Postdischarge surveillance following cesarean section: The incidence of surgical site infection and associated factors

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Background: The rate of surgical site infections (SSI) and their associated risk factors was identified by performing postdischarge surveillance following cesarean section at a public university teaching hospital in Brazil.
Methods: The study was conducted at the Center for Women's Integrated Health Care in Brazil between May 2008 and March 2009. Women were contacted by telephone 15 and 30 days after cesarean section. During hospitalization, a form was completed on factors associated with post-cesarean SSI. The χ^2 test and Fisher exact test were used to analyze categorical variables and the Mann-Whitney test for numerical variables. Relative risks (RR) and their respective 95% confidence intervals (95% CI) were calculated for factors associated with SSI. P values $< .05$ were considered significant.
Results: The final sample consisted of 187 women. SSI was detected in 44 cases (23.5%). In 42 of 44 women (95%), SSI appeared following discharge from hospital, becoming evident within the first 15 days following surgery. Number of prenatal consultations ≤7 (RR, 2.09; 95% CI: 1.26-3.48) and hypertension (RR, 2.07; 95% CI: 1.25-3.43) were significantly associated with SSI in the bivariate analysis. In the multivariate analysis, only hypertension (RR, 2.47; 95% CI: 1.21-5.04) remained significant.
Conclusion: Postdischarge surveillance is essential for ensuring accurate estimates of post-cesarean section SSI. A 15-day postdischarge follow-up was shown to be sufficient. Hypertension was a factor associated with SSI.
Key Words: Postdischarge surveillance; cesarean section; surgical site infection; hospital infection; infection control nurse.

Surgical site infections (SSI) are common postoperative complications, constituting a major clinical problem in terms of morbidity and mortality,[1] duration of hospitalization, and hospital costs.[2,3]

Most SSIs only become apparent after the patient is discharged from hospital.[4-13] Different studies that included postdischarge surveillance have reported infection rates varying from 27.6%[4] to 84%,[5] particularly following surgeries such as cesarean sections (C-sections) for which the hospitalization period is brief.[6]

Few Brazilian hospitals conduct surveillance after the patient has been discharged from hospital, limiting their statistics to those patients in whom infection becomes apparent prior to discharge or those who return spontaneously to the hospital for treatment. Various studies have been published showing a consensus on the need to perform postdischarge surveillance of patients submitted to C-sections to obtain more accurate statistics on the frequency of SSI.[7-13]

In Brazil, Couto et al (1998)[12] reported post-C-section SSI rates of 1.6% when surveillance was limited to hospitalized patients and 9.6% when postdischarge surveillance was implemented. Another study carried out in a maternity hospital in the state of São Paulo found a post-C-section SSI rate of 1.2% when surveillance was limited to hospitalized patients versus 14.4% when these rates were obtained from postdischarge surveillance.[13] The study was conducted at the Center for Women's Integrated Health Care, a tertiary, 142-bed, university teaching and public hospital situated in the state of São Paulo, Brazil. A mean of 100 C-sections are performed in this hospital monthly. This study was carried out between May 2008 and March 2009. There has been a hospital infection control committee (HICC) in this institute since 1986, and this committee currently recommends prophylactic antibiotic therapy following all C-section deliveries. This protocol determines the use of cefazolin, 2 g intravenously, after the umbilical

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cord has been clamped or 900 mg of clindamycin for patients who are allergic to penicillin.

A recent systematic review of the methods used to identify SSI following discharge from hospital concluded that existing studies on the subject have so far failed to identify a valid, reliable method for identifying such infections postdischarge. On a local level, the method used to identify postdischarge SSI is likely to be dependent on existing resources, on the objective of surveillance, and on the nature of the data routinely available.[14] In this study, the researcher contacted the patients by telephone following discharge and established the occurrence of a SSI by having the patients confirm the presence or absence of symptoms associated with a SSI. Therefore, the methodology used to determine postdischarge SSI should be considered as a potential limitation of the study.

The objectives of the present study were to evaluate the incidence of SSI following discharge of the patient from hospital through the use of telephone interviews and to identify factors associated with the presence of these infections in a tertiary Brazilian university teaching hospital that is a regional referral hospital for maternal and child health care.

METHODS

This is an observational, longitudinal, cohort study carried out using data collected from patient charts and from interviews with patients with the objective of identifying post-C-section SSI. Sample size calculation was based on the SSI rate of 0.7% registered by the HICC in 2006, established according to the epidemiologic surveillance of patients up to the time of their discharge from hospital, and the estimated SSI incidence of around 23.5% obtained in a previously conducted pilot study that included postdischarge surveillance. A significance level of 5% and a sampling error of 8% were adopted; therefore, a minimum sample of 108 women was required, with an estimated confidence interval (CI) of 15.5% to 31%.

The inclusion criteria consisted of having been submitted to a C-section after April 2008 and having a telephone for contact. Exclusion criteria consisted of death in the immediate postoperative period or the presence of any form of impairment that would hamper the patient's ability to consent to participate in the proposed study or affect postdischarge telephone contact. The criterion for discontinuation consisted of being unable to contact the woman within the 30-day follow-up period, except if she had already reported an SSI at first contact. The investigator approached women who had undergone a C-section while they were still in hospital and read them the informed consent form, which had been approved by the Internal Review Board of the institute prior to initiation of the study. If the woman agreed to participate, she then signed the informed consent form, was given a copy, and was admitted to the study.

Diagnosis of SSI was defined according to the criteria standardized by the Centers for Disease Control and Prevention, Atlanta, GA, determining superficial incisional SSI, deep incisional SSI, or organ/space SSI.[15] The investigator made a questionnaire, based in this criteria, from which questions about purulent discharge, identification of an isolated organism, signs and symptoms of infection (fever, pain or tenderness, localized swelling, redness, heat), an abscess or other evidence of infection involving the deep incision, or diagnosis of SSI by attending physician were applied by telephone interview.

The following data were obtained from the patient's chart: age, gestational age, whether the patient had undergone prenatal care and the number of prenatal consultations she had attended, weight and height, parity, presence of community infection, ruptured membranes at admission and the time of membrane rupture, presence of diabetes or arterial hypertension, duration of labor, indication for C-section, surgical wound classification (clean, clean contaminated, contaminated and dirty/infected), use of general anesthesia or other type of anesthesia, the American Society of Anesthesiologists (ASA) physical status classification score, whether the C-section represented an emergency or elective surgery, duration of the surgery, volume of intrasurgical blood loss as calculated by the anesthesiologist, whether any other procedures were carried out, and whether there was compliance with the institutional protocol of prophylactic antibiotic therapy. The intraoperative nursing chart was used to detect whether electrocauterization was performed. To evaluate obesity, body mass index (BMI) was calculated for each patient and classified according to the following categories: BMI <20, underweight; BMI 20 to 24.9, ideal weight; BMI 25 to 29.9, overweight; BMI >30, obese. C-sections were classified according to the risk of SSI as 0, 1, 2, or 3 in accordance with the NNIS system.[16]

A postdischarge telephone interview was conducted by the investigator herself or by a student nurse specifically trained for this task. A structured questionnaire was used, and the estimated duration of the interview was 5 minutes. The questions were specifically designed to identify any signs of a SSI following the patient's discharge from hospital. An initial contact was made 15 days after the C-section and a second contact 30 days after the surgery. A maximum of 3 attempts were made to establish contact on both occasions. Patients who could not be contacted for the second interview were discontinued from the study unless an SSI was identified at the first interview.