Hospital morbidity due to post-operative infections in obstetrics & gynecology

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ABSTRACT

Objective: To study the incidence and risk factors for postoperative infection following cesarean sections and major gynecological surgery.

Methods: Postoperative infection was documented in the specified registers in all patients following cesarean sections and major gynecological surgery from January 1997 to December 1998. This study was a part of the prospective analysis of hospital-based morbidity and mortality in the Department of Obstetrics and Gynecology.

Results: There were a total of 89 cases of postoperative infections amongst 4,032 patients undergoing major operations giving an overall infection rate of 2.2%. The morbidity due to infections was 3.3% in cesarean sections and 0.9% in major gynecological surgery. Abdominal hysterectomies had a higher infection rate than vaginal surgery. The most common causative organisms isolated were Enterococcus, Staphylococcus and Klebsiella species.

Conclusion: It was found that vaginal flora was a significant source of contamination during surgery, which could be minimised by local sterilisation methods. The high infective morbidity in abdominal hysterectomies needs further analysis of the risk factors. Infection surveillance with a regular review of antibiotic protocols is recommended.

Keywords: Post operative infections, morbidity, wound infection, risk factors, cesarean section, hysterectomy.

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Post-operative infection in the hospital signifies morbidity, patient anxiety, longer hospitalization and great concern to the surgeon. Post-operative infection however, does occur from time to time inspite of significant advances in aseptic surgical techniques. Morbidity due to post-operative infections can be avoided in many cases by constant vigilance by the members of the surgical team. Economics of unnecessary hospitalization and antibiotic therapy in these patients is relevant in terms of best utilization of limited health resources. This study was conducted to identify the risk factors for post-operative infection and to highlight the areas where improvements could be made. So far, no such study has been conducted in the Department of Obstetrics & Gynecology in this hospital.

Methods. All patients who had cesarean sections and major gynecological operations from January 97 to December 98 in the Ministry of Health hospitals, were included in this prospective study. Obstetrics for the high risk patients and Gynecology is located in the Salmaniya Medical Complex which is a tertiary care hospital with various subspecialties. The low risk cases are admitted to the two peripheral maternity hospitals with facilities for performing all obstetric procedures with adequate neonatology cover.

Post-operative infection included all cases of post-operative pyrexia and wound infection. Post-operative pyrexia was defined as a rise of temperature of at least 38 degrees Celsius on two

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Table 1 - Postoperative infection rate in different types of opeations.

Type of operation	No. of operations	No. of infections	Infection rate in percentage
Cesarean section	2193	72	3
Emergency	1642	53	3
Elective	551	19	3.5
Gynecological ops	1839	17	0.9
Abd. hysterectomy	186	10	5
Vaginal hysterectomy	149	5	3
Laparotomy	254	2	0.8
Laparoscopic ops	144	-	-
Diag. laparoscopy	423	-	-
Sterilizations	683	-	-
Total operations	**4032**	**89**	**2**

separate occasions after the first postoperative day. Post-operative wound infection was defined as the presence of purulent discharge from the wound with or without a positive bacteriological culture. Cases of wound infection that presented for re-admission at the outpatient clinics after discharge from the hospital were not included in this study. The necessary samples from all the patients included in the study were sent for culture and sensitivity.

All cases of post-operative infection were picked up by the nurse in charge of the ward and entered in a morbidity register available in each ward. A member of the morbidity team then reviewed the patient's case notes, entered all the necessary data in a special form and updated this information after the laboratory details were available. The details of all the antibiotics prescribed were also recorded. A monthly analysis of this data was discussed in the department and then presented to the central hospital morbidity committee.

Results. There were 4032 major operations during the 24 months study period of which 2193 were cesarean sections and 1839 were major gynecological operations. There were a total of 89 cases of post-operative infections giving an overall infection rate of 2%. There were 72 infections after cesarean section (3%) and 17 cases after major gynecological surgery (0.9%) as shown in Table 1. There were 1642 emergency cesareans with 53 infections (3%) and 551 elective cesareans with 19 infections (3.5%). There were no cases of postoperative infection in patients undergoing laparoscopic surgery, diagnostic laparoscopies and sterilizations. Abdominal hysterectomy had a higher infection rate of 5% as compared to vaginal surgery where the rate was 3%.

Wound infection alone occurred in 43 cases (1%), pyrexia alone in 35 cases (0.9%) and both wound infection and pyrexia in 11 cases (0.3%) as shown in Table 2. Furthermore, it can be seen that the infection rate in each category was higher amongst cesarean sections as compared to major gynecological operations. Overall, post-operative wound infections occurred in 54 cases giving a wound infection rate of 1%.

All the 89 infections were diagnosed between the first and twelfth post-operative days and 71 (80%) of the cases were detected by the sixth day. In 68 patients (76%) the diagnosis was made between the second and sixth post-operative day with the peaks on the second and the fourth days. (Table 3).

Bacteriology. A total of 152 specimens were sent for culture and sensitivity from 84 of the 89 patients. Sixty eight specimens were reported as sterile and 84 had positive cultures out of which 10 showed growth of two organisms thus giving a total of 94 isolates. It can be seen from Table 4 that the most common causative organism isolated was Enterococcus 19 (20%) followed by Staphylococcus species 16 (17%) and Klebsiella species 14 (15%)

Antibiotics used. Table 5 shows the range of antibiotics used to treat the post-operative infections. Cefuroxime alone and in combination with other antibiotics was the most commonly prescribed drug (57 cases) followed by Cephalexin alone and in combination. (30 cases). However, Metronidazole, another very frequently used antibiotic was never

Table 2 -Type of morbidity.

Type of operation	No. of operations	Wound infection alone (%)	Fever alone (%)	Both wound infection and fever (%)
Cesarean section	2193	35 (2)	30 (1)	7 (0.3)
Major gynecological surgery	1839	8 (0.4)	5 (0.3)	4 (0.2)
Total	**4032**	**35 (0.9)**	**35 (0.9)**	11 (0.3)

Table 3 - Day of diagnosis of infections.

Day of diagnosis	Number of patients (%)
1	3 (3)
2	20 (22.5)
3	11 (12)
4	18 (20)
5	11 (12.5)
6	8 (9)
7	5 (6)
8	6 (7)
9	0 (0)
10	3 (3)
11	3 (3)
12	1 (1)

Table 4 - Bacterial isolates from specimens.

Organism	Number of isolates (%)
Gram Positive	
Staphylococcus aureus	3 (3)
Staphylococcus epidermidis	13 (14)
Streptococci	6 (6)
Enterococci	19 (20)
Gram Negative	
Enterobacter species	4 (4)
Kliebsiella species	14 (15)
Escherechia coli	11 (12)
Proteus species	9 (10)
Pseudomonas aeruginosa	8 (8.5)
Acinobacter	1 (1)
Gram negative bacilli	1 (1)
Others	
Candida	5 (5)
Total	**94**

Table 5 - Profile of antibiotics prescribed.

Antibiotic	No. pescribed (%)
Cefuroxime	34 (25)
Cefuroxime & Metronidazole	18 (13)
Cefuroxime & Cephalexin	3 (2)
Cefuroxime & Amoxycillin	1 (0.8)
Cefuroxime & Ceftriaxone	1 (0.8)
Cephalexin	20 (14.9)
Cephalexin & Metronidazole	6 (4.5)
Cephalexin & Amoxycillin	1 (0.8)
Cephtriaxone	7 (5.2)
Cephtriaxone & Metronidazole	14 (10.5)
Amoxycillin	10 (7.5)
Ciprofloxacin	10 (7.5)
Claforan & Metronidazole	1 (0.8)
Cloxacillin	3 (2)
Erythromycin	2 (1.5)
Rovamycin	1 (0.8)
Clotrimoxazole	1 (0.8)
Netilmycin	1 (0.8)
Total	**134**

used alone but always in combination with other drugs in 39 patients.

Discussion. Infection following surgical procedures has a great significance to the patient and the surgeon. Evaluation of risk factors in post-operative infections is important to reduce its occurrence and minimize its morbidity to the patient. In the present study the overall postoperative infection rate was 2% which was quite low as compared to other studies.[1,2] Perhaps one reason for our low infection rate could be due to the fact that only infections occurring during the hospital stay were included in the present study. Our infection rate of 3% for cesarean section was also low as compared to those quoted by Henderson[3] (42%), Parrot[1](31.5%) and Moir[4] (6%) but slightly higher than that quoted by Chia[5] (2%). Equivalent infection rates for emergency (3%) and elective (3.5%) cesareans in our study were unexpected but are comparable to the findings of Parrot et al.[1] Most authors have quoted a higher post-operative infection rate for the emergency cesareans.[3,6] Our observation of similar post-operative infection rates could be due to the prophylactic use of antibiotics in those patients who underwent emergency surgery. One would have expected the infection rate in our cesarean sections (3%) to be higher than that in abdominal hysterectomy (5%) as most of the cesarean sections were emergency procedures (75%). However, this was not so probably because of the younger age group in the obstetric population who have fewer medical problems. Similar observations were made by Chia[5] who noted infection rate of 5.5% in abdominal hysterectomies and 2% in cesarean sections. Others[2,7] have recorded a much higher infection rate in hysterectomies. Vaginal surgery is usually assumed to carry a higher risk of post-operative infection as vaginal mucosa is more prone to contamination pre-operatively.[5] Surprisingly, we found that our infection rate in vaginal surgery (3%) was lower than that in abdominal hysterectomies (5%). This is most likely due to our practice of using intraoperative prophylactic antibiotics for vaginal surgery. Sterilizations and laparoscopic procedures had no infections at all as the risk of contamination from the abdominal skin and vagina is minimal in such operations.

Wound infection alone or with pyrexia was observed in 54 out of 89 cases of post-operative infections (61%). Our morbidity due to wound infection (1%) is low as compared to that of Chia[5] (2%). Wound infection rate of 1.9% in our cesarean sections is also very low as compared to that reported by Beattie[8] (25%), Parrott[1] (11%), Mugford[9] (8%) and Nice[10] (7%). Majority of our infections were diagnosed by the 6th post-operative day (80%) with peaks on the 2nd and 4th days. This was probably due to the urinary tract infections secondary to

catheterisations which accounted for the peak on the 2nd day and wound infections on the 4th day.

In the present study 53 of the 94 isolates (56%) were Gram negative organisms. This supports the view that majority of the post-operative infections in obstetrics and gynecology are due to contamination from the genital tract.[11] Our study further supports this view as Gram positive Enterococci, which are normal commensals in the vagina, were found to be the causative organisms in 19 (20%) of the isolates. It can therefore be suggested that aggressive measures to sterilize the vagina pre-operatively in gynecological surgery may help to reduce the incidence of post-operative sepsis as has been shown by Eason.[11]

A survey of the antibiotics prescribed to the patients in this study showed a large variety of drugs used (Table 5). This practice of using antibiotics according to the preference of individual surgeons may contribute to the increased rate of resistance of Enterococci and Staphylococci.[12] It is recommended that a standard protocol for using antibiotics should be formalized keeping in mind the common organisms responsible for postoperative infections. In fact, infection surveillance should be an ongoing process with monthly meetings to review the results so that surgeons could modify the antibiotic protocols in use as was shown by the Singapore study.[5]

The present study has highlighted the fact that vaginal flora may be a source of contamination during surgery. Attention should therefore be given to ways and means of decreasing this risk factor either by local sterilization procedures like using povidone-iodine gel vaginally[11] or by giving prophylactic antibiotics. The other unusual observation made by us was the comparatively higher incidence of infective morbidity in abdominal hysterectomies. A study should be conducted to further identify the specific risk factors in patients undergoing this operation. There was no case of infection recorded after laparascopic surgery and this mode of surgical intervention should be encouraged wherever possible. Sound techniques in surgery with use of specific antibiotics and an ongoing process of infection surveillance are valuable means of decreasing post-operative infective morbidity.

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