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Short report

Post-caesarean section surgical site infections at a Tanzanian tertiary hospital: a prospective observational study

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SUMMARY

Few data are available on the determinants and characteristics of post-caesarean section (CS) surgical site infections (SSIs) in resource-limited settings. We conducted a prospective observational cohort study to evaluate the rates, determinants, and microbiological characteristics of post-CS SSI at the Dodoma Regional Referral Hospital (DRRH) Gynaecology and Obstetrics Department in Tanzania. Spanning a three-month period, all pregnant women who underwent CS were enrolled and followed up for 30 days. SSI following CS occurred in 224 (48%) women. Only 10 (2.1%) women received pre-incision antibiotic prophylaxis. Urgent intervention is needed to prevent and control infections and contain the rising rate of post-CS SSI at the DRRH.

Introduction

Caesarean section (CS) can be a life-saving procedure and it prevents poor obstetric outcomes. In 2007, the average global CS rate was reported to be around 15%, with substantial variability worldwide. However, the incidence of deliveries by CS

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has increased sharply over the last 30 years.[1] Post-surgical infection is a complication of CS, with rates ranging from 1.2% to 6.5% in high-resource countries.[2–4] Moreover, postpartum infections remain among the most frequent causes of pregnancy-related maternal mortality and morbidity worldwide. Few data are available on the determinants, characteristics, and incidence of post-CS SSI in resource-limited settings.

Dodoma Regional Referral Hospital (DRRH) is the referral hospital in Dodoma Region, Tanzania, and one of the few centres where pregnant women can receive CS services. We conducted a prospective cohort study to evaluate the rates, determinants, and microbiological characteristics of post-CS SSI at the Gynaecology and Obstetrics Department of DRRH.

Methods

A prospective observational cohort study was conducted in the Gynaecology and Obstetrics Department of DRRH, Dodoma, Tanzania. Following a three-month enrolment period starting on August 19th, 2013, patients were followed up for 30 days post CS. All pregnant women admitted to the DRRH Labour Ward who underwent an elective or emergency CS were eligible for enrolment within 24 h post CS and followed up for 30 days to detect SSI, in accordance with the latest Centers for Disease Control and Prevention (CDC) classification.[5]

Data were collected using a comprehensive structured questionnaire that was filled in at each follow-up visit. Information was retrieved from different sources: hospital medical records, antenatal cards, surgical notes, structured interviews, and clinical examinations. On the first day post CS during the inpatient stay at DRRH, all data related to the surgical procedures and post-surgical management were collected from the surgical notes. Demographic and clinical data were obtained from antenatal cards, hospital medical records, structured interviews, and clinical examinations. The ward doctor inspected the wounds daily and monitored the patients for any signs of infection during the inpatient stay. The doctor who discharged the patients was responsible for scheduling a first visit at Makole Health Center (MHC) on day 7 post CS. Surgical wounds were inspected and stitches were removed at MHC for outpatients or at DRRH for patients who were still hospitalized. Finally, on day 30 post CS, data collection was done at the DRRH Obstetrics and Gynaecology Outpatient Clinic.

Patients underwent a variable number of visits between day 7 and day 30. At each visit, a clinical examination of the surgical wound was performed and antibiotic treatment history was collected. SSIs were classified according to CDC definitions.[5] A wound swab was taken if any sign of SSI was detected. Telephone calls were made to patients not attending scheduled visits. Data were retrieved through a structured telephone interview and a specifically designed algorithm was used for SSI diagnosis. Patients who did not attend a follow-up clinical visit by day 10 post CS were repeatedly contacted by telephone in order to determine whether they had developed an SSI. If an SSI was diagnosed through a structured telephone interview, the patient was referred to the nearest healthcare facility for further treatment. A patient was considered lost to follow-up after five unsuccessful attempts by telephone during the follow-up period.

A bacteriological swab was obtained, where possible, in every case of clinical suspicion of SSI by collecting the exudates from the open discharging wound. The specimens were processed soon after collection, according to the standard operative procedures of the microbiology laboratory. Briefly, specimens were inoculated on Blood agar and MacConkey agar and incubated aerobically. Petri dishes were checked after 24 and 48 h and bacteria were identified using conventional biochemical and physiological methods. Antimicrobial susceptibility of isolates was determined using disc diffusion.[6] The antibiotics tested included: oxacillin (1 μg), ampicillin (10 μg), amoxicillin (25 μg), amoxicillin/clavulanate (20 + 10 μg), clindamycin (2 μg), erythromycin (15 μg), ciprofloxacin (5 μg), cotrimoxazole (1.25 + 23.75 μg), ceftriaxone (30 μg), cloramphenicol (30 μg), gentamicin (10 μg), tetracycline (30 μg). MRSA was identified by using the diffusion method with oxacillin disc.

Statistical analysis was performed using SAS software version 9.3 (SAS Institute, Inc., Cary, NC, USA). A descriptive analysis of categorical variables was performed through frequency tables; interquartile ranges and medians were computed for continuous variables. The chi-squared test, Fisher's exact test, and log binomial regression model were adopted for both univariate and multivariate analysis to detect the association between predictor variables and SSIs. Covariates with $P \leq 0.1$ were considered for multivariate analysis; odds ratios and confidence intervals were computed.

This survey was approved by the Hospital Management of DRRH (RMO/A.10/8/12) and the Tanzanian National Institute for Medical Research-NIMR (Ethical approval certificate number: NIMR/HQ/R.8a/Vol. IX/1927). All enrolled patients provided written consent.

Results

A total of 664 patients who delivered by CS during the study period were enrolled. Of these, 197 (29.7%) did not attend any clinical visit after the surgical procedure and all attempts to contact them by telephone failed; hence, no outcome was available. The remaining 467 (70.3%) were followed up for 30 days after CS; in 31 (6.6%) of these women, the follow-up was performed exclusively by telephone interview, and in seven (22.6%) of them the information retrieved was consistent with SSI. No differences in comorbidities or demographic and pregnancy characteristics were found between women lost to follow-up and those successfully followed up (data not shown). Only 236 (50.5%) women were screened for diabetes during pregnancy, whereas the majority of the patients were tested for human immunodeficiency virus (455; 97.4%), in accordance with national guidelines. Premature rupture of membranes (PROM) occurred in 11 (2.4%) women; of these, only two (18.2%) received a course of antibiotics. The great majority of CS (425; 91%) cases were emergency procedures. The most frequent reason for performing CS was having a previous scar (120; 25.7%), followed by cephalopelvic disproportion (CPD) (81; 17.3%), though only 25% and 4.9% of women with previous scars or CPD, respectively, underwent an elective procedure. In the majority of cases, the surgical procedure consisted of a midline vertical incision (341; 73%) performed by a junior doctor (337; 72.2%). Pre-incision antibiotic prophylaxis was administered in 10 (2.1%) patients: only two (20%) of them received it between 30 and 60 min before the incision. In almost all cases, a three-day course of antibiotics with intravenous ceftriaxone plus metronidazole followed by oral ampicillin/cloxacillin plus

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