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CLINICAL ARTICLE

Severe maternal morbidity due to abortion prospectively identified in a surveillance network in Brazil

Danielly S. Santana [a], José G. Cecatti [a,b,*], Mary A. Parpinelli [a], Samira M. Haddad [a], Maria L. Costa [a], Maria H. Sousa [b], João P. Souza [c], Rodrigo S. Camargo [a], Rodolfo C. Pacagnella [a], Fernanda G. Surita [a], João L. Pinto e Silva [a]; Brazilian Network for the Surveillance of Severe Maternal Morbidity [1]

[a] Department of Obstetrics and Gynecology, University of Campinas, Campinas, Brazil
[b] Campinas Center for Studies in Reproductive Health (CEMICAMP), Campinas, Brazil
[c] UNDP/UNFPA/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction, Department of Reproductive Health and Research, World Health Organization, Geneva, Switzerland

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ABSTRACT

Objective: To evaluate the occurrence of severe maternal complications associated with abortion in Brazil. *Methods:* In a cross-sectional multicenter study, prospective surveillance was done for cases of potentially life-threatening conditions (PLTC), maternal near miss (MNM), and maternal death (MD) among 9555 women with obstetric complications between June 2009 and May 2010. Abortion was evaluated as a cause, and sociodemographic and obstetric characteristics, safety conditions where the abortion was performed, and the medical procedures used were also assessed. Prevalence ratios adjusted for the cluster effect of the design were calculated with 95% confidence intervals. Multiple logistic regression analysis was performed to identify factors independently associated with greater severity. *Results:* For 237 women (2.5%), abortion resulted in severe complications including PLTC (81.9%), MNM (15.2%), and MD (3%). When abortion was unsafe, infectious causes were more common for PLTC, whereas management criteria were more important for MNM and MD. In multivariate analysis, the presence of previous maternal conditions (sickle cell disease, low weight, neoplasm), being transferred or referred, previous uterine scar, and delays were associated with greater severity. *Conclusion:* Abortion was responsible for only a small percentage of the complications associated with pregnancy; however, the risk of abortion-related complications progressing unfavorably was higher.

1. Introduction

Abortion is responsible for approximately 67 000 deaths annually worldwide, in addition to incurring higher direct and indirect costs of healthcare [1–6]. Unsafe abortion is a procedure performed by untrained individuals using risky techniques or under inappropriate sanitary conditions for the purpose of terminating an unwanted pregnancy [7]. Worldwide, the annual incidence of unsafe abortion has been estimated at approximately 20 million [1,2].

In Brazil, abortion is permitted only for cases of rape or where there is a higher risk to the woman's life. Nevertheless, although it is illegal, it is widely practiced. It was estimated that 2.07 abortions occurred per 100 women of reproductive age in the country in 2005 [8]. Popularization of the use of misoprostol in Brazil has decreased the occurrence of complications resulting from induced abortion, reducing hemorrhage and infections, with a consequent drop in maternal mortality and severe morbidity [9].

There is little information on the association of abortion with maternal near miss (MNM), a new marker of health and obstetric care [10]. MNM is defined by the WHO as a woman who almost died but survived complications during pregnancy, childbirth, or the 42 days following the end of pregnancy [11]. Until this standardization, the definitions, criteria, and reported ratios of near miss varied greatly [12]. By evaluating the association between abortion and MNM, it might be possible to identify early signs of maternal life-threatening complications via the

* Corresponding author at: Department of Obstetrics and Gynecology, University of Campinas, R. Alexander Fleming, 101, 13083-881 Campinas-SP, Brazil. Tel.: +55 19 35219482; fax: +55 19 35219304.
E-mail address: cecatti@unicamp.br (J.G. Cecatti).
[1] Marilza V. Rudge, Iracema M. Calderon, Maria V. Bahamondes, Simone P. Gonçalves, Eliana M. Amaral, Olímpio B. Moraes Filho, Simone A. Carvalho, Francisco E. Feitosa, George N. Chaves, Ione R. Brum, Gloria C. Saint'ynes, Carlos A. Menezes, Patricia N. Santos, Everardo M. Guanabara, Elson J. Almeida Jr, Joaquim L. Moreira, Maria R. Sousa, Frederico A. Peret, Liv B. Paula, Luiza E. Schmaltz, Cleire Pessoni, Leila Katz, Adriana Bione, Antonio C. Barbosa Lima, Edilberto A. Rocha Filho, Melania M. Amorim, Debora Leite, Ivelyne Radaci, Marilia G. Martins, Frederico Barroso, Fernando C. Oliveira Jr, Denis J. Nascimento, Cláudio S. Paiva, Moises D. Lima, Djacyr M. Freire, Roger D. Rohloff, Simone M. Rodrigues, Sergio M. Costa, Lucia C. Pfitscher, Adriana G. Luz, Daniela Guimaraes, Gustavo Lobato, Marcos Nakamura-Pereira, Eduardo Cordioli, Alessandra Peterossi, Cynthia D. Perez, Jose C. Peraçoli, Roberto A. Costa, Nelson L. Maia Filho, Jacinta P. Matias, Silvana M. Quintana, Elaine C. Moises, Fátima A. Lotufo, Luiz E. Carvalho, Elvira A. Zanette, Carla B. Andreucci, Márcia M. Aquino, Maria H. Ohnuma, Rosiane Mattar, Felipe F. Campanharo.

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use of an effective surveillance system. This might prevent this extreme condition from ultimately progressing to death.

The main aim of the present study was to evaluate the occurrence of severe maternal complications caused by abortion among a group of women identified through a surveillance network for severe maternal morbidity implemented in Brazil [8]. Secondary aims were to determine the prevalence of abortion as a primary cause of these complications, to identify sociodemographic and obstetric characteristics associated with the occurrence of death or near miss, and to determine both the safety conditions under which the abortion was performed and the medical procedures required to deal with the abortions.

2. Materials and methods

A multicenter cross-sectional study was implemented in 27 referral obstetrics units across all geographic regions of Brazil. Over a 12-month period between June 1, 2009, and May 31, 2010, prospective surveillance was conducted for cases of maternal potentially life-threatening conditions (PLTC), MNM, and maternal death (MD) [10]. The study was previously approved by the Institutional Review Board of each center and by the National Research Committee prior to initiation. The women did not sign informed consent because data were collected exclusively from clinical records immediately after the discharge of women.

All of the women admitted to the study centers who had any of the diagnostic criteria for these conditions were included in the study, even if they were transferred to another healthcare service before the case was concluded.

Immediately after a woman was discharged from hospital or transferred to another healthcare facility, or after the occurrence of MD, her daily charts were reviewed. This procedure enabled cases to be identified—via the identifiers defined by the WHO—as those most commonly associated with organ failure and severe morbidity [10]. Data that were initially unavailable were obtained from the healthcare team responsible for the patient or from other sources such as the hospital database, prenatal records, and transfer documents. The charts of the patients identified were reviewed, and the data were collected via a form that was also used to record information on the appropriateness of the care received and the occurrence of delays in receiving care.

After manual collection, the data were entered onto electronic forms on the project's website, located on the institutional page of the coordinating center of the study, and sent to a central database using a specific platform, OpenClinica version 2.5.5 (Akaza Research, Waltham, MA, USA). Additional details of the study methods have been published elsewhere [8,13].

Before data collection, an operations manual was supplied and training was carried out for the investigators and coordinators of each center. During data collection, each coordinator reviewed the forms, checked data input, and searched for any data that were unavailable on the chart. After this initial quality control, the local investigator once again reviewed the data to check for any possible inconsistencies. Lastly, the national coordinating center reviewed the database, identified any inconsistencies, and sent data clarification forms to the participating centers for correction or completion [13].

The present analysis focused on abortion. Essentially, the inclusion criteria for cases of abortion were the same as those for the original study [8]; that is, cases were included only if they had any complication that could be classified as PLTC (from a list provided by WHO), MNM (from a set of clinical, laboratory, or management criteria recommended by WHO), or MD according to the new WHO definition and criteria [10,11,14]. Most abortions were carried out at the same hospital, but some were performed elsewhere and the patient was subsequently transferred to the referral center to treat the severe complication. Abortion was classified as spontaneous or induced, and as safe or unsafe by the study coordinator at each center in accordance with the criteria defined for the study.

The sample size was originally based on the estimate that approximately 75 000 deliveries would have to be covered by surveillance to allow the identification of 750 cases (1%) of MNM via the new criteria established by WHO [11].

For the present evaluation, the women were initially divided into 2 groups: those with obstetric complications resulting from abortion; and those with obstetric complications resulting from all other causes. The prevalence ratios of PLTC, MNM, and MD were calculated and compared between the 2 groups. In addition, health indicators related to maternal morbidity and mortality were calculated in accordance with the WHO recommendations, including the MNM incidence ratio, severe maternal outcome ratio (MNM + MD), MNM to MD ratio, mortality index, and maternal mortality ratio [10].

To evaluate factors that might be associated with greater severity, 2 groups were compared: cases of MNM and MD (greater severity); and cases that developed only a PLTC (less severity). The prevalence ratios and their 95% confidence intervals (CIs) were then calculated and adjusted only for the cluster effect of the design in these bivariate analyses. Likewise, the association was compared between the ways in which the abortion was initiated, the safety conditions under which the procedure was performed, the identification of any delay in receiving care, and the severity of the complication. The procedures used to perform or to complete the abortion were then described comparatively for the 2 groups of severity, and the basic main causes of PLTC and the diagnostic criteria used for MNM were compared between cases of safe and unsafe abortion.

Multiple logistic Poisson regression analysis was performed to identify factors independently associated with a greater severity of complications resulting from abortion, controlling not only for the cluster effect but also for all other predictors included in the model. SPSS version 11.5 (IBM, Armonk, NY, USA) and Stata version 7.0 (StataCorp, College Station, TX, USA) were used for statistical analysis. The significance level was set at a P value of 0.05.

3. Results

Among 9555 women identified as having severe maternal morbidity, 549 had undergone termination of pregnancy before 22 weeks of gestational age. For 312 women (3.2%), pregnancy had ended owing to an ectopic pregnancy, whereas for 237 women (2.5%) it was due to an abortion. There were 9318 women whose complications were due to causes other than abortion (Table 1). The risk of the occurrence of MNM was higher for women who had undergone abortion. Only the mortality index was higher for abortion-related cases than for cases due to other causes; the other calculated ratios were lower.

In the bivariate analysis, the risk of MNM or MD was not found to be significantly higher as a function of maternal age, ethnicity, education level, or marital status (Table 2). Likewise, none of the obstetric conditions evaluated reflected a higher risk of progression to MNM or MD (Table 3). The form in which the abortion was initiated, the safety conditions, and the existence of a delay in obtaining obstetric care were also not found to be associated with increased severity of the obstetric complication (Table 4).

Although hemorrhagic causes and the application of management criteria to identify cases with PLTC were present in most cases of abortion, infectious causes were more common in cases of unsafe abortion, whereas clinical and/or surgical causes were more common in cases of safe abortion. Among cases of more severe complications, MNM, and MD, the use of WHO clinical and laboratory criteria for severity was similar for safe and unsafe abortions; however, WHO management criteria were more common in cases of unsafe abortion (Table 5).

The procedures most commonly used to manage abortion-related complications of any degree of severity were uterine curettage, which was performed in 74.4% and 81.3% of women with PLTC and with MNM or MD, respectively, and the use of uterotonic drugs, misoprostol and/or oxytocin. There were no significant differences regarding the use