

Prophylactic Antibiotics use in Cesarean Section

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This prospective study was done at obstetric unit, CMH Multan to identify best antibiotic prophylaxis for cesarean section as regards the dose, duration and route of administration postoperatively. A prospective study was done over 06 months where all cesarean sections performed from 1st July till 31st December 2000 were included in the study. The main prophylactic antibiotic used was β lactamase resistant penicillin (500mg 6 hourly) given intravenously initially followed by oral therapy. Three doses of an aminoglycoside were added to cover gram negative infection for the first day only. The main outcome measures kept were febrile morbidity, wound sepsis and genital tract infection. The total number of CS during this period was 240. Among these 84 were emergency cesarean sections and 156 were elective CS. The overall incidence of postoperative infectious morbidity after strictly following the prophylaxis protocol was found 10.6%. Febrile morbidity was 17.5 %, wound sepsis was recorded as 12 % and genital tract infection was found 2.5 %. Choosing the narrowest possible spectrum of antibiotics along with adherence to standard surgical practice can keep post-cesarean morbidity in acceptable range. This would not only restrict the treatment cost but also check the emergence of resistant strains.

Key words Antibiotic prophylaxis, caesarean section

Over last 50 years, the use of antibiotics has changed from their established role in the treatment of infection to that of preventing infection. The discovery that short courses and even single dose of antibiotic prophylaxis can decrease the infection rate resulting from the procedure has led to a wide spread introduction of antibiotic prophylaxis into obstetric practice. This has been most widely adopted in the prevention of postoperative infection following cesarean section.

The worldwide increase in cesarean section rate has led to an increase in surgical morbidity associated with delivery. The infection rate following cesarean section has been reported at 11-85%. This compares unfavourably with that following normal delivery- less than 10%. This has led to search for both important predisposing risk factors and effective means of prophylaxis. Postoperative genital tract infection is a serious complication causing significant morbidity. Postoperative genital tract infection is a serious complication causing significant morbidity, both immediate and in some cases long-term. In severe cases, it may threaten mother's life.

Attempts at prophylaxis were first documented in 1943. Richards (1) reported that use of sulfa compounds decreases infectious morbidity. The results of most studies assessing the efficacy of prophylactic antibiotics have been in favour of the administration of some form of prophylaxis.

Subjects and methods

A prospective study was done at obstetric unit, CMH Multan to identify best antibiotic prophylaxis for cesarean section as regards the dose, duration and route of administration postoperatively.

All cesarean sections performed from 1st July till 31st December 2000 were included in the study. The antibiotic

used was B lactamase resistant penicillin (500mg 6 hourly) and an aminoglycoside (80mg 8 hourly). Both were initially given intravenously, followed by oral therapy with β -lactamase resistant penicillin only.

The main outcomes measured were febrile morbidity, wound sepsis and genital tract infection. The infectious morbidity was recorded according to the definitions given by Joint Committee on Maternal Welfare.

Febrile morbidity is defined as a temperature of 38°C or greater on any two of the first 10 postoperative days, excluding the first 24 hours, and measured at least 4 times daily.

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

Genital tract infection is a clinical diagnosis initially, with pain and tenderness of the uterus, and existence of purulent discharge from the cervix confirmed by positive microbiological culture on high vaginal swab.

The following protocol for routine cesarean sections was followed:

- All the patients had shaving of operation site just before proceeding to operation theatre. -In operation theatre floor cleansing was done with hypochlorite solution, operation trolleys and tables were cleaned with methylated spirit.
- Preoperatively intravenous antibiotic combination was administered before induction of anaesthesia.
- Abdomen was scrubbed with povidine three times and with methylated alcohol (spirit) two times.
- The facilities of both general and spinal anaesthesia are available. Among our subjects, 170 cases underwent general anaesthesia while 30 received spinal anaesthesia.

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- All included cases had lower segment cesarean section; two hysterotomies done during this period were excluded.
- Uterus was stitched in two layers while stitching of both visceral and parietal peritoneum was left to surgeon's discretion. Suturing material used was chromic catgut and skin was closed with silk.
- A β -lactamase resistant penicillin and an aminoglycoside was administered parenterally for 2 doses further and then patient was switched on oral β -lactamase penicillin that was continued for next four days.
- Patient was mobilized within 06 hours of operation.
- Postoperatively manual record was maintained of the outcome measures.

The records were retrieved manually and tabulated over 06 months i.e. July-Dec 2000. The cesarean section rate was 38-42/month. The delivery rate for the hospital is 2500/year. The total number of CS during this period was 240. Among these 84 were emergency cesarean sections and 156 were elective cesarean section. This hospital is a tertiary referral center, therefore most of the sections are planned beforehand.

The overall incidence of postoperative infectious morbidity after following the above protocol was found 10.6%. Febrile morbidity was 17.5 %, wound sepsis was recorded as 12 % and genital tract infection was found 2.5%.

Table 1. Distribution of infectious morbidity

Type Of Infectious Morbidity	No. Of Patients	%age
Febrile Morbidity	42	17.5
Wound Sepsis	30	12
Genital Tract Infection	06	2.5

The culture report for wound sepsis and is shown in table II. Staphylococcus aureus was predominantly isolated though anaerobes were also found positive in other cases. More emphasis was put on local wound care and antibiotics were administered according to the sensitivity reports. Two among these needed wound debridement.

Table 2 Culture Reports for Wound Sepsis

Strains Of Bacteria	No Of Cases Positive
Bacteriodes sp	6
Staphylococcus aureus	12
GP b Streptococcus sp	3
B Hemolytic GP C	3
E-Coli	4
Psuedomonas	4
Klebsiella	6

The risk of postoperative infection is enhanced in cesarean sections complicated by spontaneous rupture of membranes > 6 hours, intrapartum infections, obesity, prolonged surgery and anemia. Low socio-economic group, induction of labour, internal monitoring haematoma

formation, previous abdominal surgery and general anaesthesia are significant contributory factors to infection. All cases of emergency cesarean section, in particular those urgent cases without proper preoperative cleaning can be considered at risk. The distribution of risk factors in our series was as shown in Table 3.

Table 3, Distribution of risk Factors for Post-operative Infections

Risk Factors For Post-Op Infections	No. Of Patients Effected	%age Effected
SROM	96	40
Intrapartum infection	05	2
Obesity >90 kg	36	5
Prolonged Surgery >1 hour	7	3
Anemia <10g/dl		78
Haematoma	05	2
Low SE group	240	100
Age <24 years	150	62
Induction of Labour	72	30
Previous abdominal surgery	48	20
Emergency Cesarean Section	84	
Internal fetal monitoring	Nil	Nil

Discussion

Emergence of resistant flora in second half of the last century necessitated search for newer antimicrobials that made treatment more expensive and caused emergence of even stronger resistant bacteria. This has caused genuine concern worldover and a review of antibiotic policies for reduction of antibiotic use.

Ideally a drug should be selected that is relatively inexpensive and which would not be the first line drug employed for the treatment of serious infections. Extrapolating from the recent studies, it appears that the duration of adequate drug levels in the tissues need not be prolonged^{2,3} Therefore most drugs with a reasonable half life of 1-2 hours should be effective when given in single doses or as a short course of maximum three doses. The antibiotics of choice for prophylaxis of cesarean sections remain penicillin and Cephalosporins,

Prophylactic antibiotic appears to act in two principal ways, namely by destroying some bacteria and showing the growth of others. They also alter the characteristics of the serosanguineous fluid that collects in the pelvic cavity preoperatively, rendering it less suitable to support the growth of microorganisms. Other possible mechanisms of action include interference with the production of bacterial proteases and interference with the attachment of bacteria to mucosal surfaces. In addition, antibiotics may, in a way that is not completely understood, enhance the host's phagocytic capacity. Burke⁴ demonstrated that timing of antibiotic delivery to injured tissue is of critical importance to its efficacy as a prophylactic measure. The greatest benefit is obtained when the dose is administered just before or coincident with the time of maximal bacterial contamination and tissue trauma.

It is also important to weigh the cost of antibiotic prophylaxis against the alleviation of morbidity. Mugford et al⁵ showed that antibiotic prophylaxis was cost-effective by decreasing the duration of inpatient stay following cesarean section. Evidence appears to be in favour of antibiotic prophylaxis for cesarean section but the best regimen has yet to be decided.

Earlier studies of prophylaxis used a prolonged regimen similar to us, starting with an initial dose prior to incision followed by 3-5 days of antibiotic therapy (6,7). Now several investigators have shown that such regime is therapeutic and have recommended a short 3 days course. However, in third world countries like Pakistan, lapses in proper asepsis have traditionally been covered with indiscriminate use of antibiotics. This is a dangerous trend and needs to be curtailed. Choosing the narrowest possible spectrum of antibiotics for the particular offending or suspected organism is the right strategy (8,9). Thus, an epidemiology of local flora is essential. We therefore restricted our use to penicillinase resistant penicillin drug, which has an excellent spectrum against skin flora involved in soft tissue infection. It is the time of administration that is very important to achieve highest concentration at the time of incision (10).

Paediatricians have voiced concern that antibiotics employed prior to delivery increase the risk of immediate or delayed infection in the neonate with resistant organisms. There may also be difficulty in the microbiological identification of causative organisms in cases of neonatal sepsis. Indeed it is true that the most commonly used prophylactic antibiotics, namely penicillin and cephalosporins, readily cross the placenta, but studies have failed to show that neonates are at any increased risk of complications of this nature.

Conclusion

There is good argument for giving prophylactic antibiotics to all patients undergoing cesarean section. The benefit of such a policy would depend on the background infection rate at various institutions. Recent research suggests that women undergoing elective low risk cesarean sections may

well benefit from antibiotic prophylaxis. The evidence is certainly strongly in favor of prophylactic antibiotic coverage of all emergency cesareans, and all those with other risk factors of post-operative infection.

The major factors to be taken into account are firstly the background morbidity of infectious complication at different institution for cases considered to be of low risk, and secondly the consequences for both the neonate and mother associated with using antibiotics on such wider scale. The risk of organism resistance must be considered with blanket prescription of antimicrobials.

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