk factors for surgical wound infection in digestive surgery. Retrospective study

of 3,000 surgical wounds. Tunis Med. 2000;78(11):634-40.
7. Baño JR, Herreros JMC, Maqueda IM, Saei EI. Treatment of methicillin-resistant Staphylococcus aureus in Latin America. Braz J Infect Dis. 2010;14(2).
8. Anielski R, Barczyński M. Postoperative wound infections. III. Patient related risk factors. Przegl Lek. 1998;55(11):565-71.
9. Vamvakas EC, Carven JH. Transfusion of white-cell containing allogeneic blood components and postoperative wound infection: effect of confounding factors. Transfus Med. 1998;8(1):29-36.
10. Mueller NT, Whyatt R, Hoepner L, Oberfield S, Dominguez-Bello MG, Widen EM, et al. Prenatal exposure to antibiotics, cesarean section and risk of childhood obesity. Int J Obes (Lond). 2015;39(4):665-70.
11. Dousti S, Haghdoost SM. Rate of post cesarean surgical wound infection and its related factors in women refered to Tabriz hospitals. Iran J Obster Gynecol Infertil. 2020;35(15):60-6.
12. Arabshahi SK, Nasrollah E, Beyhaghi A. A survey on the risk factors of surgical wound infection. Razi J Med Sci. 2005;12(46):313-21.

Cite this article as: Farzipour S, Jalilvand F, Sharghi A, Mostafaei-Aghah E. Evaluation of demographic characteristics and comorbidities in patients with surgical site infection after gynecological surgeries, 2016-2020. Int Surg J 2022;9:951-5.