
WOUND INFECTION FOLLOWING CESAREAN SECTION

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Summary

A Retrospective case-control study conducted in Basrah maternity and child hospital during the period from December 2001 till September 2002. It aims at evaluating cases of wound infection in Basrah Maternity and Children hospital and comparing them to different variables, like, age, parity, medical illnesses, previous obstetric history and educational status. It included 139 patients (case and control), with an age range of 18-43 year and a parity range of 1-8. Out of 1670 parturient patients whose deliveries ended with cesarean section (elective and emergency) during the period of our study, 139 patients were included in our study. There were 49 cases of wound infection and 90 cases who were taken as control. Different variables were also studied as obesity, diabetes, anemia and social class.

Introduction

Wound infection: is defined as the presence of induration, serosanguineous discharge, or dehiscence with purulent discharge with or without a positive microbiological culture¹.

Wound infections are a common surgical complication often requiring a prolonged hospital stay and leading to increase costs². Wound infection is a possible complication whenever an incision is made³. Incidence of wound infection after cesarean section has been quoted from (1-9%)⁴. The clinical manifestations of wound infection

occasionally may not appear until weeks later. The patient may demonstrate tachycardia, intermittent low-grade fever and greater than expected incisional pain⁵.

Contamination of the wound can occur from extraneous sources (exogenous) or from the patient's own bacteria (endogenous)

1- exogenous organisms: contamination from the hands of the surgeon, patient's skin, theatre anesthetists and air handling⁶. Causative microorganisms are staphylococcus aureus and hemolytic streptococcus group (A)⁷.

2- Endogenous organism: the most frequent source of bacteria that cause postoperative pelvic infection among women is the vagina. They are mainly

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lactobacilli SP, Gardnerella vaginalis, Staphylococcus epidermidis, Corynebacterium SP, Enterococcus faecalis species of streptococcus, and Enterobacteriaceae. Anaerobes include peptostreptococcus SP, Peptococcus SP, Provaotella bivia and members of the bacteroides fragilis group⁸.

Vaginal examinations and invasive monitoring apparatus probably facilitate the introduction of vaginal bacteria into uterine cavity⁹.

Different factors play a role in wound infection as size of bacterial inoculation, the presence of foreign material, bacterial virulence and host defense, even small inoculate of relatively non virulent bacteria may cause clinical infection in patients whose defense mechanisms (humoral) and / or cellular) are deficient⁹.

Underlying conditions such as diabetes, mal-nutrition, malignant disease, chronic alcoholism or decreased tissue perfusion¹¹ may cause such deficiencies. Other general systemic factors play an important role in production of infection as anemia and obesity¹².

Local risk factors are linked to the duration of labor, length of time of ruptured membranes, number of vaginal examination, urgency of the situation and type of incision¹².

Patient and methods

A prospective case-control study conducted in Basrah maternity and child hospital from 1st, Dec., 2001 till 1st, of Sept., 2002 which included (139) patients (case and control), with an age range of (18-43) year and a parity range of (1-8).

One thousand six hundred and seventy parturient patients, their deliveries ended with cesarean section (elective and emergency) during the period of our study. Out of them (139) patients they were included in our study.

All those patients they were subjected to our questionnaire and examination list which includes the following: age, parity, type of surgery (elective, emergency), history of medical disease (DM, obesity), history of labor pain and watery vaginal discharge, history of previous operation, types of incision (vertical, transverse) and educational status. The above study includes two groups of patients:

1-patients group: this includes (49) patients with H/O wound infection. This group was also subdivided into two subgroups:

A-Simple wound infection: which includes (27) patients, were presented with induration, redness, serous discharge from the wound or simple stitch abscess. Those patients treated as an out patient with broad-spectrum antibiotics and frequent wound cleansing (they were diagnosed on clinical aspect, culture and sensitivity done on all case group but the results show always contamination that is why was not studied separately.

B- complex wound infection: this subgroup include (22) patients, presents with wound disruption and they were in need of wound excision and secondary suturing.

2-Control group: includes 90 patients, who undergo cesarean section, they have approximately the same age, parity and wt. And were taken randomly.

*Different variables were also studied which include age, parity, presence of anemia which is defined as hemoglobin concentration below 10 gm/dl.

*Diabetes also taken in consideration as possible cause where (105) mg/dl consider as maximum accepted fasting blood sugar.

*Obesity: - those weights were 20% more than the ideal⁽¹³⁾.

Chi-Square test was used for statistical analysis were P value of >0.05 considered significant.

Results

A total of (1670) parturient patients their deliveries ended with cesarean section (elective and emergency) during the period of our study. Forty-nine Patients of them show evidence of wound infection, simple and complex (27, 22) respectively this gives an incidence rate of about (2.9%).

They were matched with (90) cases of (C.S) without evidence of wound infection, were taken as control group.

Table no. (1) showed that (63.3%) of the case group were above the age of 35 years while (36.8%) below this age versus (64.4%), (35.5%) of control group respectively. No statistical significant differences were recorded in comparison of both groups.

- (18.3%) of infected group were primigravidas versus (22.2%) in control group.
- (63.3%) of infected group had parity range of (2-5) versus (62.2%) in control group. And (18.3%) with parity more than five in the infected group versus (14.4%) in control group. No statistical significant differences were recorded in comparison of both groups in regard to this parameter. (57%) of infected group with low level of education versus (46.6%) in control group. (32.6%) with medium level of education and (10.2%) with higher level of education versus (40%), (13.3%) in control group respectively. (34.6%) of infected group had hospital stay more than 3 days,

while (46.6%) in control group do so.

- (65.3 %) of infected group had hospital stay less than 3 days versus 53.3% in control.

All the above variables show no statistical significant differences. (65.3%) of infected group were obese, (6%) had DM and (34.6%) had anemia. While (31.1%, 31.1 and 37.7% had negative H/O medical illness) in control group respectively. These three variables were highly significant.

- (77.5%) of infected group following emergency (C.S) while (22.45) following elective (C.S) as was shown in table no. (2).
- (26.6%) of control group following emergency (C.S) while (73.3%) following elective (C.S). This variable shows high statistical significant difference with a P value of <0.05 .
- (28.5%) of infected group had lower midline incision while (71.4%) had transverse incision, compared with (64.4%), (35.5%) respectively which is statistically highly significant. (67.3%) of infected group had history of interference (Rupture membrane, frequent vaginal examination, meconium stained liquor) while (32.6%) were not. Versus (25.5%), (74.4) respectively among control group.

These results had significant statistical differences.

Table (3) shows those women with positive history of diabetes, anemia and/or obesity were more liable for wound infections than others with high significance. Other variables show no significant differences.

Table (1) shows pre-operative variables matched for both groups.

Parameters	Infected Group	Non Infected Group	P. value
Age			
≥ 35	31 (63.2%)	58 (64.4%)	0.962
< 35	18 (36.8%)	32 (35.5%)	(N.S)
Parity			
0-1	9 (18.3%)	20(22.2%)	0.678
2-5	31 (63.3%)	57 (62.2%)	(N.S)
>5	9 (18.3%)	13 (14.4%)	
Level of Education			
Illiterate	28 (57.1%)	42 (46.7%)	0.495
Medium	16 (32.7%)	36 (40%)	(N.S)
Higher education	5 (10.2%)	12 (13.3%)	
Hospital Stay			
≥3 days	17 (34.7%)	42 (46.6%)	0.236
<3days	32 (65.3%)	48 (53.3%)	(N.S)
Medical History (-ve)	(0)	34 (37.8)	
Obesity	32 (65.3%)	28 (31.1%)	0.0001
D.M	3 (6.1%)	nil	(H.S)
Anemia	17 (34.6%)	28 (31.1%)	
History of Interference			
Yes	33 (67.3%)	23 (25.6%)	<0.0001
No	16 (32.7%)	67 (74.4%)	(H.S)

* N.S means no significance.

* H.S means highly significant.

Table (2) shows intra-operative variables matched for both groups.

Parameters	Infected Group	Non Infected Group	P. value
Emergency	38 (77.6%)	24 (26.7%)	<0.0001
Elective	11 (22.4%)	66 (73.3%)	(H.S)
Type of incision			
Lower midline	14 (28.6%)	58 (64.4%)	=0.0001
Transverse	35 (71.4%)	32 (35.6%)	(H.S)

*H.S means highly significant

Table (3) shows types of wound infection in comparison with different variables.

Parameters	Simple	Complex	P. value
Emergency	15 (55.6%)	17 (77.3%)	0.198
Elective	12 (44.4%)	5 (25.7%)	(N.S)
Type of incision			
Lower midline	20(74%)	15 (68.2%)	0.891
Transverse	7 (26%)	7 (31.8%)	(N.S)
History of Interference			
Yes	18 (36.7%)	15 (16.6%)	0.846
No	9 (18.3%)	7 (7.7%)	(N.S)
Medical history			
Obesity	12 (24.4%)	20 (22.2%)	
D.M	0	3 (3.3%)	
Anemia	5(10.2%)	12(13.3%)	

Discussion

While wound infection represent a much smaller proportion of post-cesarean infection morbidity than endometritis, it does however, represent a much greater percentage of morbidity related costs due to the longer hospital stay required for treatment¹.

Early recognition of a wound infection or conditions leading to wound infections may help in decreasing hospital costs and length of patient stay in the hospital². Infected wound following (C.S) appear to have several causes³.

In our study the higher percentage of wound infection among those patients whose undergo emergency (C.S) and those within history of prolong rupture of membranes, multiple vaginal examination, meconium stained liquor and prolonged labor.

These resulted from greater inoculations of amniotic fluid by bacteria, difficulty in surgical technique, prolonged surgical time and improper preparation of patients. These factors contribute to increased incidence of wound infection in this group of patients.

These results were reported by other studies^{2, 14, 15}.

Obesity was found to represent a significant risk factor for wound infection.

The risk could be due to the relative a vascularity of adipose tissue or technical difficulties of handling adipose tissue that can result in more traumas to the abdominal wall or difficulties in obliterate dead space in the fatty abdominal wall.

This result was supported by other studies¹⁶⁻¹⁹.

Anemia, diabetes had statistical significant association with wound infection in our study and this supported by other studies^{2, 14}.

The incidence of wound infection was higher in transverse incision than lower vertical incision.

This could be a result of higher number of (C.S) with transverse incision rather than lower midline & there is increase chance of hematoma formation after this type of wound due to increase vascularity³.

Other study found no significant differences between the type incision.

There were no differences in the incidence of wound infection regarding age, parity, hospital stay and level of education.

Wound infection still constitutes a major problem in the developing countries. This can be explained for many reasons as many untrained staff, use of non disposable gown and finally the effect of economic sanction on our country probably play certain role in increasing the incidence of wound infection in our hospitals.

Conclusion

Wound infection following (C.S) have multiple etiologies, it is mainly associated with factors that cause an increase in media necessary for bacterial growth such as blood and serous fluid. An increase in the percentage of the wound infection among obese, anemic diabetic patient and in those who undergo an emergency cesarean section was noticed in our study.

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