



ANTIBIOTIC PROPHYLAXIS IN CAESAREAN SECTION AT AL-SHIFA HOSPITAL GAZA STRIP, PALESTINE: A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Today, there is general agreement among the best current guidelines on the use of antibiotics as a prevention method in caesarean section (CS). CS constitutes the most commonly performed obstetric procedure in Gaza hospitals it was shown to reach 23 % in 2018, 23% of all maternal deaths were sepsis-related. Clinical research, which has never been done before in the Gaza Strip, a quality tool Control, is used worldwide to improve healthcare and also to assess the commitment of physicians and other medical staff of the applicable guidelines..

Objective: This study aims to evaluate the overall use of prophylactic antibiotics for Caesarean delivery and assessing clinicians' and other clinical staffs' adherence to the applicable guidelines., to determine the best time to administer prophylactic antibiotics for Caesarean delivery in order to reduce postoperative maternal infectious morbidity in a low resource setting, to determine the best antibiotic to use and to assess the effects of prophylactic antibiotic treatment on infectious complications in women undergoing caesarean delivery in Al -Shifa Hospital, Gaza Strip, Palestine.

Methods: A cross sectional study about assessment of prophylactic antibiotic administration in caesarean section of Al Shifa Hospital was carried in period between 1st of March, 2022 and 20th of April,2022 by using a self-administered questionnaire from previous literature, the analysis included a 92 women underwent CS either elective or non-elective. We used also SPSS (version 17 for Windows) for more statistical analysis. **Results:** Our study included 92 participants who done CS in studied period, about 6.5% of them had postoperative infection. The result shows that there are no statistically significant association between timing of antibiotic administration, type of prophylactic antibiotic used, having a history of Chorioamnionitis or not, DM, HTN or obesity and risk of postoperative infection. There is a significant association between mother's age group and parity and Maternal BMI. There was no statistically significant association between number of previous CS, type of CS, type of anaesthesia given, duration of labour and postoperative infection in mother's age group in years. **Conclusions:** Prophylactic antibiotics should be used for women who will be undergoing c/s to protect them against a surgical site infection. controlling excess weight before pregnancy, as well as blood sugar and blood pressure control during pregnancy are to be considered as to mitigate the risk of SSI post C/S. The study concluded that the administration of antibiotics after C/S was also associated with better SSI prevention, SSI is less likely if time between ROM and C/S is less than twelve hours.

INTRODUCTION

Improving the survival chances of babies and their mothers is still an urgent global challenge. The caesarean section rate is rising continuously, making caesarean section one of the most common surgical procedures.^[1] The World Health Organization (WHO) suggests a caesarean rate from 5% to 15 %.^[2] In the middle east region, there was a great variation in CS rates found across countries with Egypt having the highest CS rate at 26.2% and Mauritania the lowest at 5.3%. Six countries (Egypt, Sudan, Jordan, Lebanon, Bahrain and Qatar) had CS rates exceeding the World Health Organization (WHO) threshold of 15%, with the remaining other countries having CS rates between 5 % and 15 % like United Arab Emirates, West Bank had CS rates between 7 % and 9 %.^[3] Caesarean section(CS)

constitutes the most commonly performed obstetric procedure in Gaza hospitals it was shown to reach 23 % in a study done at six hospitals in Palestine in 2018.^[4] CS could save lives or benefit health when it is highly indicated and timely accessed, yet, it is not without risks, the most significant one is raised maternal mortality. The International Classification of Diseases (ICD-10) defines maternal death as the death of a woman while pregnant or within 42 days of the end of pregnancy.^[5] CS has morbidity 5-10 times higher compared to vaginal birth^[6], maternal death following CS in low- and middle-income countries as here in Gaza are 100 times higher than in high-income countries.^[7,8] From these figures we note the enormous effect of preventing the distressing consequences of CS, which mean by the complications resulting from CS during

surgery and postoperative complications and the increase rates of maternal morbidity.

Sepsis is a leading cause of severe maternal morbidity and maternal death^[9], 23% of all maternal deaths were sepsis-related, maternal sepsis is a severe bacterial infection; group A Streptococcus (GAS) are an important cause of maternal sepsis, sometimes the bacteria are able to evade the body's normal defence mechanisms and cause sepsis it may be localised to the uterus or it can be spread to involve fallopian tubes and ovaries or into the blood stream, GAS spreads more readily when bacteria are able to enter through a break in the skin or damaged tissue, which can occur mainly during the caesarean section itself according to many study it shows that the risk of postpartum infection seems to be nearly five-fold increased after CS compared with vaginal birth.^[10,11,12] Surgical site infection (SSI), it is the second most common nosocomial (hospital-acquired) infections after urinary tract infections^[13] and it is one of the most common complications following caesarean section, and has an incidence of 3%–15%. The Centres for Disease Control and Prevention defines SSI as an infection occurring within 30 days from the operative procedure in the part of the body where the surgery took place.^[14] *Staphylococcus aureus* are the most common cause of wound infections, another organism as Enterobacteriaceae, Escherichia coli and Klebsiella pneumonia¹⁵, moreover direct physical contact is most significant potential bacterial transfer.^[16]

SSI prevention is a multi-faceted approach needs to be careful before, during, and after surgery to reduce exposure and susceptibility to pathogens this will prevent wound access to bacteria, by using aseptic surgical techniques, one of the recommended approach is to use prophylactic antibiotic. The beneficial effect of prophylactic antibiotics in reducing the infectious morbidity from caesarean section is well established.^[17] Determination of the etiologic agent is vital in the final choice of the antibiotics. From these we have to focus on preventing infectious complications following caesarean section by the use prophylactic antibiotics.^[18,19]

Currently here in Gaza there is the Palestinian protocol (Obstetric Guidelines and Labour Ward Protocols) indicates the use of prophylactic antibiotic which should be given for all women undergoing caesarean section, should be administered within 60 min before the start of caesarean section, single dose of a targeted antibiotic, such as 1st generation cephalosporin the first line of the antibiotic of choice unless allergy is present.^[20] This study will illustrate if the Palestinian practice in Al-Shifa adherent to this protocol or not, also it will illustrate the significant of timing in antibiotic prophylaxis administration and whether it contributed to the results of postoperative infection. These some information is imported from the (Mapping and Assessment of Maternal, Neonatal and Young Children Health Care Services in Gaza Strip, State of Palestine). Among the visited NCUs Shifa are one of the most equipped facilities with more than 80% of items available,

Highest number of delivery beds (11) was observed in Al Shifa hospital. The number of births per day is 43 births and number of Caesarean Sections (CS) is 12 per day. The number of delivery room is 3 each one has a 4 bed, Work surface for resuscitation near delivery beds (within 2 meters from delivery beds) is available with only 2 of them, size of population in Catchment area is 645,205. Assessment of the provider/patient ratio showed that number of resident doctors per NCU per bed is 1/14.^[20,21]

METHODS

Study design

A cross sectional study was carried during 2022 among the Palestinian women receiving prophylactic antibiotic in caesarean section in Al Shifa hospital in GAZA the data were collected in the period between 1st of March, 2022 and 20th of April, 2022.

Sample size

Based upon the assumption that women undergoing caesarean section, both emergency and elective, population size 120, 50% ± 5% (45 – 55%) of the target population. Assuming 95% confidence interval (alpha (α) = 0.05), we calculated sample size 92. We increased the number to 5 % to account for the design effect. A structured questionnaire was adopted from the participant based on previous researches and literature review^[4,17], and was modified using the opinion of a focus group of faculty, senior consultants, and medical officers.

Study Setting

The data was collected from obstetric department of Al Shifa hospital _Gaza strip.

Study Participants

A self-administered questionnaires used to collect demographic data on participants; Age group in years, blood group, RH, gestational age, diabetes, HTN, chronic medication, previous operation, hematocrit level, parity, BMI, CS type of incision, anesthesia given and intraoperative complication. Participants in this study included 92 women undergoing CS, both patients who undergoing elective CS and emergent CS. They received prophylactic antibiotic according to their allotment that was either about 1 hour prior to skin incision or at time of skin incision as per the current standard of practice in Al Shifa Hospital.

Inclusion criteria

All women undergoing CS either emergent or non-emergent were included in the study

Exclusion criteria

Patients with data not completely taken and patient withdrawal of consent.

Instruments

The key variables in this study were measured by a self-report questionnaire. The first part of the instrument

included demographic characteristics of age, maternal BMI at delivery, blood group and RH. The rest of questionnaire assessed the variables in the research hypotheses.

Ethical consideration

Ethical approval was obtained from Approval was obtained from the Ethics Committee of Clinical Research in Faculty of Medicine, IUG is taken, and accepted by O.

G. of Human Resources Development, Ministry of Health.

Standard analysis

We have used SPSS version 26 for Windows. Descriptive statistics are expressed as frequencies, percentages and as mean \pm standard deviation (SD). Chi-square (χ^2) test was used to compare between categorical variables and derive p value.

RESULTS

Table 1: Distribution and clinical characteristics of participants. Data shown frequency (n), percentage (%) and Mean \pm SD. Total number of respondents=92.

Variable	Options	Frequency (n)	Percentage (%)	Mean \pm SD
Age group in years	18-25	26	28.3	0.89 \pm 0.671
	26-35	50	54.3	
	>35	16	17.4	
Blood group	A	27	29.3	1.24 \pm 0.918
	B	19	20.7	
	AB	3	3.3	
	O	43	46.7	
RH	Positive	78	84.8	0.85 \pm 0.361
	Negative	14	15.2	
Gestational age	<34	4	4.3	1.75 \pm 0.527
	34-36	15	16.3	
	\geq 37	73	79.3	
Diabetes	No	89	96.7	0.03 \pm 0.179
	Yes	3	3.3	
HTN	No	86	93.5	0.07 \pm 0.248
	Yes	6	6.5	
Chronic medication	No	86	93.5	0.07 \pm 0.248
	Yes	6	6.5	
Previous operation	No	42	45.7	0.54 \pm 0.501
	Yes	50	54.3	
Hemoglobin level	<11	51	55.4	0.45 \pm 0.5
	\geq 11	41	44.6	
Parity	0	19	20.7	0.98 \pm 0.629
	1-4	56	60.9	
	>4	17	18.5	
BMI	<30	52	56.5	0.43 \pm 0.498
	\geq 30	40	43.5	
CS	Elective	32	34.8	0.65 \pm 0.479
	Non-elective	60	65.2	
Type of incision	Midline	0	0	1 \pm 0
	Pfannenstiel	92	100	
Anesthesia given	General	45	48.9	0.51 \pm 0.503
	Spinal	47	51.1	
Intraoperative complication	No	85	92.4	0.08 \pm 0.267
	Yes	7	7.6	
Number of previous CS	0	53	57.6	0.62 \pm 0.796
	1	21	22.8	
	\geq 2	18	19.6	

Table 1: A total of 92 CS surgeries were performed during the studied period, about 50% of participants were in the 26–35-year age group, while 28.3% of them were in 18-25 year age group, and only 17.4 % above 35 years old. The majority of participants had an O blood group (46.7%) and are RH positive (84.8%), and the majority

were in their \geq 37 gestational age of pregnancy (73%) and 20.6% give birth to preterm infants “less than 37 gestational weeks”. Majority of participants had no chronic diseases, only 3.3% were diabetic, 6.5% were hypertensive and a 43.5 % of participants were obese (BMI \geq 30) Most of them take no chronic medication

(93.5%), and most had done previous operations (54.3%), which mostly were previous CS, dilation and curettage (D&C). More than half of participants (55.4%) were anaemic and had a haemoglobin level less than 11 g/dl, and about 18.5% of participants are multipara (parity > 4), and majority (60.9%) had parity range 1-4 and 20.7% were nulliparous. More than half of participants (57.6%) had no previous CS and this time was there first, while a minority (19.6%) had 2 or more previous CS. Most of CS done in this period were non-elective (65.2%) and a 34.8% were elective surgeries. The percentage of types of anaesthesia given was close

to each other, about 51.1% of them had a spinal anaesthesia, while 48.9% had general anaesthesia. All participants had a Pfannenstiel incision (100%) and most of them had no intraoperative complication (92.4%). About 6.5% of participants had postoperative infection, 5.4% of them had wound infection while only 1.1% had endometritis despite aseptic technique, intraoperative skin preparation with iodine 10% which was done for all participants and prophylactic antibiotics (Cefazolin mainly) which was given by intravenous route for all in a dose of 2 g.

Table 2: Multivariate analysis of risk factor for postoperative infection. Data shown frequency (n) and p-value.

Variable	Wound infection	Endometritis	None	P- value
Chorioamnionitis				
No	5	1	83	0.897
Yes	0	0	3	
Antibiotic used				0.990
Cefazolin	5	1	82	
Azithromycin	0	0	1	
Ampicillin	0	0	3	
Gentamicin	0	0	0	
Other	0	0	0	
Timing of antibiotic				0.693
>30-60 minutes pre-incision	1	0	27	
>15-30 minutes pre-incision	4	1	59	
0-15 minutes pre-incision	0	0	0	
Post-cord clamp (following delivery after the umbilical cord is clamped)	0	0	0	
Maternal BMI				0.667
<30	3	1	48	
≥30	2	0	38	
DM				0.897
No	5	1	83	
Yes	0	0	3	
HTN				0.443
No	4	1	81	
Yes	1	0	5	
Number of per vaginal examination				0.531
0	0	0	24	
1-3	4	1	43	
≥4	1	0	19	
Hair removal				0.864
No	1	0	19	
Yes	4	1	67	
Method of hair removal				0.163
Sugar	4	1	38	
A razor blade	0	0	29	
Rupture of membrane				0.535
No rupture of membrane	2	0	51	
<12 hours	2	1	28	
≥12 hours	1	0	7	
Duration of labor				0.543
No labor				
<12 hour	2	0	43	
12-24 hour	2	1	24	
>24 hour	0	0	13	

Most of participants had no Chorioamnionitis (96.7%), and 88 participants out of 92 received an IV prophylactic

Cefazolin with a dose of 2 g, while about 3 participants received IV 2 g Ampicillin, and one participant received

IV Azithromycin with dose of 1 g, and in all cases the prophylactic antibiotics were given within one hour prior to skin incision. The result shows that there is no statistically significant association between timing of antibiotic administration, type of prophylactic antibiotic used or having a history of chorioamnionitis or not at risk of postoperative infection. P-value respectively was 0.693, 0.990 and 0.897, and there is no statistically significant relationship between having HTN, DM or obesity of our participants with risk of postoperative infection. P-value respectively was 0.443, 0.897 and 0.667. About 52.2% of participants had 1-3 times per vaginal examination during pregnancy period, and 21.7% had 4 or more times per vaginal examination, while a 26.1% had no per vaginal examination at all. Most of them had done hair removal prior to surgery (78.3%), which mostly was done by using sugar (59.7%) and less had done it by a blade razor (40.3%). All participants

who had postoperative infection had done hair removal mostly by sugar, and they mostly had 1-3 per vaginal examination. But there is no statistically significant relationship between number of vaginal examination, hair removal and method of hair removal with risk of postoperative infection. P-value was respectively 0.531, 0.864, and 0.163. Half of the participants had no labour prior to CS (50%) and the majority (57.6%) had no rupture of membrane also and the result shows than there is no statistically significant association between labour and rupture of membrane prior to labour and risk of postoperative infection. P-value respectively 0.543 and 0.535.

Table 3: Multivariate analysis of mother's age group in years. Data shown frequency (n) and p value.

Variable	18-25	26-35	≥36	P-value
Parity				
0	8	9	2	0.028
1-4	18	30	8	
>4	0	11	6	
Maternal BMI				
< 30	20	26	6	0.028
≥30	6	24	10	
Previous CS				
0	20	26	7	0.102
1	5	11	5	
≥2	1	13	4	
C.S				
Elective	5	21	6	0.137
Non-elective	21	29	10	
Anesthesia				
General	11	27	7	0.565
Spinal	15	23	9	
Duration of labor (hours)				
No labor	9	29	8	0.190
< 12	10	15	2	
12-24	5	4	4	
>24	2	2	2	
Postoperative complications				
Wound infection	0	4	1	0.330
Endometritis	1	0	0	
None	25	46	16	

There is a significant association between age group of mother and parity (p-value =0.028), about 41 participants out of the 73 who had previous parity “ one or more” were in the 26-35 years age group. There is a significant association between age of mother and BMI (p-value = 0.028), about 24 of Obese participants were in the 26-35-year age group. And there was no statistically significant association between number of previous CS,

type of CS, type of anaesthesia given, duration of labour and postoperative infection with mother's age group in years. P-value respectively was 0.102, 0.137, 0.565, 0.190, and 0.330.

Table 4: Multivariate analysis of prophylactic antibiotic postoperatively.

Variable	No	Yes	P- value
Age group in years			
18-25	8	18	0.248
26-35	25	25	
≥ 36	8	8	
Number of previous CS			
0	24	29	0.375
1	7	14	
≥2	10	8	
Number of per vaginal examination			
0	11	13	0.811
1-3	20	28	
≥4	10	10	
Rupture of membrane			
No rupture of membrane	29	24	0.037
< 12 hours	11	20	
≥ 12 hours	1	7	
Postoperative infection			
Wound infection	1	4	0.340
Endometritis	0	1	
None	40	46	

Table 4: About 55.4 of participants received a prophylactic antibiotic postoperatively, like ceftriaxone 1g, metronidazole 500 mg, cefuroxime 250 mg and ciprofloxacin. There is a statistically significant association between administration of prophylactic antibiotic postoperatively and rupture of membrane (p-value = 0.037), about 24 participants out of 51 who received postoperative prophylactic antibiotic had no rupture of membrane and 20 participants had a rupture of membrane lasting less than 12 hours. There is no statistically significant association between mothers age group in years, number of previous CS, number of per vaginal examination with administration of postoperative prophylactic antibiotic p-value respectively is 0.248, 0.375, and 0.811. and there is no statistically significant relationship between postoperative infection and administration of prophylactic antibiotic postoperatively (p-value = 0.340) as most of participants who had received antibiotic postoperatively had suffered from wound infection and endometritis.

DISCUSSION

Surgical site infections (SSIs) can be found in 5% of patients following surgery, causing significant morbidity and, in severe cases, death. Treating post infections place a significant demand on the health-care system's financial resources.^[22]

Although crucial, antibiotic prophylaxis alone does not remove the risk of developing post Cs infection. Antisepsis, optimization of maternal comorbidities, and evidence-based surgical procedures are some of the approaches that have been demonstrated to be beneficial in lowering the incidence of SSI.^[23]

In our study, 88 out of 92 participants received an IV prophylactic Cefazolin dose of 2 g, while approximately

3 participants received IV 2 g Ampicillin, and all prophylactic antibiotics were administered within one hour prior to skin incision. The use of azithromycin for unscheduled caesarean delivery was observed in one case with no infection or endometritis, which contradicts a previous study, that recommends reducing morbidity by adding azithromycin for unscheduled caesarean section.^[24]

When considering antibiotic prophylaxis for specific indications, we should consider the benefits to maternal and infant health, safety concerns, and the public health need to limit antibiotic resistance. Prophylactic antibiotics are clearly beneficial for women undergoing elective or non-elective caesarean birth, but the consequences for the infant are unknown. Little information was provided about potential adverse effects, such as the effect of antibiotics on new-borns, limiting the assessment of total benefits and harm.^[25]

In our study, postoperative infection affected approximately 6.5 % of patients, wound infection affected 5.4 %, and endometritis affected 1.1 %, despite the use of aseptic technique and a prophylactic antibiotic (Cefazolin) given to all in a dose of 2g, according to a study, which recommended high doses of cefazolin for morbidly obese women.^[24]

This could be due to pre-existing infections, prolonged rupture of membrane, a source of immune deficiency, or it might be due to antibiotic resistance. To exclude antibiotics resistance, antibiotic culture testing is indicated before modifying the antimicrobial treatment plan in patients who arrive with a hospital-acquired infection.^[26]

The majority of patients in our study ranged from the

ages of 26 and 35. Since most women prefer to complete their families around this time. This can also explain our findings, which showed a positive relationship between mother's age group and parity (p-value =0.028), with approximately 41 of the 73 people who had previous parity being between the ages of 26 and 35.

Elective surgeries are preferred whenever possible because they provide a sterile operating field. However, the majority of CS performed during our study period (65.2%) were non-elective, with 34.8 percent being elective.

To prevent post-operative morbidity, all individuals had Pfannenstiel incisions, as well as intraoperative skin preparation with 10% iodine. Iodophor-containing products exhibit broad-spectrum antibacterial characteristics, effectiveness, and safety of practically all skin surfaces, regardless of patient age.^[27]

Hair removal by shaving versus clipping revealed that shaving was associated with a higher risk of wound infection. Many hospitals have switched from razors to clippers for preoperative hair removal.^[28] The majority of our participants (78.3 %) had done hair removal prior to surgery, which was mostly done with sugar (59.7 %) and less with a blade razor (40.3 %). All of the patients who had experienced a postoperative infection had undergone hair removal, primarily with sugar, and had 1-3 vaginal examinations per day. But even so, there is no statistically significant link between the frequency of vaginal examinations, hair removal, or hair removal procedure; this finding appears to contradict a previous one, which stated that even preoperative prophylaxis will not prevent post CS infection if the risk of infection is very high, as in the case of repeated vaginal examinations for more than six times prior to CS.^[29]

Postoperative antibiotics such as ceftriaxone 1g, metronidazole 500 mg, cefuroxime 250 mg, and ciprofloxacin were given to about 55.4 of the participants. There was a statistically significant relationship between postoperative prophylactic antibiotic administration and membrane rupture.

Prior to CS, half of the participants had no labour, and the majority had no membrane rupture. Our findings have no statistically significant relationship between labour and membrane rupture prior to labour and the risk of postoperative infection. This contradicts a study that found a significant link between labour, membrane rupture, and the risk of infection. Which implied that, if labour began or membranes ruptured, the risk of infection was nearly constant for the first 16 hours, and the infection rate increased significantly between 16 and 20 hours, but there was no further increase after that.^[30]

According to, B. Giuliani, 1999 study, Even preoperative prophylaxis does not preclude postoperative infectious complications when infection has been present for 24

hours due to premature membrane rupture.^[29]

There is no link between post-operative infection and post-operative prophylactic antibiotic (p-value = 0.340), as the majority of people who received antibiotic after surgery had wound infection and endometritis. These findings are consistent with the findings of a previous study, which concluded that administering antibiotics prior to incision are preferable to post cord clamping administration. Preoperative administration in women undergoing CS reduces the rate of postoperative maternal infectious morbidity significantly.^[31]

The findings of our study show that there is no statistically significant relationship between the timing of antibiotic administration, the type of prophylactic antibiotic used, or having a history of Chorioamnionitis with postoperative infection. This contradicts the findings of Salkind, who found that antibiotics should be administered within 30 minutes of skin incision for maximum benefit;^[32] and the findings of a research, which showed that chorioamnionitis was an independent risk factor for post-caesarean SSI.^[33]

A significant connection between maternal age and BMI was discovered in this study (P=0.028). Twenty-four of the obese persons ranged in age from 26 to 35. This is consistent with a prior study findings showing there is a substantial positive correlation between rising maternal age and increased BMI.^[34]

More than half of the participants (57.6%) had no prior CS, while a minority (19.6%) had two or more prior CS. The percentages of different types of anaesthetic provided were closed to one another. 51.1 % were given spinal anaesthesia, while 48.9 % were given general anaesthesia. There is no statistically significant relationship between the age of mother, the presence of HTN or diabetes, the number of prior CS, the type of CS, the type of anaesthesia used, or the length of labour and the risk of postoperative infection. This is incompatible with a research that showed obesity, hypertension, diabetes, emergency caesarean delivery, and young age females as independent risk factors for post-caesarean SSI.^[33Error! Bookmark not defined.] But nonetheless, our results could be attributed to the dedication we witnessed in following medical protocol when administering prophylactic antibiotics.

Obesity has no correlation with the risk of postoperative infection in our study participants. This appears to contradict previous findings of a study, which found that pre-pregnancy weight gain, pre-existing mental symptoms, and blood transfusions before or after birth was all independent risk factors for operation site infection.^[35] Survival rates among overweight women undergoing caesarean delivery who received standard preoperative antibiotic prophylaxis have increased significantly.^[36]

In our study, about 3.3 % of the participants are diabetic, and approximately 6.5 percent are hypertensive. Because DM, HTM and obesity are considered independent risk factors for post-caesarean CS^[34], our study should have focused more on the effects of antibiotics on such variables. It is critical to encourage pregnant women in the antenatal period to avoid independent risk factors such as controlling diabetes, hypertension, and losing weight as a plan prior to conception to reduce the risk of surgical site wound infection whereas Caesarean section can be decided urgently or electively.

CONCLUSION

Bacterial infections during childbirth are responsible for almost one-tenth of maternal mortality and contribute to serious morbidity and disability for many women. Prophylactic antibiotics are to be used for women who will be undergoing caesarean section to protect against surgical site infection, chorioamnionitis and endometritis regardless of the timing as far as it is administered within one hour prior to surgery. Antibiotics as cefazolin, ampicillin, azithromycin and gentamycin can be used effectively as prophylactic antimicrobials. Control of diabetes is mandatory to reduce the risk of wound infection post C/S. Overweight is to be controlled prior to conception while planning for pregnancy as it's considered as a factor associated with SSI. When timing of rupture of amniotic membranes (ROM) was prolonged to be more than twelve hours prior to the C/S surgical site infection was more likely to occur despite using prophylactic antibiotic that is why the shorter the waiting time between ROM and the C/S the better wound healing with less SSI rate. Nevertheless, administration of antibiotic post C/S was associated with better results in preventing SSI when compared with cases that have had more than twelve hours of waiting between ROM and the C/S Chorioamnionitis was not associated with it.

Study limitation

Study timing was most stressful during the target school year to protect against response rate reduction.

Future studies

Similar studies to be conducted with a larger study population with setting covers more than one maternity hospital distributed geographically to represent the cases from the entire Gaza Strip.

Recommendation

1. Using antibiotics is to be mandatory in all cases who will be operated up on in C/S as this is consistent with the vast majority of the studies in the literature review
2. Drug sensitivity test is to be applied whenever applicable and included in future studies as it was not covered in this study.
3. Health promotion is so important to urge the pregnant women in the antenatal prior to avoid independent risk factors as controlling diabetes, hypertension, reducing weight as a plan prior to

conception to mitigate the risk of surgical site wound infection should C/S is decided wither urgently or elective.

4. Medical students may launch similar researches during the internship period so they will concentrate more and have more time in comparison with the time preceding the final exams
5. Women who may have ROM and indicated for C/S are better to be operated within shorter time of less than 12 hours to minimize the risk of SSI considering that post-surgical antibiotics administration after surgery to cases that were postponed for more than twelve hours will not help in minimizing the risk of SSI.

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