

Prevalence, causes, and clinical course of patients with surgical reintervention due to complications during cesarean section

Prevalencia, causas y curso clínico de pacientes con reintervención quirúrgica debido a complicaciones durante la cesárea

Juan G. Vázquez-Rodríguez^{1*}, Juan Serrano-Rodríguez², Silvia A. Arredondo-Andrade¹, Fabián G. Chable-Chan³, Juan A. García-Bello⁴, and Carlos M. Nájera-Coutiño¹

¹Intensive Care Unit, Unidad Médica de Alta Especialidad, Hospital de Gineco Obstetricia No. 3; ²Department of Maternal Fetal Medicine, Unidad Médica de Alta Especialidad, Hospital de Gineco Obstetricia No. 3; ³Department of Emergency, Hospital General "Dr. Gaudencio González Garza";

⁴Health Research Division, Unidad Médica de Alta Especialidad, Hospital de Gineco Obstetricia No. 3. Centro Médico Nacional "La Raza", Instituto Mexicano del Seguro Social. Mexico City, Mexico

Abstract

Objective: The objective of the study is to identify the prevalence, causes, and clinical evolution of patients with surgical reintervention due to complications during cesarean section. **Materials and methods:** The file of the Toco-Surgical Unit of the Gynecological Obstetrics Hospital No. 3 of the National Medical Center "La Raza" Mexican Institute of Social Security was reviewed to know the total number of patients undergoing cesarean section from January to December 2019 and cases with reintervention due to complications during cesarean section were selected. Their general data, the cause of reintervention, stay in the intensive care unit (ICU), hospital stay, and mortality were studied. The data were analyzed with descriptive statistics using the statistical program SPSS version 20. **Results:** It was found that 3371 patients underwent cesarean section, of which 1.60% (54 cases) underwent reoperation for the following reasons: Unpacking 27.79%, obstetric hemorrhage 20.37%, bleeding due to uterine atony 20.37%, hysterotomy commissure hematoma 18.52%, uterine infiltration 3.70%, vascular injury 3.70%, bladder injury 3.70%, and colonic injury 1.85%. The ICU stay was 3.79 ± 2.03 days, hospital stay was 13.67 ± 11.16 days, and mortality was 1.85%. **Conclusion:** The prevalence of reintervention was reduced, bleeding was the main cause, and the clinical evolution was satisfactory with low mortality.

Keywords: Cesarean section. Cesarean section complications. Abdominal reoperation. Obstetric intensive care.

Resumen

Objetivo: Identificar la prevalencia, causas y evolución clínica de las pacientes con reintervención quirúrgica por complicaciones durante la cesárea. **Material y métodos:** Se revisó el archivo de la Unidad de Toco-Quirúrgica del Hospital Ginecología No. 3 del Centro Médico Nacional "La Raza" Instituto Mexicano del Seguro Social para conocer el total de pacientes sometidas a cesárea desde enero hasta diciembre de 2019 y se seleccionaron los casos con reintervención por complicaciones durante la cesárea. Se estudiaron sus datos generales, la causa de reintervención, estancia en la Unidad de Cuidados Intensivos (UCI), estancia en hospital y la mortalidad. Los datos se analizaron con estadística descriptiva utilizando el programa estadístico SPSS versión 20. **Resultados:** Se encontró que 3371 pacientes fueron sometidas a cesárea de las cuales 1.60% (54 casos) se reintervinieron por las siguientes causas: desempaquetamiento 27.79%, hemorragia obstétrica 20.37%, sangrado

*Correspondence:

Juan G. Vázquez-Rodríguez

E-mail: juangustavovazquez@hotmail.com

0009-7411© 2022 Academia Mexicana de Cirugía. Published by Permanyer. This is an open access article under the terms of the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Date of reception: 11-05-2022

Date of acceptance: 26-07-2022

DOI: 10.24875/CIRU.22000261

Cir Cir. 2023;91(4):446-450

Contents available at PubMed

www.cirugiaycirujanos.com

por atonía uterina 20.37%, hematoma de la comisura de histerotomía 18.52%, infiltración uterina 3.70%, lesión vascular 3.70%, lesión vesical 3.70% y lesión colónica 1.85%. La estancia en UCI fue 3.79 ± 2.03 días, estancia en hospital 13.67 ± 11.16 días y mortalidad 1.85%. **Conclusión:** La prevalencia de reintervención fue reducida, el sangrado fue la principal causa y la evolución clínica resultó satisfactoria con baja mortalidad.

Palabras clave: Cesárea. Complicaciones de la cesárea. Reintervención abdominal. Cuidados intensivos obstétricos.

Introduction

Surgical resolution of pregnancy through cesarean section is one of the most important advances in contemporary perinatal medicine. Cesarean section has had an extraordinary impact in reducing maternal and perinatal mortality¹. It is the most frequently performed surgery in the world and is increasing every year. Reports have documented its increase in both developed nations and developing countries^{2,3}. Frequencies exceed the 10-15% recommended by the World Health Organization for performing said surgery⁴. The experts have explained that the preference of the method for the convenience of the doctor, surgery at the request of the patient, and pathologies secondary to a first surgery are situations that have been added to the maternal, placental, and fetal indications that are ordinarily taken into account to perform a cesarean section⁵.

With this scenario, it is possible that the number and nature of complications during cesarean section also have some change compared to previous reports, particularly when the cesarean section is repeated one or more times⁶. Possible complications during caesarean section have been known for decades, including bleeding in the layer of the surgical bed, bleeding from the hysterotomy commissures, uterine infiltration, hematomas, accidental damage to arterial or venous vascular structures, injuries to the ureters, urinary bladder, and intestines⁷. Liver rupture during manual revision of the gland and splenic tear are rare or infrequent complications, but they can occur. In any case, all of them can force a subsequent intervention.

Surgical reintervention is a relatively frequent entity that is usually derived from a first surgical procedure that could have been unsatisfactory that detected a problem that was not resolved due to the hemodynamic or ventilatory conditions of the patient, due to post-surgical complications derived from intrinsic factors and/or extrinsic and even due to deficiencies in the surgical technique itself. A new operation constitutes an extra trauma with greater possibilities of imbalance of the patient's homeostatic mechanisms, increased complications and higher mortality⁸⁻¹⁰. In addition, the number of

reinterventions is part of the parameters used to evaluate the quality and efficiency of hospital services¹¹. The objective of this research is to identify the prevalence, causes, and clinical course of patients with surgical reintervention due to complications during cesarean section.

Materials and methods

This is an observational, longitudinal, retrospective, retroactive, and descriptive study in a series of cases. The admission record to the Toco-surgery Unit of the Gynecology-Obstetrics Hospital No. 3 of the National Medical Center "La Raza" of the Mexican Institute of Social Security Mexico City was reviewed to know the total number of patients undergoing cesarean section in the period from January to December 2019. Patients who were reoperated due to complications during cesarean section were selected. Routinely, after their reintervention, all the patients were admitted to the intensive care unit (ICU) for surveillance and were later transferred to a general ward. The files were consulted to document general data, the cause of reinterventions, their clinical course, ICU stay, hospital stay, and mortality. Before conducting the study, authorization was obtained from the local Health Research and Health Research Ethics Committees (Registration R-2019-3504-11). Data were analyzed with descriptive statistical measures (mean, median, standard deviation, and range) using the statistical program SPSS version 20.

Results

It was found that during the year 2019, the cesarean section was performed on 3371 patients, of which 1.60% (54 cases) underwent a surgical reintervention, which were the subjects of the present study. Their mean age was 32.12 years and parity 3 with a pregnancy of 35 ± 3.5 weeks. The following comorbidities were found: Overweight 64.81% (35 cases), previous pregnancy with placenta previa 44.4% (24 cases), history of severe pre-eclampsia 20.37% (11 cases), type 1 diabetes mellitus 14.81% (8 cases), primary hypothyroidism 7.4% (4 cases), exogenous grade I

obesity 7.4% (4 cases), previous pregnancy with HELLP syndrome 5.5% (3 cases), uterine myomatosis 3.7% (2 cases), congenital scoliosis 1.85% (1 case), exogenous obesity Grade II 1.85% (1 case), chronic systemic arterial hypertension 1.85% (1 case), and primary antiphospholipid antibody syndrome 1.85% (1 case). It was found that 51.85% of the patients had a previous cesarean section (28 cases) and 18.52% had two previous cesarean sections (10 cases). For 29.63% of the patients, the cesarean section was their first surgery (16 cases).

The indications for cesarean section in the 54 patients studied had the following distribution: Placental alterations 53.70% (29 cases), unreliable fetal status 27.78% (15 cases), and maternal indications 18.52% (10 cases). In no case was the cesarean section performed by the doctor's preference or at the request of the patient. Complications during cesarean section that required reintervention were related to bleeding 94.45% (51 cases) followed by urinary bladder injuries 3.70% (2 cases) and large intestine injury 1.85% (1 case). Figure 1 in turn, the distribution of complications related to bleeding was as follows: Surgical bed bleeding 27.79% (15 cases), obstetric hemorrhage 20.37% (11 cases), persistent bleeding due to uterine atony 20.37% (11 cases), hemorrhage from a hysterotomy commissure 18.52% (10 cases), uterine infiltration 3.70% (2 cases), and bleeding due to accidental injury of a uterine artery 3.70% (2 cases). In all cases, the complications were corrected by performing only one reintervention table 1.

The mean stay in the ICU was 3.79 ± 2.03 days and in the hospital was 13.67 ± 11.16 days. There were no patients transferred to other hospitals. Mortality was 1.85% (1 case), and it was a patient with an urgent cesarean section indicated for severe pre-eclampsia with HELLP syndrome and a bleeding ruptured hepatic hematoma that was managed during surgery with the Pringle maneuver, packing, and closure of the abdominal cavity. This patient had to undergo immediate surgical reintervention due to persistent bleeding that was uncontrollable and progressed to Class IV hypovolemic hemorrhagic shock, cardiorespiratory arrest, and death in the operating room.

Discussion

3371 women who underwent cesarean section in 2019 were studied. It was found that the prevalence of patients with reintervention due to complications during surgery was 1.60% (54 cases), a very low figure

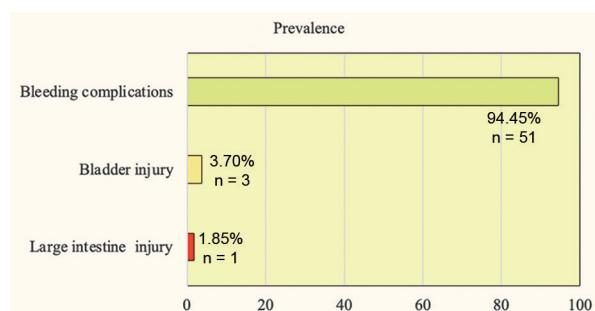


Figure 1. Complications during cesarean section that required reintervention in 54 patients (100%).

compared to data from series from other countries such as Holland 1997⁷, Brazil 2004¹², Sudan 2014¹³, and India 2016¹⁴. As can be seen in table 2, the number of cases studied in this investigation is greater than the number of patients in any of the other series. It also highlights that the highest frequency of complications during cesarean section corresponds to the report by Umbeli et al.¹³ in patients from Sudan 49.80% and that the lowest frequency was that of our study. The data from this series showed that the main complications that led to reintervention were hemorrhagic, followed by bladder injury and colonic injury with very low percentages. Thus, the causes were not different from the type of intraoperative complications identified in previous reports^{7,12-14}.

The stay in the ICU of the 54 patients studied was similar to the average of other patients in the same highly specialized center, but the hospital stay was longer¹⁵. These data could have been a consequence of the longer post-surgical recovery time in a general ward, but not in the ICU, which imply a rapid recovery from his critical condition. Mortality in our series was very low (1.85%), and it was a patient with severe pre-eclampsia and HELLP syndrome with massive bleeding due to a ruptured hepatic hematoma, a situation of extreme severity, and poor prognosis in any scenario. In general, the data support the opinion that the clinical course of the patients studied was successful.

Finally, the following comments are pertinent. The data presented here correspond to patients from a highly specialized medical unit that concentrates the most complicated cases of high-risk pregnancy in Mexico City and the central zone of the country and does not necessarily have a general representativeness. The hospital that hosts this research belongs to an institution affiliated with the Mexican health sector (Mexican Institute of Social Security), so in no case was the cesarean

Table 1. Complications during cesarean section, prevalence, and reintervention in 54 patients

Complications during cesarean section	Prevalence	Number of cases	Reintervention technique
Bleeding complications	94.45	51	
Of the surgical bed	27.79	15	Unpacking
Obstetric hemorrhage	20.37	11	Local hemostasis
Uterine atony	20.37	11	Hysterectomy
Commissure hemorrhage	18.52	10	Local suture
Uterine infiltration	3.70	2	Hysterectomy
Vascular injury	3.70	2	Uterine artery ligation
Bladder injury	3.70	2	Primary closure
Large intestine injury	1.85	1	Primary closure
Total	100	54	

Table 2. Historical comparison of the prevalence of complications during cesarean section

Author, country and year	Cases	Complications	
		Prevalence	Type
Van Ham et al. ⁷ Holland (1997)	2,647	14.8%	Uterine laceration 10.1% Hemorrhage > 1,000 cc 4% Others 0.7%
Nomura et al. ¹² Brazil (2004)	998	13.8%	Extend of hysterorrhaphy 7% Obstetric hemorrhage 6% Uterine atony 0.7% Bladder injury 0.1%
Umbeli et al. ¹³ Sudan (2014)	470	49.8%	Obstetric hemorrhage 23.1% Extended of hysterorrhaphy 22.7% Intestine injury 2.8% Bladder injury 0.6% Ureteral injury 0.2%
Jain et al. ¹⁴ India (2016)	1,349	2.5%	Obstetric hemorrhage 1.3% Extended of hysterorrhaphy 0.9% Uterine infiltration 0.3%
Vázquez et al. ¹⁵ México (2019) Current study	3,371	1.60% n 54*	Bleeding from the surgical bed 0.44%, n 15 Obstetric hemorrhage 0.33%, n 11 Uterine atony 0.33%, n 11 Commissure hemorrhage 0.29%, n 10 Uterine infiltration 0.060%, n 2 Accidental arterial injury 0.060%, n 2 Bladder injury 0.060%, n 2 Large intestine injury 0.030%, n 1

*The data are shown as the percentage and number of cases (n) for each type of complication since they are very small fractions.

section performed due to the doctor's preference for the method or at the request of the patient. In addition, the casuistry corresponds to the year 2019, which represents the last regular year before the COVID-19 pandemic, a disease that changed the routine of humanity,

so the frequency of cesarean sections may possibly be different due to the effect of viral illness such as a maternal factor, due to deterioration of the fetal state, due to the preference of the medical staff, or due to the express request of the patient. Thus, the reports on the

frequency of the cesarean section and its intraoperative complications in times of the COVID-19 pandemic and after it will be relevant because they can show different results.

Conclusion

The prevalence of reintervention due to complications during cesarean section was 1.60%, the main cause was hemorrhage, and the clinical course was satisfactory with very low mortality.

Funding

The authors declare that no funding was received from any public or private institutions

Conflicts of interest

The authors declare no conflicts of interest.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. Right to privacy and informed consent. The authors have obtained approval from the Ethics Committee for analysis and publication of routinely acquired clinical data and informed consent was not required for this retrospective observational study.

Use of artificial intelligence for generating text.

The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

References

1. Antoine C, Young BK. Cesarean section one hundred years 1920-2020: the good, the bad and the ugly. *J Perinat Med.* 2021;49:5-16.
2. Vogel JP, Betrán AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J, et al. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. *Lancet Global Health.* 2015;3:e260-70.
3. Hehir MP, Ananth CV, Siddiq Z, Flood K, Friedman AM, D'Alton ME. Cesarean delivery in the United States 2005 through 2014: a population-based analysis using the Robson 10-group classification system. *Am J Obstet Gynecol.* 2018;219:105.e1-11.
4. World Health Organization. WHO Statement on Caesarean Section Rates. Geneva, Switzerland: WHO; 2015. Available from: https://apps.who.int/iris/bitstream/handle/10665/161442/WHO_RHR_15.02_eng.pdf
5. ACOG committee opinion No. 761. Cesarean delivery on maternal request. *Obstet Gynecol.* 2019;133:e73-7.
6. Silver RM, Landon MB, Rouse DJ, Leveno KJ, Spong CY, Thom EA, et al. Maternal morbidity associated with multiple repeat cesarean deliveries. *Obstet Gynecol.* 2006;107:1226-32.
7. Van Hart MA, van Dongen PW, Mulder J. Maternal consequences of caesarean section. A retrospective study of intra-operative and postoperative maternal complications of caesarean section during a 10-year period. *Eur J Obstet Gynecol Reprod Biol.* 1997;74:1-6.
8. Ortiz Fernández M, de la Rosa CP, Ponce RC. Riesgo de reintervención quirúrgica abdominal: Estudio de casos y controles. *Rev Esp Med Quir.* 2005;10:25-8.
9. Bergella V. Cesarean Birth: Postoperative Issues; 2015. Available from: <https://www.uptodate.com/contents/cesarean-birth-postoperative-issues>
10. Pérez-Guerra JA, Vázquez-Hernández M, Ramírez-Moreno R, López-García FR. Reintervenciones abdominales: prevalencia en cirugías electivas y urgencias. *Cir Cir.* 2017;85:109-13.
11. Paneque RE. Indicadores de calidad y eficiencia de los servicios hospitalarios. Una mirada actual. *Rev Cubana Salud Pública.* 2004;30:17-36.
12. Nomura RM, Alves EA, Zugaib M. Maternal complications associated with type of delivery in a university hospital. *Rev Saúde Pública.* 2004;38:9-15.
13. Umbeli T, Salah I, Kunna A, Elmhaghoub A, Nasr A, Rabaa A. Maternal and neonatal complications associated with caesarean section in the second stage of labour at Omdurman maternity hospital during 2012-2013. *Merit Res J Med Med Sci.* 2014;2:225-8.
14. Jain M, Patel A. A cross sectional study of rate, indications and complications of primary caesarean section. *Int J Reprod Contracept Obstet Gynecol.* 2016;5:1814-9.
15. Vázquez-Rodríguez JG, Fernández-Ruiz L, Camacho-Castillo L. Causas, curso, clínico y desenlace de pacientes con estancia prolongada en la unidad de cuidados intensivos de un hospital de Ginecoobstetricia de la ciudad de México. *Ginecol Obstet Mex* 2022;90:417-26.