
COMPLICATIONS AND RISKS OF CESAREAN BIRTH

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Abstract: Cesarean section is a surgical procedure that is most often performed in gynecology and obstetrics. In the world, including in our country, there is a trend of increasing the number and liberalization of cesarean sections. It is hard to believe that the very high frequency of cesarean sections has a medical justification. In current obstetric practice, the relative safety of cesarean delivery, focuses on short-term rather than long-term outcomes for the mother. However, after a cesarean section, women are at increased risk for a number of chronic gynecological conditions. The aim of the research is to determine the complications and risks of cesarean delivery in different parts of the world.

Materials and methods: The article is the result of a review of scientific literature published in English and Bosnian. Using the search engine scholar.google.com and the Pubmed database, and using the keywords "cesarean section", "complications", "mortality" and "morbidity", 11 scientific papers were selected, which were published in the period 2013-2022. years.

Results: By reviewing the scientific literature, we selected 11 scientific papers, from different parts of the world, which talk about the risks and complications of cesarean delivery. Complications that occur after cesarean delivery are shown in separate studies. The trend of increasing cesarean deliveries in twin pregnancies has led to increased morbidity and mortality of mothers and fetuses, as well as severe maternal morbidity in patients who were in trial delivery after a previous cesarean delivery, and an increased risk of deaths after cesarean delivery compared to vaginal delivery.

Conclusions: Cesarean section is the cause of up to three times higher maternal mortality rate compared to vaginal birth, either directly or by contributing to the existing risks. Common early maternal complications are postpartum hemorrhage, wound infection, and prolonged hospital stay. After a previous cesarean birth, a trial birth should be performed in institutions with 24-hour surgical services and under the constant supervision of qualified experts. Cesarean delivery in twin pregnancies is associated with increased maternal and fetal morbidity and mortality.

Keywords: cesarean section, complication, mortality, morbidity.

1. INTRODUCTION

Cesarean section is a surgical procedure that is most often performed in gynecology and obstetrics (Słabuszewska-Józwiak et al., 2020). In the world, there is a trend of increasing the number and liberalization of cesarean sections. It is hard to believe that the very high frequency of cesarean sections, over 20% in some institutions in the world, has a medical justification. It is believable that paramedical reasons such as avoiding even the slightest risk of fear of lawsuits, court processes and the like contribute to this (Tadić et al., 2003). Globally, the high rate of cesarean section is a public health issue (Kalisa et al., 2017). More than a century ago, cesarean section was avoided due to the high mortality rate, while today it is the method of delivery for every third woman in the United States of America and four out of five women in some other places of the world (Antoine et al., 2020). In many parts of the world, one of the reasons for the increased number of cesarean sections is the increasing number of women requesting cesarean section in the absence of clear medical indications, such as placenta praevia, HIV infection, contracted pelvis and pelvic presentation or previous cesarean delivery. Differences in neonatal physiology following cesarean delivery and vaginal delivery are thought to have implications for the infant, with cesarean section potentially increasing the risk of compromised health in both the short and long term. (Lavender et al., 2012). Many studies that have been done raise the question of how justified it is, medically and ethically, to perform

a cesarean section exclusively at the request of a pregnant woman (Gradinščak et al., 2017). Pregnancy, after a previous cesarean birth, is potentially dangerous because of the scar on the uterus. If not recognized and treated, it can lead to unwanted complications during all three trimesters of pregnancy. The late consequences of cesarean delivery, such as placenta previa and placenta accreta, have been known since ancient times, but it took more than a decade for the obstetric community to establish the connection between placenta accreta and pregnancy with a cesarean scar (Timor-Tritsch et al., 2019). A rare but potentially fatal complication of the next pregnancy, after a previous cesarean delivery, is uterine rupture. In current obstetric practice, the relative safety of cesarean delivery focuses on short-term rather than long-term outcomes for the mother. After a cesarean section, women are exposed to an increased risk of a number of chronic gynecological conditions. These include surgical adhesions, pain, infertility, irregular bleeding, painful intercourse, painful periods and endometriosis (Lavender et al., 2012).

2. MATERIALS AND METHODS

The article is the result of a review of scientific literature published in English and Bosnian. Using the search engine scholar.google.com and the Pubmed database, and using the keywords "cesarean section", "complications", "mortality" and "morbidity", out of a total of 680 scientific papers, on the topic of complications and risks of cesarean delivery, they were singled out. 11, and were published in the period 2013-2022. years.

3. RESULTS

Table 1. Summary of study characteristics

Author	Name of the study	Research objective/s	Materials and methods	The results
Kyvernitakis et al., 2013	Increased number of cesarean deliveries of twins in Germany from 1990 to 2012.	Longitudinally investigate the trend of increasing cesarean delivery in twin pregnancies and the association of cesarean delivery with increased maternal and fetal morbidity and mortality.	Between 1990 and 2012, data on the mode of delivery of 18,132 twin pregnancies were analyzed in Hassen, Germany, and were divided into 4 categories according to weeks of pregnancy (<28, 28-31, 32-36, >36). The cesarean delivery rate was also analyzed and divided into 3 categories: university hospitals with a perinatal center, non-university hospitals with a perinatal center, and smaller clinics without a perinatal department.	Cesarean section rates changed from 63.6%, 88.9%, 59.6% and 40% in 1990 to 74.2%, 95.5%, 76.9% and 68.7% in 2012 year. The total increase in the birth of twins by cesarean section in the last 23 years was 23.5%. The increase in cesarean sections in university hospitals with perinatal departments, in non-university hospitals with perinatal departments and in smaller hospitals without perinatal departments was 16.8%, 21% and 22.1%. Combined caesarean sections increased from 3.9% in 1990 to 7.0% in 2012. The results indicate a large increase in cesarean deliveries in twin pregnancies from 1990 to 2012.

Table 2. Summary of study characteristics

Author	Name of the study	Research objective/s	Materials and methods	The results
Kalisa et al., 2017	Perinatal and maternal outcome after prior cesarean section in Rwanda	Perinatal and maternal outcomes were compared between offered natural delivery, cesarean delivery and elective repeat cesarean delivery in a hospital in Rwanda.	In a retrospective cohort study, data were extracted from all women admitted for delivery at the Ruhengeri Maternity Hospital in Rwanda, between June 2013. and December 2014. and who had delivered by cesarean section in their previous pregnancy.	Of 435 women with a previous cesarean delivery, 297 (68.3%) patients underwent a trial vaginal delivery, and 138 (31.7%) patients underwent an elective cesarean section. 134 patients (45.1%) had a vaginal delivery, and 163 (54.9%) patients underwent an emergency cesarean section after an unsuccessful trial delivery. Severe maternal morbidity was higher in patients who were in trial delivery.

Table 3. Summary of study characteristics

Author	Name of the study	Research objective/s	Materials and methods	The results
Sharma et al., 2018	Vaginal delivery versus cesarean delivery	The aim of the research was to find and compare the complications of cesarean section compared to vaginal delivery.	A descriptive study was conducted in two hospitals in Nepal.	Out of 550 women giving birth, 408 of them gave birth vaginally, and 142 gave birth by cesarean section. Maternal complications were postpartum hemorrhage 116, prolonged labor 47 and wound infection 42, which indicates that complications were more common in mothers born by cesarean section.

Table 4. Summary of study characteristics

Author	Name of the study	Research objective/s	Materials and methods	The results
Young et al., 2018	Childbirth after previous cesarean delivery and neonatal and maternal morbidity	To compare the outcome of vaginal delivery after cesarean section versus repeat cesarean section for mother and newborn.	Data from the discharge database, which includes all single-sex deliveries to women in Canada between 37 and 43 weeks of pregnancy between April 2003 and March 2015, were used. All women had previously given birth by cesarean section. Logistic regression was used to estimate adjusted rate ratios (RR) and 95% confidence intervals (CI).	Severe maternal morbidity and mortality were higher in women after attempted vaginal delivery compared to women who delivered by elective cesarean section (10.7 vs. 5.65 per 1000 births). An increase in severe neonatal morbidity and mortality was associated with vaginal delivery after cesarean delivery.

Table 5. Summary of study characteristics

Author	Name of the study	Research objective/s	Materials and methods	The results
Kallianidis et al., 2018.	Cesarean section in the Netherlands and maternal mortality	To investigate the incidence of maternal mortality caused by cesarean section and the relationship between the operation and morbid events leading to death in the Netherlands.	All maternity hospitals in the Netherlands between January 1, 1999. and December 31, 2013. were included in a retrospective cohort study investigating maternal deaths.	For 100,000 cesarean sections, the risk of death was 21.9, while the risk for death after 100,000 vaginal deliveries was 3.8. Death directly related to cesarean complications occurred in 2 women per 100,000 cesarean sections.

Table 6. Summary of study characteristics

Author	Name of the study	Research objective/s	Materials and methods	The results
Yerba et al., 2020	Surgical site infection after cesarean section and associated factors	To determine which preoperative factors led to surgical site infection in patients delivered by emergency cesarean section at a hospital in Peru.	In a case-control study in Arequipa, Peru, patients who had an infection at the surgical site after cesarean delivery were included.	In 4346 cesarean sections, infection at the surgical site developed in 2.4% of cases. Anemia, moderate anemia, number of vaginal births greater than five and onset of vaginal birth were factors associated with infection.

Table 7. Summary of study characteristics

Author	Name of the study	Research objective/s	Materials and methods	The results
Nedberg et al., 2020	Cesarean section among primiparous women in Georgia	Determine which factors were associated with cesarean section in primiparous women.	The registry-based study included 17,065 single-sex primiparous women from 37 to 43 weeks of pregnancy.	The share of cesarean sections was 37.1%. There was a higher probability of cesarean delivery in older primiparous women, obese women, and children weighing ≥ 4000 g. The high rate of cesarean delivery at 37-38 weeks of pregnancy raised concerns about the welfare of the newborn.

Table 8. Summary of study characteristics

Author	Name of the study	Research objective/s	Materials and methods	The results
Pires-Menard et al., 2021	The emergency cesarean section at term and severe neonatal outcomes	To determine and identify risk factors leading to severe neonatal outcomes in neonates born by emergency cesarean section.	The study included primiparous women who were delivered at term by emergency cesarean section at a Brisbane hospital between December 2007 and April 2017. Defined neonatal outcomes were admission to the NICU, severe acidosis, Apgar score ≤ 3 and 5 at birth and death.	Neonates born by emergency cesarean section had a lower median BMI and were delivered before 41 weeks of gestation. Umbilical cord prolapse, unsuccessful instrumental delivery and discouraging fetal status are the most common indications for cesarean delivery.

Table 9. Summary of study characteristics

Author	Name of the study	Research objective/s	Materials and methods	The results
Negrini et al., 2021	Vaginal birth and cesarean birth - a comparison	To compare the rate of breastfeeding in the first hour after delivery, the rate of admission of the newborn and the mother to intensive care, the costs of hospitalization and readmission to the hospital up to 30 days after delivery, whether it is a vaginal birth or a cesarean section in a private hospital in Brazil.	A retrospective study was conducted from a hospital database from 2016 to 2019, which included low-risk same-sex pregnancies at term with cephalic presentation, without prior cesarean section.	A total of 9,345 births were analyzed. The group of patients delivered by cesarean section had a much worse rate of breastfeeding in the first hour after delivery (92.57% versus 88.43%), a higher percentage of admission to the intensive care unit for the newborn and the mother (0.8% versus 0.3% and 6.7% compared to 4.5%) and the higher average cost of hospitalization (BRL 14,342.04 compared to BRL 12,230.03).

Table 10. Summary of study characteristics

Author	Name of the study	Research objective/s	Materials and methods	The results
Bizuayew et al., 2021	Factors associated with surgical site infection after cesarean section in the East Gojjam zone of Northwestern Ethiopia.	To determine risk factors for surgical site infection after cesarean section in primary hospitals in the eastern zone of Gojjam, northwestern Ethiopia.	Retrospektivna studija provedena je od 10. do 30. rujna 2020. u tri primarne bolnice u istočnoj zoni Gojjam.	Out of 622 cesarean operations, 77 (12.4%) had an infection at the operation site. Rural populations, labor lasting longer than 24 hours, water rupture >12 hours, hypertension and preoperative hematocrit $\leq 30\%$ are factors associated with infections after cesarean section.

Table 11. Summary of study characteristics

Author	Name of the study	Research objective/s	Materials and methods	The results
Chen et al., 2022	Experience in different modes of delivery in twin pregnancies.	To study the maternal and prenatal outcomes of twin pregnancies with different modes of delivery.	A retrospective study with data collected from a regional hospital in Taiwan, including vital twin pregnancies born at a gestational age of 32 weeks and above. Medical records were reviewed for prenatal conditions and postpartum outcomes.	98 pairs of twins were included, of which 44.9% were born via vaginal delivery. Patients born vaginally had a longer time interval between twins (5.7 ± 5.6 vs. 1.5 ± 0.9 min, $p < 0.01$), less blood loss (198.7 ± 144.1 vs. 763.2 ± 332.3 ml, $p < 0.01$) and had a shorter stay in the hospital (3.0 ± 0.5 vs. 5.7 ± 0.5 days, $p < 0.01$) compared to patients delivered by cesarean section.

4. DISCUSSION

A review of the scientific literature identified 11 scientific papers from different parts of the world that talk about the risks and complications of cesarean delivery. Kyvernitakis A in a study conducted in Germany, indicate a dramatic increase in cesarean births in twin pregnancies in the period from 1990 to 2012 (Kyvernitakis A et al., 2013), while Chen J in a retrospective study conducted in Taiwan, indicate the benefits of vaginal delivery in twin pregnancies, which implies less blood loss and a shorter hospital stay compared to patients delivered by cesarean section (Chen J et al., 2022). Complications in the form of maternal and perinatal outcomes during the offered natural birth and elective repeat cesarean birth in Rwanda, Kalisha R found that severe maternal morbidity was higher in patients who had a trial birth (Kalisha R et al., 2017), and the same complications are indicated by Young CB research and associates done in Kanda (Young CB et al., 2018). Research by Sharma S, which was carried out in Nepal, indicates a greater number of complications during cesarean delivery compared to vaginal delivery (Sharma et al., 2018), and in Brazil, Negrini R found that in the group patients delivered by cesarean section had a significantly worse rate of breastfeeding in the first hour after delivery, a higher number of admissions of newborns and mothers to the intensive care unit, and a higher cost of hospitalization, compared to the group of patients delivered by vaginal delivery (Negrini et al., 2021). Kallianidis AF conducted research in the Netherlands, which indicates that maternal mortality after cesarean section was three times higher compared to vaginal delivery (Kallianidis AF et al., 2018), while Pires-Menard A and associates in Brisbane come to the conclusion that emergency cesarean section is incision associated with a higher risk of severe neonatal outcome, low birth weight, and an additional independent risk factor for poor birth conditions (Pires-Menard A et al., 2021). As factors associated with surgical site infection after emergency cesarean delivery Yerba K cite mild anemia, moderate anemia, the number of vaginal examinations greater than five and the beginning of vaginal delivery (Yerba K et al., 2020), while research conducted in Ethiopia, by Bizuayew H indicates that preventing prolonged labor and early rupture of amniotic fluid, proper care of patients with comorbidities such as hypertension, strengthening prophylaxis and treatment of anemia during prenatal care, as well as raising the awareness of rural residents, affects the reduction of the risk of surgical site infection (Bizuayew H et al., 2021). Risk factors associated with cesarean section, in the Nedberg IH study and collaborators, conducted in Georgia, are female obesity, older first-time mothers and child weight ≥ 4000 g (Nedberg IH et al., 2020).

5. CONCLUSIONS

Guided by the goal set during the research, the following can be concluded:

1. Cesarean section is the cause of up to three times higher maternal mortality rate compared to vaginal birth, either directly or by contributing to the existing risks.
2. Common early maternal complications of cesarean section are postpartum hemorrhage, wound infection, and longer hospital stays.
3. Trial delivery after a previous cesarean section should be performed in institutions with 24-hour surgical services and under the constant supervision of qualified specialists due to the risk of severe maternal morbidity.

4. The trend of cesarean delivery in twin pregnancies is associated with increased fetal and maternal morbidity and mortality.
5. Cesarean births are more expensive and have worse perinatal outcomes

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