

Incidence of Maternal Morbidity and Mortality Following Cesarean Delivery

Nada Abdulfattah, MBBCh* Samy Ismael, MBBCh, MSc, MD, PhD, German Board**
Marwa Hafiz, MRCPI*** Basma Al-Ansari, MD**** Deena Ashour, MD****

Background: Cesarean section (CS) is a mode of delivery usually performed when the vaginal delivery fails or the patient had more than one previous CS because of risk to the mother or the baby. Occasionally, CS is performed upon maternal request. World Health Organization (WHO) recommended that CS should only be performed due to medical need or lifesaving.

Objective: To evaluate the incidence rate, performance, and complications of cesarean sections.

Design: A Retrospective Cohort Study.

Setting: Obstetrics and Gynecology Department, King Hamad University Hospital, Bahrain).

Method: One thousand five hundred-one patients who underwent cesarean deliveries, either elective or emergency, during the study period from 1 January 2016 to 31 December 2017 were reviewed through Hope system and Labor and Delivery documents. Cases with postnatal complications related to cesarean deliveries were documented in an excel sheet. Patients who had complications unrelated to CS were excluded.

Result: One thousand five hundred one cesarean deliveries were reviewed; the incidence of cesarean deliveries increased from 729 (48.5%) in 2016 to 772 (51.4%) in 2017. The overall postoperative complications decreased from 81 (5.4%) in 2016 to 53 (3.5%) in 2017. The most common complication was surgical site infection which improved significantly through the study period from 45 (2.9%) in 2016 to 23 (71.5%) in 2017. Most cases were performed as emergency cesarean sections.

Conclusion: Although the cesarean section delivery rates have increased in our department and worldwide, we have managed to decrease postoperative complications and no mortalities.

Bahrain Med Bull 2019; 41(3): 138 - 140

Cesarean section is an invasive surgical procedure; unfortunately, it associated with many immediate and late morbidity and mortality risks¹. The first modern CS was performed by German gynecologist Ferdinand Adolf Kehrer in 1881². During the past few decades, the worldwide incidence of CS births has increased markedly leading to increased morbidity and mortality³.

The increasing rate of CS could be accepted if it leads to an improved neonatal outcome⁴. Even if the safety of CS has improved the neonatal outcome, the economic impact must be considered⁵.

CS is an important and useful surgical intervention for difficult deliveries. However, it should be used as the last resort. Patients and physicians elect to use CS delivery for a variety of reasons⁶. In addition, the rate of cesarean section over the past two decades has increased significantly due to non-medical reasons⁷.

However, when a cesarean section is performed upon maternal

request, surgery should not be done before 39 weeks of gestation to avoid the complications of prematurity, especially respiratory morbidity. Also, in women desiring a big family, cesarean section on maternal request should not be offered as the risk for placenta accrete and hysterectomy increase with each cesarean section⁸.

The increasing CS rates are a growing concern in many countries as it has increased hospital base delivery and access to healthcare⁹. Although it is a desirable procedure for many patients and often necessary, CS is occasionally performed unnecessarily out of fear of being sued and profitability¹⁰.

Data obtained from 150 countries revealed that 18.6% of all births were delivered by CS. The highest rate was 40.5% in Latin America and the Caribbean region, followed by 32.3% in Northern America, 31.1% in Oceania, 25% in Europe, 19.2% in Asia and 7.3% in Africa. The trend analysis on data collected from 121 countries between 1990 and 2014 showed that the global CS average rate has increased by 12.4% (6.7%- 19.1%) with an annual increase rate of 4.4%¹¹.

* Senior House Officer
** Consultant
*** Registrar
**** Senior House Officer
Department of Obstetrics and Gynecology
King Hamad University Hospital
Kingdom of Bahrain
E-mail: nada.abdulfattah@khuh.org.bh

A few indications for CS are absolute, considering that vaginal delivery would be extremely dangerous. The indications of CS include birth canal defects, previous cesarean delivery, cephalo-pelvic disproportion, maternal infection, mechanical obstruction to vaginal birth, women with an abdominal cerclage, invasive carcinoma of the cervix and malpresentations¹²⁻¹⁵.

Indications for elective repeat cesarean section include prior classical or inverted T-shaped uterine incision or other transfundal uterine surgery, previous uterine rupture, medical or obstetric complications (such as placenta previa), two prior uterine scars and no vaginal deliveries¹².

Hall et al showed that emergency CS delivery was associated with an almost nine-fold risk of maternal death relative to that of vaginal delivery, while elective CS delivery was associated with an almost threefold risk¹⁶. Even after controlling medical and obstetric complications, maternal age and preterm delivery a fourfold increase in maternal mortality with CS is expected¹⁷.

Hawkins et al revealed that of 129 maternal deaths, 82% were due to anesthesia in patients who had CS deliveries and 52% in patients under general anesthesia¹⁸.

The most frequent postoperative infection after CS delivery is endometritis; the risk after cesarean delivery is 35-40% in the absence of prophylactic antibiotics. Prophylactic antibiotics decrease the overall incidence of infection by 60%¹⁹.

The aim of this study is to evaluate the incidence rate and complications of cesarean sections.

METHOD

Patients who underwent cesarean deliveries, either elective or emergency during the study period from 1 January 2016 to 31 December 2017 were reviewed. One thousand five hundred one patients were reviewed through Hope system and Labor and Delivery documents. Cases with postnatal complications related to cesarean deliveries were documented in an excel sheet. Patients who had complications unrelated to CS were excluded.

RESULT

Atonic postpartum hemorrhage was 20 (1.3%) in 2016 and 13 (0.8%) in 2017. Peripartum CS-hysterectomy was 1 (0.06%) in 2016 and 1 (0.06%) in 2017.

In this study, the incidence of cesarean section revealed a mild plateau from 25.59% in 2016 to 26.53% in 2017.

In this study, the overall incidence of complications was 11.11% in 2016 and 6.86% in 2017.

Table 1: Cesarean and Spontaneous Vaginal Deliveries

Categories	2016 No (%)	2017 No (%)	Total
Spontaneous Vaginal Deliveries	2,119	2,138	4,257
Cesarean Section	729 (48.5%)	772 (51.4%)	1,501 (100%)

Table 2: Categories of Cesarean Delivery

Categories of CS	2016 No (%)	2017 No (%)
Category 1 & 2	448 (29.8%)	473 (31.5%)
Category 3 & 4	281 (18.7%)	299 (19.9%)
Total	1,501 (100%)	

Table 3: Cesarean Section-Related Complications

Complication	Year 2016 No (%)	Year 2017 No (%)
Purpural pyrexia	10 (0.7%)	15 (0.9%)
Postpartum hemorrhage	20 (1.3%)	13 (0.8%)
CS-hysterectomy	1 (0.06%)	1 (0.06%)
Surgical Site Infection	45 (2.9%)	23 (1.5%)
Urinary bladder injury	5 (0.3%)	1 (0.06%)
Bowel injury	0	0
Maternal death	0	0
Burst abdomen and septic shock	0	0
Total CS-related complications	81 (5.4%)	53 (3.5%)
	134 (8.9%)	

DISCUSSION

The high rate of cesarean deliveries does not have any additional benefits and it increases the burden on the health services.

The justification for increasing cesarean section rates is difficult to prove not only economically, but also regarding maternal and fetal morbidity and mortality. Wide variations between different regions and medical centers suggest clinical uncertainty and practical variations. There is no ideal cesarean section rate but WHO states that there are no additional health benefits with rates above 10- 15%.

In this study, the incidence of cesarean section revealed a mild plateau from 2016 (25.59%) to 2017 (26.53%). The United States cesarean delivery rate in 2016 was 31.9%²⁰. Increased CSR in developed countries is largely due to fear of litigation, health insurance system and CS by choice.

In our study, increased C-section rate is not the result of medicolegal concern or health insurance system. Patients are not given the autonomy unless in dire health need or in patients with previous cesarean sections refusing the trial of labor. Our high C-section rate is due to the high rate of emergency sections.

The increasing rates of cesarean deliveries also increase the rate of complications; it also increases the future rates of cesarean deliveries as most patients will choose to go for an elective cesarean in their subsequent pregnancies.

In general, the most common complication of cesarean delivery is puerperal infection which increases with prolonged labor, rupture of membranes and maternal diseases such as DM²¹.

In this study, the overall incidence of complications is 11.11% in 2016 and 6.86% in 2017.

Hou et al found that implementing an evidence-based bundle lowered the rate of surgical site infection²². The bundles varied but included at least three of the following: the use of prophylaxis antibiotics, using clippers instead of razors, preparing the skin with chlorhexidine, following aseptic surgical technique, patient education, staff education, and skin closure specifications. Unscheduled cesarean delivery is a major risk factor for wound complications, even when evidence-based interventions to reduce post-cesarean delivery wound complications have been administered. In one study, 28 percent of such patients had a wound complication²³.

The incidence of postpartum surgical site infection was not accurately identified because most cases are recognized only after discharge. This suggests the necessity to perform post-discharge surveillance to obtain more accurate SSI rates.

WHO defines maternal death as maternal death during pregnancy or within 42 days of delivery or termination of pregnancy from any cause related to or aggravated by pregnancy or pregnancy-related condition irrespective of the duration and site of pregnancy²⁴. In this study, there was no maternal mortality following cesarean sections.

CONCLUSION

The study revealed that the most common indications of cesarean section are repeat cesarean, fetal distress and malpresentation.

VBAC could reduce cesarean delivery rates in patients with term singleton fetuses with vertex presentations. Patients refusing vaginal delivery after previous cesarean section due to fear of labor pains should be counseled regarding analgesia during labor.

Using fetal scalp blood sampling if EFM patterns are non-reassuring has been associated with reduced cesarean delivery. Also, intermittent auscultation rather than continuous EFM has been associated with a decrease in cesarean delivery rates.

Author Contribution: All authors share equal effort contribution towards (1) substantial contribution to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version should be published. Yes.

Potential Conflicts of Interest: None.

Competing Interest: None.

Sponsorship: None.

Acceptance Date: 16 July 2019.

Ethical Approval: Approved by the Research and Ethics Committee, King Hamad University Hospital, Bahrain.

REFERENCES

1. Althabe F and Belizan JM (2006): Cesarean section: the paradox, *Lancet*; 368: 1472-3.
2. Sharma, Reena & Dogra, Poojan. (2017). Indications and rate of caesarean delivery at tertiary care hospital: a retrospective study. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 6. 4367. 10.18203/2320-1770.ijrcog20174406.
3. Pinette MG et al. (2004): Vaginal births after cesarean rates are declining rapidly in the rural state of main. *Journal of Maternal –Fetal & Neonatal Medicine*; 16:37-43.
4. Feng XL, Xu L, Guo Y, Ronsmans C (2012): Factors influencing rising caesarean section rates in China between 1988 and 2008, *Bull World Health Organ*; 1;90(1):30-9, 39A.
5. U.S. National Institutes of Health (2010): “Cesarean Section – A Brief History: Part 2”. 2009-06-25. Retrieved 2010-11-27.
6. Paterson-Brown S. (1998). Should doctors perform an elective caesarean section on request? Yes, as long as the woman is fully informed. *BMJ (Clinical research ed.)*, 317(7156), 462–463.
7. Deng W, Klemetti R, Long Q, Wu Z, Duan C, Zhang WH, Ronsmans C, Zhang Y, Hemminki E (2014): Cesarean section in Shanghai: women’s or healthcare provider’s preferences? *BMC Pregnancy Childbirth*; 22;14:285.
8. Weiner Z (2014): What should we tell our patient who requires cesarean section?. *Harefuah*.; 153(6):327-8.
9. Nagy S (2014): Changing trends and indications for cesarean section in the last few decades 2014 Jul 20;155(29):1140-6
10. Dosa L (2011): Cesarean section delivery, an increasingly popular option. *Bulletin of the world Health Organization*; 79 (12): 1173.
11. Ana Pilar Bertan, Juanfeng Ye, Anne-Beth Moller et al, The increasing trends in carsarean seation rates; *Global, Regional and National Estimates 1990-2017*. PLOS, February 5,2016
12. Apuzzio JJ, Vint-zileos AM, Iffy L (eds) (2006): *Cesarean section, Operative Obstetrics 3rd edition*. Taylor & Francis, London and New York; 364: 386.
13. Riley LE, Greene MF. Elective caesarean delivery to reduce transmission of HIV. *New England Journal of Medicine*. 1999;340:1034.
14. Craft, Shonda M et al. “Pregnancy decisions among women with HIV.” *AIDS and behavior* vol. 11,6 (2007): 927-35. doi:10.1007/s10461-007-9219-6
15. Cunningham FG, Kenneth J, Steven L, John C, Larry and Katharine D (2005): *Cesarean delivery and peripartum hysterectomy Williams Obstetrics 22nd edition*. McGraw-Hill, New York, NY: 587-604.
16. Hall MH and Bewley S (1999): Maternal Mortality and Mode of delivery. *Lancet*; 354-776
17. Harper MA, Byington RP, Espeland MA, et al. (2003): Pregnancy related death and health care services. *Am J ObstetGynecol*; 102: 273-8.
18. Hawkins H, Koonin IM, Palmer SK, et al. (1997): Anesthesia-related death during obstetric delivery in the united States 1979-90. *Anesthesiology*; 86: 277-84.
19. Weis JL, Malone FD, Emig D, et al (2004): Obesity, obstetric complications and cesarean delivery rate- a population-based screening study. *Am J ObstetGynecol*; 190: 1091-7.
20. CDC, National center for health statistics, 2016
21. Conroy, Kelley et al. “Infectious morbidity after cesarean delivery: 10 strategies to reduce risk.” *Reviews in obstetrics & gynecology* vol. 5,2 (2012): 69-77.
22. Hou L et al. (2014): Cesarean delivery rate and indications in mainland China: a cross sectional study in 2011. *Zhonghua Fu Chan KeZaZhi*.; 49(10):728-35.
23. Raghuraman N, Temming LA, Stout MJ, Macones GA, et al, Intrauterine Hyperoxemia and Risk of Neonatal Morbidity, *Amedeo literature guide*, March 2017.
24. Patwardhan, M et al. “Maternal death: Case definition and guidelines for data collection, analysis, and presentation of immunization safety data.” *Vaccine* vol. 34,49 (2016): 6077-6083. doi:10.1016/j.vaccine.2016.03.042