Journal of Cardiovascular Disease Research

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 12, 2023

Original research article

To study antibiotics for elective cesarean sections: A comparison of short and long courses

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Abstract

Background and Objectives: A clean, uncontaminated wound results from a Caesarean section. Antibiotics are mostly used to lower parturition infections and associated problems. Lowering the mortality and morbidity following surgery. This study looked at the effectiveness of using a short course of antibiotics against the longer course that is typically used in a government tertiary care facility.

Material and Methods: This study was conducted as a prospective interventional study. The present study involved a total of 200 individuals who were randomly assigned to two separate groups. Each group is comprised of 100 individuals. The selection of participants was conducted in accordance with predetermined inclusion and exclusion criteria. The research was carried out at Narayana Medical College, Nellore, and Andhra Pradesh, India under the department of Obstetrics and Gynaecology. The study was done from August 2022 to August 2023, spanning a duration of one year.

Results: Based on the cited current research, the estimated incidence of wound infection typically ranges from 3% to 5%. The study conducted by Robinson *et al*. examined the association between risk factors and wound infection. The findings indicated that extremely obese individuals had a higher risk of wound infection compared to non-obese individuals. There was no significant variation in the incidence of wound infection based on the type of skin incision employed. Its primary objective was to assess infectious morbidity and the findings revealed that the collective risk of maternal infectious morbidity was 17%.

Conclusion: Based on the findings of this study, it can be inferred that a shorter duration of antibiotic treatment yields comparable efficacy to a longer duration of antibiotic treatment. No statistically significant differences were observed between the two groups in relation to febrile morbidity, wound induration, serous wound discharge, purulent wound discharge, wound gaping, or atypical vaginal discharge.

Keywords: Antibiotics, both short- and long-term, and elective cesarean sections

Introduction

A Caesarean section is a surgical procedure that results in a clean and uncontaminated incision. The primary purpose of administering antibiotics is to mitigate the incidence of postpartum infections and associated consequences [1]. Consequently, this intervention leads to a decrease in the occurrence of negative health outcomes and death following a surgical procedure. This study aimed to assess and compare the effectiveness of a short course regimen of antibiotic usage with the conventional long course regimen in a government tertiary care center. The patient population that typically seeks medical care at our hospital consists predominantly of individuals from a lower socioeconomic status, who face dietary deficiencies and possess limited educational attainment. Consultants working in government hospitals express a prevailing concern regarding the reduced utilization of antibiotics. This study aims to investigate the comparative effectiveness of the short course regimen, which is currently underutilized, in comparison to the extensively employed long course regimen [2, 3].

Prophylactic antibiotics, when rigorously defined, refer to the administration of antibiotics to patients prior to the occurrence of contamination or infection. A more comprehensive and pragmatic interpretation encompasses clinical scenarios characterized by the presence of infection or contamination, where surgical intervention is the primary approach for treating the infection, and the administration of antibiotics prior to surgery primarily aims to mitigate the occurrence of postoperative wound infections [4]. The administration of antibiotics at the onset of treatment might be categorized as anticipatory, presumptive, or empiric. Prophylactic antibiotic medicines that are effective demonstrate activity against a majority, albeit not all, of possible infections, typically consisting of endogenous flora. Despite notable progress in the areas of diagnosis, medical care, and antimicrobial therapy, sepsis during the puerperium continues to be a significant contributor to maternal mortality. The literature analysis reveals that there are numerous factors that are regarded to contribute to the increased susceptibility to severe sepsis with

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 12, 2023

acute organ dysfunction. One of the factors that can contribute to negative outcomes in medical procedures is the utilization of inadequate sterile technique [5, 6].

The mortality of a pregnant woman, occurring throughout the process of childbirth and in the postpartum period, is a matter of significant apprehension for healthcare professionals and governmental entities alike. The primary causes of maternal death in underdeveloped nations include obstetric hemorrhage, protracted obstructed labor, eclampsia, and puerperal infection. In addition to maternal mortality, puerperal sepsis has the potential to result in enduring morbidity, including complications such as secondary infertility, ectopic pregnancy, and chronic pelvic pain [7, 8].

The objective of this study was to evaluate and compare the efficacy of a short course of antibiotics vs a standard lengthy course of antibiotics in preventing post-operative infectious problems among patients undergoing elective cesarean section at a Narayana Medical College hospital. To determine the comparative effectiveness of different treatment regimens in relation to infectious morbidity, including febrile morbidity, wound induration, wound discharge, wound gaping, and atypical vaginal discharge.

Materials and Methods

This study was conducted as a prospective interventional study. The present study involved a total of 200 individuals who were randomly assigned to two separate groups. Each group is comprised of 100 individuals. The selection of participants was conducted in accordance with predetermined inclusion and exclusion criteria. The research was carried out at Narayana Medical College, Nellore, and Andhra Pradesh, India under the department of Obstetrics and Gynaecology The study was done from August 2022 to August 2023, spanning a duration of one year**.**

Inclusion Criteria

- Women who receive routine prenatal care.
- A calm prenatal phase.
- Female patients having elective cesarean sections.

Exclusion Criteria

- Hypertension.
- Antibiotic therapy beginning two weeks before surgery.
- PROM presence.

Methods

A total of 200 female participants were meticulously chosen and assigned randomly to two distinct groups. Each group is comprised of 100 women. Following a thorough assessment of medical history and physical examination, including the exclusion of any pre-existing medical conditions, infections, prior hospitalizations, and previous antibiotic usage, the female participants were meticulously chosen and subsequently divided into two randomized groups.

The participants were provided with an explanation on the nature of the study, including its objectives and methodology. Additionally, the study outcomes were communicated to the participants. Finally, written informed consent was collected from each participant. An intradermal injection of Cefotaxime was delivered as a test dosage on the forearm to assess for potential allergic reactions. The trial excluded patients who had a known allergy to cefotaxime administered via injection. The female participants in group 1 received an intravenous injection of cefotaxime, with a dosage of 1 gram, within one hour of the initiation of the surgical procedure. If the duration of the surgery exceeded two hours, the dose was administered again. A subsequent administration of medication is administered to the same patient 12 hours following the initial dosage. The aforementioned regimen is commonly referred to as the short course. The participants in the second group received intravenous cefotaxime at a dosage of 1 gram twice day for a duration of 3 days.

Results

Table 1: Distribution of ages between the two research groups

		Groups		Total
		Group I	Group II	
Age range	20 yrs.	05	05	10
	21 - 25 yrs.	50	50	100
	26 - 30 yrs.	25	25	50
	31 - 35 yrs.	15	15	30
	Above 35 yrs.	05	05	10
Total Count		100	100	200

Table 1 presents the age distribution within the two groups.

Table 2: Group parity

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 12, 2023

		Groups		Total
		Group I	Group II	
Gravida	Multi Count	75	35	110
	Primi Count	25	65	90
Total Count		100	100	200

The study involved the recruitment of a total of 200 patients, with 100 patients assigned to group 1 and another 100 patients assigned to group 2. The table presented above displays the total number of patients enrolled in the study, categorized into two groups. Group 1 comprises 100 patients, with 75 being multiparous and 25 being primiparous. On the other hand, Group 2 consists of 100 patients, with 35 being multiparous and 65 being primiparous.

Table 3: Wound leucocytosis count details

		Groups		Total
		Group I	Group II	
Wound	No Count	65	35	100
	yes Count	45	55	100
	Total	100	100	200

A Caesarean section refers to a surgical procedure those results in a clean and uncontaminated incision. The primary purpose of administering antibiotics is to mitigate the occurrence of postpartum infections and associated problems. Consequently, this leads to a decrease in the occurrence of negative health outcomes and death following a surgical procedure.

Table 4: Abnormal vaginal discharge

Count	Groups		Total
	Group I	Group II	
Abnormal Vaginal Discharge	100	98	198
	100.0%	98.0%	100.0%
	00	02	02
	0.0%	2.0%	2.0%
Total	100	100	200
	100.0	100.0	100.0

Out of a total of 200 individuals, only 2 exhibited atypical vaginal secretions. The objective of this study was to evaluate the relative efficacy of a brief antibiotic regimen compared to the traditional prolonged course of antibiotic therapy at a government tertiary care facility.

Table 5: Organisms cultured from the wound discharges

			Groups		Total
			Group I	Group II	
Organism Cultured	E. coli	Count % within Groups	02	02	04
			1.3%	1.3%	1.3%
	Kleibseila	Count % within Groups	01	01	02
			0.7%	0.7%	0.7%
	Pseudmo nas	Count % within Groups	00	01	01
			0.0%	0.7%	0.3%

Among the patients who experienced wound discharge, Escherichia coli was the most frequently cultured organism. The patient demographic that typically seeks medical care at our hospital consists of individuals from a lower socioeconomic status, who have nutritional challenges and possess a lower level of educational attainment. Consultants working in government hospitals express a prevailing concern regarding the limited utilization of antibiotics. This study aims to investigate the comparative effectiveness of the short course regimen, which is currently underutilized, with the frequently used long course regimen. The excessive and prolonged utilization of antibiotics does not provide any additional advantages, but rather contributes to the financial burden and exacerbates the escalating threat of antibiotic resistance within the community.

Discussion

Based on the aforementioned studies, it can be generally inferred that the incidence rate of wound infection ranges from approximately 3% to 5%. The study conducted by Robinson *et al*. examined the association between risk variables and wound infection. The findings indicated that severely obese individuals were more susceptible to wound infection compared to non-obese individuals or those with moderate obesity [9]. There was no significant variation in the incidence of wound infection based on the

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 12, 2023

type of skin incision employed. The study conducted by Dumas *et al*. demonstrated that there is an equivalent risk of wound infection associated with both Joel Cohen and Pfannensteil skin incisions. The Caesar trail, a significant multicentric 2x2x2 pragmatic study, aimed to determine the comparative effectiveness of different methods of caesarean section. Its primary objective was to assess infectious morbidity, specifically focusing on maternal outcomes [10]. The study findings revealed that the overall risk of maternal infectious morbidity was 17%. There were no significant differences seen between the intervention groups for the primary outcome in each set of interventions: single-layer closure versus double-layer closure of the uterine incision; closure versus non-closure of the pelvic peritoneum; and liberal versus restricted use of a sub rectus sheath drain. No disparities were observed in any of the secondary morbidity outcomes, and there were no statistically significant adverse effects associated with any of the employed strategies. In their Cochrane review, Small and Gyte (year) determined that there is no discernible distinction in terms of the timing of antibiotic prophylactic administration, whether it is delivered prior to cord clamp or after to cord clamp [11, 12].

In this investigation, we observed no significant difference in terms of the duration and quantity of antibiotic administration with respect to infectious morbidity. There was no statistically significant difference observed between the administration of a short course of antibiotics and a lengthy course of antibiotics. In Group 1, around eight individuals exhibited symptoms of fever, while in Group 2, approximately ten patients experienced fever [13, 14]. The patients experienced a postoperative fever with a temperature over 38°C, which manifested within 24 hours following the elective cesarean procedure and often persisted for a duration of 3 to 5 days. The patients exhibited concurrent abdominal wound infections, prompting the collection and submission of a wound swab for pus culture and sensitivity analysis. The appropriate antibiotics were modified in accordance with the situation [15, 16].

Within the first group, a total of nine patients exclusively experienced wound induration. Five patients exhibited wound induration on the third day following the surgical procedure, while six patients had wound induration on the fifth day following the surgical procedure. No more antibiotics were administered to any of these individuals. The administration of serratiopeptidase tablets occurred three times per day during a period of three consecutive days [17]. The wound induration of all nine patients resolved, and the sutures were removed on the seventh day after the operation. Among the individuals in group 2, a total of 11 patients exhibited only wound induration. Three patients experienced wound induration on the third post-operative day, six patients on the sixth post-operative day, and two patients acquired wound induration on the fifth post-operative day. In the case of these individuals, intravenous administration of cefotaxime at a dosage of 1 gram was extended for an additional two days. Additionally, a tablet containing serratiopeptidase was administered three times daily for a duration of three days [18]. The inflammation of the wound decreased. The suture was extracted between the 7th and 8th day following the surgical procedure. In both cohorts, none of the patients exhibiting wound induration experienced subsequent development of serous or purulent wound discharge [19, 20].

Among the patients in group 1, a total of five individuals exhibited the manifestation of serous wound drainage. Three patients developed serous wound discharge on the third post-operative day, whereas two patients developed serous wound discharge on the fifth post-operative day. Empirical administration of an antibiotic injection, specifically cefotaxime 1g IV BD, was implemented for all patients in question. Additionally, the wound discharge was collected for analysis, while a thrice-daily dosage of Tablet serratiopeptidase was prescribed for a duration of 3 days. No microorganisms were detected in any of the wound swab cultures. The serous wound discharge of all five patients resolved, and the suture was removed on either the eighth or ninth day after the operation. Within the second group, a total of six individuals exclusively exhibited wound induration as a symptom [21, 22]. Two patients exhibited wound induration on the third day following the surgical procedure, while three patients experienced this symptom on the sixth day. Additionally, one patient acquired wound induration on the fifth day after the operation. In the case of these patients, the administration of intravenous cefotaxime at a dosage of 1 gram was extended for an additional two days. Additionally, a regimen of oral serratiopeptidase tablets was prescribed, to be taken three times daily for a duration of three days. The presence of serous wound drainage. The suture was removed between the 7th and 9th day following the surgical procedure. In both groups, none of the patients exhibiting serous wound discharge had further progression to purulent wound discharge or wound gaping. A cumulative of six participants within the study had the manifestation of purulent wound discharge. Three patients were assigned to group 1, while another three patients were assigned to group 2 [23, 24].

The organism Pseudomonas exhibited resistance to the administration of cefotaxime, prompting a change in antibiotic treatment to the administration of piperacillin-tazobactam via injection. This alternative antibiotic regimen was maintained for a duration of five days. All six individuals who exhibited purulent wound drainage subsequently developed wound gaping. The wound dressing was performed on a daily basis, with a frequency of twice per day. After the resolution of the purulent discharge, these patients were scheduled for wound re-suturing. Following the procedure of wound resuturing, the administration of the identical antibiotic was prolonged for an additional duration of three days [25]. The dressing was removed on the third day following the postoperative period, subsequent to the re-suturing of the wound.

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Furthermore, the patient was discharged on the following day. The patients were monitored on an outpatient basis, and the sutures were subsequently removed on the 10th day after the wound was re-sutured. The wound of each of the six patients demonstrated successful healing upon re-suturing, without any subsequent problems. Out of the patients in group 2, only two individuals exhibited abnormal vaginal discharge, but none of the patients in group 1 demonstrated this symptom. The two patients had abnormal vaginal discharge for duration of two days, specifically on the third and sixth days following the operation. However, by the fifth day post-operation, the abnormal discharge had vanished. In addition, there was no presence of uterine pain or fever [26, 28].

Conclusion

Based on the findings of this study, it may be inferred that a short course of antibiotics is as effective as a long course of antibiotics. No statistically significant differences were observed between the two groups in relation to febrile morbidity, wound induration, serous wound discharge, purulent wound discharge, wound gaping, or atypical vaginal discharge. The increasing prevalence of antibiotic resistance has emerged as a significant concern, necessitating the prioritization of the utilization of more limited antibiotics. The short regimen is more cost-effective compared to the long course of antibiotics due to the reduced volume and duration of antibiotic usage. The abbreviated antibiotic regimen is deemed to be both safe and effective, offering convenience and resource efficiency by reducing the need for extensive labor. Therefore, by utilizing this approach, the occurrence of irregularity in medication administration may be avoided. Consequently, it can serve as a viable alternative to the conventional practice of delivering intravenous antibiotics for a period of three days, followed by a switch to oral antibiotics, which is commonly employed in a tertiary government healthcare facility.

Funding

None

Conflict of Interest

None

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