PROFESE ONLINE
recenzovaný časopis pro nelékařské zdravotnické obory

ISSN 1803-4330
DOI: 10.5507/pol.2020.001
volume 12 / 2 • December 2019

Caesarean section and risks for mother

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ABSTRACT

Introduction: A caesarean section is the most common obstetric operation that terminates pregnancy and delivery in the third trimester. It is the surgical procedure and like any other surgery, it poses certain risks. According to current studies, after the caesarean section is performed it is possible to observe a link between the operation and occurrence of gynaecological problems, complications in subsequent pregnancies, and dysfunction of mother's pelvic floor.

Aim: The main aim of this review was to present and summarize the published findings of the issue of caesarean section from the perspective of maternal risks.

Methodology: Electronic information databases PubMed, EBSCO, Medvik (BMČ), and Google Scholar were used for searching literature sources. Documents from the period of 2007–2018 were searched using keywords verified in the Medical Subject Headings thesaurus and combined using Boolean operators.

Findings: In the perspective of short-term risks, planned caesarean delivery is comparable with vaginal birth. However, an acute caesarean delivery is associated with a higher incidence of blood loss, visceral injury, infectious and thromboembolic complications. The long-term risks of caesarean delivery consist of gynaecological problems such as intermenstrual spotting, dysmenorrhoea, and pelvic pain. caesarean delivery also poses significant risks for future pregnancies.

Conclusions: Many studies dealings with the risks of caesarean section show inconsistent results. In the context of the increasing number of caesarean sections, more detailed research is needed to clarify this area of interest.

KEY WORDS

Caesarean section, uterine scar, subsequent pregnancy, pelvic floor disorder

LITERATURE OVERVIEW QUESTION

In connection with the growing number of caesarean sections in the Czech Republic and elsewhere, we may ask the following question: What risks does a caesarean section pose for the mother?

BACKGROUND

Caesarean section, section caesarea (CAESAREAN DELIVERY) in Latin, is considered a relatively safe procedure in the developed world due to widely available antibiotics, aseptic methods as well as improving surgical techniques (1). Worldwide, the number of caesarean sections is on the rise, yet there the distribution varies considerably among regions. For instance, in 2014 in south America, the caesarean section accounted for 42.9 % of all deliveries which makes it a continent with the highest caesarean delivery rate. Contrarily, in Africa where the rate is the lowest, the caesarean delivery accounts for 7,3 % (2). In the Czech Republic (CR), the number of caesarean deliveries doubled between 1992-2007. According to the Institute of Health Information and Statistics of the Czech Republic, in 2014 the rate of caesarean delivery was 26.9 % and the value remained the same in 2015 (3). Some European countries seem to have the number of caesarean deliveries under control. The slowest increase of caesarean delivery rate in Europe and in the world is reported in Finland. In 2014, the number was just below 15 %. Despite differences among European countries in the number of primiparas, older mothers or obesity rates, it is unlikely that these differences

can sufficiently explain the unequal rates of caesarean delivery in each country (2). According to WHO, the ideal rate should be between 10-15 % as a higher number does not lead to a significant improvement in the perinatal care. If there is no health indication for a SC, it should not be performed with mothers who otherwise presents no complications. The surgery may in some cases increase the risks for the mother and the child. At present, there is no internationally recognized classification system which could be used to make a relevant comparison of SC's indications between countries or facilities. The WHO suggests "Robson classification" which has been used frequently over the past years. This classification divides pregnant women into ten categories according to the basic obstetric characteristics – parity, mode of delivery, gestational age, foetal lie and number of foetuses (4).

DESCRIPTION OF THE RESEARCH STRATEGY

To search for literature sources, the following electronic information databases were used: PubMed, EBSCO, Medvik (BMČ) and Google Scholar. In order to achieve as many relevant sources as possible, not only simple, but also advanced search was used. The period searched was set from 2007-2018, in Czech, Slovak, and in English. Exclusion criteria were duplicity, documents not meeting the criteria, theses, and documents dealing with the selected topic only partially.

LITERATURE OVERVIEW

SC risk for the mother

The caesarean delivery is mostly performed in order to save the mother's or child's life or as a complication prevention. In the Czech Republic, the surgery must be justified by obstetric or non-obstetric indications. The most common indications in the Czech Republic are foetal hypoxia, breech position, or other pathologies of foetal lie, and multiple pregnancies. In the developed world, the reasons for a caesarean delivery are similar, the differences being only in the order of the indications (5). In the Czech Republic, the mother's wish is not considered an indication, yet in the USA or in Mexico it is. This may be one of the factors of the increasing number of caesarean delivery in these countries (6). Women choose caesarean delivery mainly because they fear birth pain and injury to the pelvic floor with subsequent sexual dysfunction. They sometimes opt for caesarean delivery in a false belief that it is safer for the child and themselves (7). At present, the issue of caesarean delivery by choice is a heated discussion topic and brings us to the question whether a woman has a choice in the mode of delivery in the 21st century (5). The surgery itself is not without risks and the decision lies with the surgeon or obstetrician who must weigh the risks and benefits and justify the procedure (7). According to WHO, a caesarean delivery is effective when performed from medical indication as a life-saving procedure for the mother or the child. WHO also stated that there is no relation between lower mother mortality and the rate of caesarean delivery above 10 % (4). A caesarean delivery may significantly lower perinatal mortality and morbidity in case of mother of foetal complications. However, at present time, the number of caesarean deliveries performed without any medical or obstetric indication is on the rise. (8). In developed countries, a caesarean delivery is considered as safe as a vaginal delivery due to the minimal short-term risks for the mother or the child (infection, haemorrhage, visceral injuries, vein thrombosis). With elective SC, the risks are similar to the vaginal delivery, yet with an acute SC, there may be up to six-times more complications. The aim of the obstetricians is to minimize the number of acute SC's in favour of the elective SC's. As a result, the number of planned caesarean delivery is increasing even when the pregnancy may have ended physiologically (5). However, the long-term risks and benefits of a caesarean delivery have not been fully discussed. This may be due to an insufficient number of relevant studies or contradictory results. In the developing countries, there are still significant risks of short-term adverse effects for the mother after a caesarean delivery without medical indication (8).

The effect of caesarean delivery on the risks for gynaecological complaints

The scar after an caesarean delivery may be the source of several gynaecological complications, namely abnormal uterine bleeding (AUB), intermenstrual spotting, pelvic pain, dysmenorrhea and dyspareunia. There are some hypotheses explaining these occurrences (9). One of them is that due to changes in connective tissue in the scar, which is no longer functioning properly, and the contractility of the myometrium is impaired. As a result, myometrial hypertrophy forms in the front uterine wall and the subsequent morphological changes cause the above-mentioned symptoms (10).

Another problem may lie in a poorly healed scar ("niche"). This could become a reservoir in which menstrual blood accumulates and could cause AUB. Vervoort et al. (11) claims that the niche is present in more than half of the women who underwent SC. The niche may form due to an incision preformed too low on the uterine cervix or a wrong suturing technique (incomplete closure of the uterine wall caused by e.g.

single-layer suturing). There are also other surgical procedures which may increase the risk of adhesions, such as incomplete closure of peritoneum, poor homeostasis, tissue ischemia, tissue manipulation or using a wrong type of suturing material (11).

The caesarean delivery may also cause some of the pathological conditions on the uterus, namely damage to and enlargement of the lower uterine segment (LUS). The created protrusion in the point of the defect on the uterine wall accumulates menstrual blood and capillary dilation occurs with possible adenomyosis in the place of the scar (9). Lymphocytic infiltration with consequent damage to the lower uterine segment may also appear and contribute to chronic pelvic pain and dyspareunia. The study which evaluated prevalence of clinical complaints linked with a defective caesarean delivery scar confirmed this association and also explained the link between the size of the defect and the reported complaints. The size of the defect was assess using transvaginal ultrasound (12). A relation between the defective scar and dyspareunia was not confirmed. With the growing number of SC's, the risk for greater scar defects and subsequent gynaecological problems increases.

When clinical complaints are present, a surgical treatment is recommended which means removal of the defective part of the scar and re-suturing of the myometrium. The procedure can be performed from a hysteroscopic, laparoscopic, and vaginal approach. The choice depends on the distance between the defect and the internal orifice, the defect size and the surgeon's dexterity. It is also possible to carry out hysteroscopic resection of the frontal uterine wall, but this is the preferred option for women who do not plan pregnancy in future as the procedure makes the uterine wall thinner (9).

C-section risks to subsequent pregnancy

One of the risks that may occur after a C-section is a problem with getting pregnant in the first place. The most common problems that occur in pregnancy after a C-section are: perinatal death, placenta praevia and accreta, placenta abruption, uterine rupture, ectopic pregnancy in c-section scar, and stillbirth. It is estimated that out of 1500 caesarean deliveries, there will be 166 women with subfertility. In subsequent pregnancies, there will be 3 cases of placenta previa, 2 with uterine rupture and 21 miscarriages and one stillbirth (8).

A Danish study observing 24 839 women with a vaginal as well as caesarean delivery in history clearly indicates that subsequent pregnancy after a c-section is not linked with a higher risk of miscarriage, stillbirth nor prem-term birth compared to women after a vaginal delivery. However, in women after caesarean delivery, there was an increased risk of anaemia, placental abruption, uterine rupture and hysterectomy. All factors that may have influenced the findings have been adjusted for (age, BMI, alcohol abuse, etc.). The study also confirms a higher occurrence of abnormal placentation. Women after a caesarean delivery had higher subfertility rates compared to women after a vaginal delivery and the number of children was also lower (13).

According to a systematic review by Marshall, Fu and Guise, looking at the consequences of multiple caesarean deliveries for women's health, the number of complications associated increases with every c-section. Especially in women who underwent three or more caesarean deliveries, the risk of mother morbidity increases progressively. These women have a significantly higher risk of placenta previa and placenta accreta and hysterectomy, mostly due to placental disorders, uterine atony, and uterine rupture. Women who wish to have more children should be informed about the risks associated with an elective caesarean delivery (14).

A Norwegian study confirms a slightly increased risk of a past caesarean delivery to placental complications, both placenta previa and accreta, as well as placental abruption. In women after a caesarean delivery, there is an increase risk of preeclampsia, bleeding during pregnancy, and intrauterine foetal restrictions. However, these complications may be linked to the above-mentioned placental conditions. The authors oppose the conclusions of the aforementioned study by Marshall, Fu and Guise (14) that a greater number of caesarean deliveries increases the rate of maternal morbidity. Contrarily to this, they claim that uterine rupture and placental abruption occur only rarely after a caesarean delivery. A caesarean delivery performed at the beginning of labour may serve as a preventive measure from placental abruption and uterine rupture. Therefore, it is necessary to consider the mode of delivery and carefully weigh the risk and benefits of given options (15).

Among mothers with a higher number of caesarean deliveries, there is a higher rate of haemorrhage and subsequently a greater need for blood transfusion. They are under risk of surgical injuries and adhesions formation. Yet a higher rate of placental abruption, perioperative complications and wound healing has not been found (14).

A higher occurrence of adhesions after a caesarean delivery is reported in a research by Hesselman et al. (15). Women who have not undergone a caesarean

delivery had only 10 %, risk compared to women with one caesarean delivery in history where the risk was 37 % and rose to 42 % after two caesarean deliveries and to 59 % after three. Another factor contributing to the formation of adhesions was maternal age (≥ 35 let), obesity and postpartum infections (15).

A rare, yet very dangerous complication is a uterine rupture, which may occur when attempting a vaginal birth after c-section (VBAC). The prevalence is between 0.2 to 1.5 %. Results of several studies indicate that there is a VBAC success rate between 50 and 85 %. In order to improve the outcomes, it is necessary to consider the factors involved, which include the number of caesarean deliveries in history, corporal or T-section on the uterus, birth induction, foetal macrosomia, or refusal of vaginal delivery for fear (17).

An ectopic pregnancy in the scar of a previous caesarean delivery ranks among other rare complications. The occurrence is estimated in a rate from 1:1 800 to 1:2 216

of normal pregnancies. The cause of the pathophysiological nidation is attributed to the imperfectly healed scar and an increased affinity of the trophoblast to the extracellular matrix rather that to the cells of endometrium. If diagnosed in time, the main goal is to preserve the woman's fertility. If the ectopic pregnancy is diagnosed late, radical treatment is the only option. The most common pharmacological treatment is methotrexate administration. There is also a surgical treatment with extirpation of the pregnancy. The mini-invasive surgery using the Foley catheter is considered a state-of-the-art treatment. This method was first described by Timor-Tritsch et al in 2015 (18). An observational approach has also been reported but ended with a uterine rupture and an acute hysterectomy in 50 % of cases (19).

A caesarean delivery in the first pregnancy is also consider as a risk factor for an inexplicable stillbirth during subsequent pregnancy, with risk rising especially after 34th week of pregnancy. The risk of stillbirth did not differ significantly if the c-section was an acute or planned one. Even though the pathophysiology of an intrauterine stillbirth has not been fully clarified, it is assumed that it is linked to placental dysfunction (20).

The effect of a caesarean delivery on disorder of the pelvic floor and pelvic pain

Among the disorder of the pelvic floor are urine and faecal incontinence and pelvic organ prolapse. These conditions pose an enormous heath issue and large numbers of women worldwide undergo reconstructive surgeries of the pelvic floor. These disorders and their occurrence were investigated in a study that compared primiparas after one vaginal delivery and after one caesarean delivery in a 20-year interval. Out of the total number, 47 % suffered from at least one of the dysfunctions. One third reported one of the above-mentioned dysfunctions of the pelvic floor. A relatively high prevalence of any pelvic floor disorder is explained due to the inclusion of women who only gave birth once. The prevalence of any of the disorder was doubled in women after a vaginal delivery compared to caesarean delivery. After a caesarean delivery, every sixth women suffered from one of the other disorders of the pelvic floor. Women with uterine incontinence most likely had it as an isolated symptom, whereas faecal incontinence and pelvic organ prolapse more often occurred in combination. The study suggests that the risk factors that may contribute to developing the disorder of the pelvic floor include maternal age, current BMI, genetic predispositions and perineal rupture of the II degree. However, no causal relations between pelvic flood disorders and with episiotomy or vacuum extraction were found. It must be noted that the disorders may also appear among women who have not given birth (21).

A study conducted in the UK and New Zealand arrived at different conclusions. It compared the prevalence of urine and faecal incontinence between women after a vaginal and caesarean delivery after a 12-year gap. Women after vaginal delivery had a higher rate of urine incontinence in comparison with women who had a caesarean delivery (one or more). Yet in women who had a history of both vaginal and caesarean delivery, the rate of urinary incontinence was similar to women who had a vaginal delivery only. With faecal incontinence, no significant relations were found between the mode of delivery and similar results were recorded with vaginal and caesarean delivery. However, the authors stress that a caesarean delivery cannot be considered as a preventive measure for urinary incontinence, because even after a caesarean delivery it was reported by 40 % of women (22).

In connection with a caesarean delivery, it has also been mentioned as a possible cause for pelvic pain. A Norwegian study comparing the effect of mode of delivery on pelvic pain suggests that a caesarean delivery poses a lower risk for future pelvic pain in comparison to a vaginal delivery (except for assisted vaginal delivery). However, the difference is not statistically significant. The reason for the higher prevalence of pelvic pain among women who had a spontaneous vaginal delivery is attributed to the traumas to the birth canal caused in the process.

When comparing a planned and acute caesarean delivery and pelvic pain, the pain appeared more often after an acute c-section, yet without being statistically significant. A positive relation was confirmed between the birth weight of the child and pelvic pain. The heavier the child, the greater the risk of pelvic pain in mothers. The study included more than 20,000 women who reported no pelvic pain before or after birth. The women were observed at three points: 3 months postpartum, 4-6 months postpartum and 7-18 months postpartum. All data were acquired from questionnaires by the Norwegian National Health Register (MBRN) (23).

RESULTS

The number of caesarean sections is rising in most countries worldwide. This trend cannot be attributed solely to improved surgical techniques or demographic factors, but also to the improvements in neonatal care or involving the lay patient in therapeutic decision-making, for instance. There are several indications for a caesarean delivery, yet the question remains if the C-sections performed are necessary from a medical point of view and whether such action contradicts medical ethics or not. The article summarises knowledge and results from long-term and short-term studies about the risks of caesarean delivery for the mother. It should lead to a careful consideration if the contemporary practice when several C-sections are performed for insignificant reasons will not have an impact on society in future.

With respect to short-term risks, a planned caesarean delivery is comparable with a vaginal delivery. However, an acute caesarean delivery is linked with higher blood loss, visceral injuries, infections, and thromboembolic complications. Among the long-term risks linked with caesarean delivery are gynaecological issues such as intermenstrual spotting, dysmenorrhea and pelvic pain. A caesarean delivery poses a significant risk for future pregnancies, which may be accompanied by placental disorders, uterine ruptures, intrauterine foetal death, adhesion formation or iterative SC. Women after caesarean delivery may also suffer from infertility. As for the pelvic floor, the caesarean delivery has a protective effect against urine and faecal incontinence, as well as against pelvic prolapse and pelvic pain.

ACKNOWLEDGEMENT

The article above was based on Vítková Ludmila: *Risks of Caesarean Section*. 45 p. Bachelor Thesis. Faculty of Health Sciences, Palacký University Olomouc: Department of Midwifery. Instructor Kateřina Janoušková.

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