

False beliefs about the indications of caesarean section in the Romanian population

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Abstract

There has been a considerable increase in the number of caesarean sections (C-sections) in the last 30 years. Between 2009 and 2017, Romania has reported an increase with 32.1% of the number of C-sections. The consensus regarding the obstetrical indications of the caesarean section has changed. This is mainly due to improvement in appreciating more specific fetal death risks or fetal hypoxemia, and to allow pregnancy for severe medical conditions (kidney transplant, valvular cardiac prostheses etc.). The caesarean section rate is also increased by the number of C-sections at the patient's request. Some patients request a caesarean delivery without a valid medical indication because they are afraid of episiotomy, of prolonged and painful labor, vaginal trauma or urinary incontinence associated with a vaginal birth or because of some false medical beliefs. Our article focuses on evidence-based medicine on false beliefs about the indications of the C-section in Romania, the intriguing tale of how pregnant women request a C-section, sometimes encouraged by healthcare givers. The analyzed indications which are misbelieved are: fetal nuchal cord, oligohydramnios at term for normally structured fetuses, maternal obesity, fetal macrosomia, the 40-week pregnancy, hepatitis B and C, human papillomavirus (HPV) infection, and uncomplicated myopia.

Keywords: C-section, fetal nuchal cord, oligohydramnios, obesity, macrosomia, 40 weeks of pregnancy, hepatitis, human papillomavirus infection, myopia

Rezumat

Numărul operațiilor cezariene a crescut considerabil în ultimii 30 de ani. Între 2009 și 2017, România a raportat o creștere cu 32,1% a numărului de cezariene. Consensul privind indicațiile medicale ale operației s-a schimbat. Aceasta se datorează mai ales îmbunătățirii aprecierii riscurilor de moarte fetală și de hipoxemie și datorită faptului că au fost permise sarcinile în caz de patologii severe materne (transplant renal, proteze cardiace valvulare etc.). Rata operațiilor cezariene a crescut și din cauza creșterii numărului de cezariene efectuate la cererea pacientelor. Unele gravide solicită operația cezariană fără a exista o indicație medicală, deoarece se tem de epiziotomie, de durerea prelungită din travaliu, de traumatismele vaginale sau de apariția incontinenței urinare consecutive nașterii vaginale ori din cauza unor credințe false asupra anumitor situații. Articolul nostru este focalizat pe demontarea acestor idei preconcepționate utilizând medicina bazată pe dovezi, motive prin care femeile însărcinate solicită cezariene, câteodată încurajate și de cei care le îngrijesc. Indicațiile analizate care sunt percepute fals sunt: circulara pericervicală, oligoamnioul la sarcina la termen fără anomalii structurale, obezitatea maternă, macrosomia fetală, sarcina de 40 de săptămâni, hepatitele B și C, infecția cu virusul papiloma uman (HPV) și miopia necomplicată.

Cuvinte-cheie: cezariană, circulară pericervicală, oligoamniol, obezitate maternă, macrosomie, sarcină de 40 de săptămâni, hepatită, infecție cu virusul papiloma uman, miopia

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Ideii preconcepționate despre anumite indicații ale operației cezariene la populația din România

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There has been a considerable increase in the number of caesarean sections (C-sections) in the last decades, both in developed and in developing countries. The reasons for this phenomenon are uncertain. The average rate of C-section in the last 20 years has raised with 51.15% worldwide⁽¹⁾, and it cannot all be explained by obstetrical indications. While the number of pregnant women and newborns followed a negative trend, Romania has reported between 2009 and 2017 an increase with 32.1% of the number of caesarean sections⁽²⁾. According

to The National Institute of Statistics and Health, the number of newly detected pregnant women in Romania decreased between 2010 and 2015 by 9.1%, on an annual average of 1.51%, except for 2013, when an increase in pregnancies was reported⁽²⁾. The number of women requesting elective caesarean section has increased, and the valid medical indications generated debate at the national and international level. The consensus regarding the obstetrical indications of caesarean section has changed due to maternofetal medicine and to neonatal

advancements in appreciating more specific fetal death risks or hypoxemia. To this there are added the doctors' preference to deliver by caesarean section in case of breech presentation or twin pregnancy and also the increased number of caesarean section on maternal request. Some patients request a caesarean delivery without a valid medical indication because they are afraid of episiotomy, prolonged and painful labor, vaginal trauma, or of urinary incontinence associated with vaginal birth⁽³⁾.

On the other hand, the medical health system in Romania seems to favor caesarean delivery. Hospital reimbursement by National Health Insurance House and obstetricians performing delivery by C-sections are paid more for surgery, including operating room utilization compensating wage. Although there are no recommendations on the optimal number of caesarean sections, the increased number of C-sections is associated with maternal and neonatal complications⁽⁴⁻⁶⁾, especially for iterative caesarean sections.

The objective of this article is to present evidence-based medicine on false beliefs about the indications of C-section, the intriguing tale of how pregnant women request a C-section, sometimes encouraged by healthcare givers.

1. Fetal nuchal cord and fetal asphyxia or even fetal death during pregnancy

A fetal nuchal cord is a situation in which the umbilical cord passes 360° around the neck; the nuchal cord is extremely common, and occurs in 6-37% of cases in full-term babies. Studies have reported a single loop incidence of 20.6%, a double loop of 2.5%, and a triple pericervical cord of 0.2%. Fetal cords are dependent on fetal movements, so that at the ultrasound examination the nuchal cord can be visualized. Still, at birth there is the possibility that they are no longer present, but it is valid and vice versa. The incidence of the nuchal cord is not related to parity, fetal position or reduced amniotic fluid; the incidence of nuchal cord increases with gestational age⁽⁷⁾. Jouppila and Kirkinen were the first to report, in 1982, the ultrasound diagnosis of a fetal nuchal cord⁽⁸⁾. The use of color Doppler mode has improved the diagnosis during routine examinations. Routine ultrasound screening for fetal nuchal cord in low-risk pregnancies is not justified and is not evidence-based medicine. Doppler ultrasound nuchal cord screening has a sensitivity of 95.64%, a specificity of 90.64%, a negative predictive value of 96.08% and a positive predictive value of 89.88%⁽⁹⁾. The frequency of nuchal cords increases with the increasing length of the umbilical cord, linearly after the second trimester of pregnancy, and will spontaneously resolve before the occurrence of the labor⁽¹⁰⁾.

When diagnosed before labor, Kesrouani et al. emphasized the parents' stress and anxiety of stillbirth, and also the family's desire to induce labor⁽¹¹⁾ or to perform a C-section. Studies show no fetal hypoxia or fetal demise before labor when the fetal nuchal cord is present. Fetal demise before labor is mostly linked to cord knot and thrombosis⁽¹²⁾, associated with intrauterine growth restriction and not to nuchal cord entanglement. In a study

of 6307 pregnant women with singleton pregnancies, Kobayashi et al.⁽¹³⁾ have reported that umbilical cord entanglement around the trunk was associated with a higher risk of a low Apgar score when compared with nuchal cord entanglement. Some doctors would probably prefer not to inform the patient about the presence of a nuchal cord (not recommended in the actual guidelines) in order to avoid anxiety; others doctors suggest that the presence of a nuchal cord should become an integral part of the third-trimester ultrasound, describing two or more loops around the baby neck, and that in such cases the patient should be advised to monitor fetal movements and to deliver by C-section before labor.

During labor, fetal auscultation can easily detect non-reassuring fetal status by cardiotocography due to tight cord (neck or trunk) and indicate operative vaginal birth or C-section. But studies have shown that the presence of the pericervical umbilical nuchal cord does not increase itself the risk of caesarean section or of low Apgar score at birth⁽¹⁴⁾ and is not an indication for labor induction or C-section before labor.

2. Oligohydramnios at term (37 weeks)

Amniotic fluid is an essential sign of fetal well-being. Oligohydramnios at term has been classically defined as an amniotic fluid volume which is less than 200 mL⁽¹⁵⁾. By ultrasound techniques, oligohydramnios is diagnosed when the deep vertical pocket (DVP) is less than 2 cm⁽¹⁶⁾ or amniotic fluid index (AFI) is less than 5 cm⁽¹⁷⁾. More accurate ultrasound evaluation for oligohydramnios found an AFI which is below the 5th percentile for gestational age or a subjectively low amniotic fluid volume, especially on either side of the cephalic presentation. In high-risk pregnancies, oligohydramnios is associated with an increase in perinatal mortality when comparing with normal amniotic fluid volume⁽¹⁶⁾. Oligohydramnios at term (>37 complete weeks of gestation) is commonly considered an indication for labor induction⁽¹⁸⁾. A prospective, randomized study from 2005 evaluating labor induction versus expectant management for oligohydramnios beyond 40 weeks found no difference in the mode of delivery or neonatal Apgar score or cord blood pH in the two groups⁽¹⁹⁾. Oligohydramnios found in high-risk pregnancies is different from oligohydramnios in low-risk pregnancies. Oligohydramnios associated with prolonged pregnancies, intrauterine growth restriction or placental dysfunction may worsen maternal and neonatal outcomes. A complete evaluation by a maternal-fetal medicine specialist is essential to confirm oligohydramnios and to perform Doppler evaluations. In all cases, oligohydramnios at term is an indication for labor induction, not for C-section⁽²⁰⁾.

3. Obesity in pregnancy

Obesity is a public health issue due to associated comorbidities. Obesity in pregnant women is associated with increased maternal and fetal risks. There is an increasing incidence of obesity worldwide, and there should be specific programs to help women of childbearing

age lose weight⁽²¹⁾. Obesity is defined as a Body Mass Index (BMI) ≥ 30 kg/m². C-section in obese women is associated with fetal and maternal complications⁽²²⁾. Worldwide, it is reported that one in five women becomes overweight or obese during pregnancy. Obese pregnant women are at higher risk of developing hypertension and preeclampsia, gestational diabetes, thromboembolic complications and perinatal morbidity. Current studies are worrying because they show that the rate of C-section in normal-weight women was 14.3% compared to obese women, where it reached 42.6%. Obese women were six times more likely to have a C-section due to the cephalopelvic disproportion or fetal progression failure than non-obese women⁽²³⁾. The risk of caesarean delivery is 50% higher in overweight women and more than double for obese women compared to normal-weight women⁽²⁴⁾. C-section in obese women may be associated with anesthetic complications and with longer operating time and longer baby extraction.

4. Large for gestational age and fetal macrosomia at term

Large for gestational age is commonly defined as a birth weight greater than the 90th percentile for gestational age. Macrosomia refers to excessive intrauterine growth beyond a specific threshold regardless of gestational age. Fetal macrosomia is considered when birth weight is higher than 4000 g at term. Macrosomia is associated with an increased risk of caesarean section, postpartum hemorrhage, vulvovaginal and fetal trauma.

For uncomplicated pregnancies, there are enough studies which show that the suspicion of macrosomia is not an indication for birth induction or for caesarean delivery. Macrosomia is difficult to predict; the clinical and ultrasonographic estimates of fetal weight are imperfect. The term “fetus macrosomia” is misleading, because birth weight is never known with certainty until after birth⁽²⁵⁾. Previous complicated pregnancies with diabetes, shoulder dystocia, or a previous birth of a macrosomic fetus increase the complication rate. Still, there is insufficient evidence about the estimated fetal weight threshold that should indicate caesarean delivery before labor⁽²⁶⁾. What the obstetrician wants to predict is not the macrosomia itself, but the complications that he mistakenly associates with macrosomia, such as brachial plexus injury or shoulder dystocia. However, such complications are not only determined by birth weight, but by the complex and poorly understood relationship between fetal and maternal pelvic anatomy⁽²⁷⁾, as well as by other factors related to the technique of managing the second period of the labor. Because fetal macrosomia is associated with severe maternal and neonatal adverse outcomes, we recommend an experienced obstetrician or midwife to manage labor and baby delivery.

5. Forty weeks of singleton gestation

Epidemiological studies suggest an increased risk of perinatal death by increasing gestational age. Post-term pregnancy constitutes a high-risk situation, with a perinatal death rate of 0.018% at 41 weeks and 0.51% at

>43 weeks⁽²⁸⁾, but these studies were before the definition of late intrauterine growth restriction and Doppler monitoring at term to identify the high-risk fetuses. Forty weeks of gestation is not an indication for C-section. Obesity, nulliparity and maternal age greater than 30 years old have been associated with an increased risk of postterm birth⁽²⁹⁾. Monitoring pregnancy beyond term is more expensive than labor induction, the additional costs being due mainly to the costs of additional monitoring and to higher C-section rates⁽³⁰⁾. World Health Organization's 2018 recommendation was to induce the labor beyond 41 weeks⁽³¹⁾. A meta-analysis suggests that the induction of labor between 37 and 42 weeks of gestation reduces the number of perinatal deaths, also decreasing the C-section rate compared with expectant management⁽³²⁾.

6. Uncomplicated hepatitis B or C during pregnancy

The most common way of hepatitis B virus (HBV) infection around the world is the vertical transmission, during the delivery by vaginal birth or C-section. All infants require the HBV vaccination series and hepatitis B immune globulin (HBIG) within 12 hours of birth. Delays in obtaining passive-active immunoprophylaxis can also lead to viral transmission to the fetus. Maternal serum HBV DNA level (viremia level) was considered the most important independent risk factor for vertical transmission. The doctors are reducing viremia before pregnancy reduces the risk of perinatal transmission. For HBeAg positive women with high hepatitis B viral loads – viral load >1 million copies (200,000 IU/mL) –, taking FDA-approved antivirals during the last trimester to reduce viremia helps prevent the chance of transmission to the newborn. A recent meta-analysis of 9906 participants from retrospective or case series studies from China (a country having one-third of the hepatitis B infected population worldwide) found that caesarean section could significantly reduce the risk of vertical transmission. But the authors recommend randomized trials for proving or not whether elective caesarean section can be recommended for clinical practice as a preventive measure against the vertical transmission of HBV⁽³³⁾. Even in older studies, the recommended C-section to prevent mother-to-infant transmission as the delivery modality was found to have no impact on vertical transmission⁽³⁴⁾. Immunoprophylaxis and viral load reduction are the keys to reduce vertical transmission.

Vertical transmission of the hepatitis C virus (HCV) is the leading cause of hepatitis C in children⁽³⁵⁾; vertical transmission is through pregnancy and delivery. The screening of infants born to HCV-positive women is recommended after one month of age, even after 18 months of age for anti-HCV antibodies⁽³⁶⁾. Studies have demonstrated that the mode of delivery (vaginal versus caesarean) is not a risk factor for the vertical transmission of hepatitis C⁽³⁷⁾. Several factors in labor management may be associated with an increased risk of vertical transmission of HCV: the prolonged rupture of membranes, internal fetal monitoring, and episiotomy⁽³⁸⁾.

7. Human papillomavirus infection (HPV 16, 18, 31 and 33)

The belief that a caesarean section delivery protects from the vertical transmission of neonatal genital herpes in pregnant women with active lesions during labor has led to the suggestion that this procedure can be adopted for perinatal pregnant women with genital warts or HPV infections. Human papillomavirus (HPV) represents one of the most common sexually transmitted infections worldwide, with a prevalence of 16.9% in the Romanian population⁽³⁹⁾. The reported incidence and mortality rates of cervical cancer in Romania are three times higher than in other European countries⁽⁴⁰⁾. Routine screening and HPV vaccination can prevent from cervical cancer. In Romania, 9.7% of the women from the general population are estimated to be infected with HPV 16/18⁽⁴¹⁾. Pregnancy offers the possibility to perform cervical screening using Pap smear tests.

Genital warts are due to non-oncogenic strains of papillomavirus infection. They may be an indication of C-section to prevent rare laryngeal papillomatosis, but this risk is not warranted by avoiding vaginal route of delivery, and is not our subject of discussion.

Many studies have investigated HPV vertical transmission and viral DNA and HPV antibodies in both pregnant mothers and newborns, using human and animal models⁽⁴²⁻⁴³⁾. Studies from Spain on animal models suggest that the papillomavirus can be spread to different tissues by lymphocyte infection, particularly to the reproductive tract and gametes⁽⁴⁴⁾. But it was suggested that this vertical transmission might occur *via* the placenta (trophoblastic cell) or cord blood transmission, during the first and second trimesters of pregnancy, mediated by the increased levels of steroid hormones^(45,46). A study by Freitas et al., from 2013, demonstrated the vertical transmission in periconceptional, pre- and perinatal periods: the transmission during fertilization of an oocyte or immediately after fertilization, during pregnancy, during childbirth, or even shortly after birth⁽⁴⁷⁾. HPV-DNA has been detected in amniotic fluid⁽⁴⁸⁾, placenta and the umbilical cord⁽⁴⁹⁾.

A meta-analysis of prospective studies from 1995 to 2004⁽⁵⁰⁾ found that infants born through vaginal delivery were at higher risk for exposure to HPV; this presumably occurs during the passage of the fetus through an infected birth canal by ascending infection, mainly after the premature rupture of membranes (more than 12 hours). Still, these studies tested the babies immediately after birth, creating confusion between contamination and infection. This analysis has included HPV-positive babies from HPV-negative mothers⁽⁵¹⁾. The HPV-positive mother has an increased risk of HPV transmission to the baby during pregnancy.

8. Maternal uncomplicated myopia

Myopia is the most common refractive error among youngsters⁽⁵²⁾. Myopia is associated with an increased frequency of degenerative retinal changes, independent of the severity of myopia. Retinal degenerative changes

are the risk factors of ophthalmological complications⁽⁵³⁾. A belief among ophthalmologists has existed for many years that myopia is a medical indication for C-section or an instrumental vaginal delivery to avoid retinal tears. But several reports have demonstrated the impossibility of retinal tears or detachments during the increase in intraocular pressure in the second stage of labor, because the vitreous body is pushed against the retina. This is consistent with studies in which patients were ophthalmologically examined before and after delivery⁽⁵⁴⁻⁵⁶⁾. A recent survey by questionnaire found that obstetricians expressed their need for an ophthalmologist's opinion for decision-making regarding the way of birth. The ophthalmologists recommended C-section when pregnancy was associated with corneal transplants, high myopia, retinal detachment and orbital tumors⁽⁵⁷⁾. A large prospective study of 3180 pregnancies and myopia followed for at least two years after pregnancy by ophthalmologist has demonstrated that pregnancy is inversely associated with myopia development or progression. Age is an important and well-known factor in myopia progression; when maternal age was adjusted, the analysis showed that age did not act as an effect modifying the inverse relation between pregnancy and myopia. Moreover, the highest inverse association with myopia was observed for women with the highest parity⁽⁵⁸⁾.

During pregnancy, the physiological changes in the eyes or eyesight are due to hormonal impairment, specific metabolism, fluid retention, blood circulation, and the immune system adaptations⁽⁵⁹⁾. These changes can lead to an increase in thickness and curvature of the cornea, which can lead to temporary myopia and impaired distance vision. This phenomenon is most commonly observed during the third trimester of pregnancy and is spontaneously resolved after birth. Ophthalmologists recommend that pregnant women should not change their glasses during pregnancy, but a few weeks after birth. During childbirth, women are encouraged to perform the Valsalva maneuver, and this does not cause retinal detachment as stated in the past, but can lead to capillary rupture, macular edema and impaired vision, a condition known as "Valsalva retinopathy"⁽⁵⁶⁾. The hormonal changes during pregnancy can induce or aggravate the diabetic retinopathy and uveal melanoma. Also, they can produce eyesight modification in case of hypertension during pregnancy. C-section may be indicated in case of retinal tear, optic nerve atrophy, glaucoma, cavernous hemangioma of the optic disc, diabetic retinopathy and decreased corneal thickness following refractive surgery.

Conclusions

In the world we live in, when the doctor who supervises the pregnancy may be the same with the one who attends the birth, it is obvious that the C-section is the optimal solution for delivery. More commonly, medical malpractice cases result from the failure to order an emergency C-section when a complication arises during the childbirthing process. But the Romanian healthcare system is in a continuous change, both the turn of the

mentality of the patients who, after a correct information, most of the time want to give birth naturally, but also due to the generation of mature doctors with experience in conducting labor or childbirth. The decrease in the number of unjustified caesareans by real medical

indications will make, together, doctors and patients, to build a reliable medical system. ■

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