

## THE NEONATE BORN BY CAESAREAN SECTION

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### Abstract

This paper presents the risks for the neonate born by caesarean section versus normal birth. It is deemed that these risks cover a very wide range and, when associated with other maternal-foetal risks, may influence the morbidity and mortality during the neonatal period. Also, besides the fact that it is not a comfortable and painless solution, this way of giving birth becomes more and more *fashionable* and loads the caesarean percentage with more or less argued indications, as well as the percentage of planned caesareans without labour, from which newborns with many problems of immediate and tardive adaptation result.

The conclusions of the paper focus on highlighting the major risks of this way of birth for the child and warn at least prudentially about the decision for caesarean section.

**Key words:** neonate born, caesarean section, normal birth

One of the most controversial themes of modern obstetrics is whether pregnant women should choose caesarean delivery or caesareans should be performed only when the case.

In the past, the maternal mortality associated with this type of birth was very high, with caesarean section being the only way to save the child. First mentions of birth by caesarean section come from the 16<sup>th</sup> century, but only in the 18<sup>th</sup> and 19<sup>th</sup> centuries both mother and newborn survival were ensured as a result of this procedure.

Over the last three decades, important changes concerning the relationship between birth and perinatal prognosis have appeared, including the efforts to reduce the frequency of caesarean deliveries, concomitantly with the attempt to allow for the pregnant women to express their obstetrical options. The increase of caesarean ratio was not associated with any benefit for the child or mother, but with increase of morbidity in both categories. As caesarean delivery may be scheduled so as to be convenient both for the physician and for the patient, there is a risk for this procedure to be performed more frequently and earlier than needed. It is therefore necessary to inform pregnant women on the potential risks and benefits related to the caesarean delivery [1].

WHO recommends the ratio of caesarean deliveries to be of approximately 10-15% out of total births. All the studies show the real percentage is much more higher, in regard to total number of births:

- in Australia – 19.4% in 1994 → 29.15 in 2004,
- in USA – 30.2% in 2005,
- in Latin America– 33% in 2005,

- in Romania – currently, in some centres, the percentage exceeded 50%.

However, despite the increase of its supporters as alternative for vaginal birth, the caesarean section is not a benign intervention.

We shall present hereinafter evidences and proves arguing this aspect.

In 2007 BMJ published a study by Villar and colleagues [2] that highlights the increased risk for severe maternal morbidity in case of caesarean delivery compared with vaginal delivery, both in the case of *intrapartum* and elective caesarean delivery. The authors defined the **elective caesarean** as the intervention decided by the physician before the onset of labour, without a medical indication, and the **intrapartum caesarean** as the intervention indicated during labour, regardless if the labour was spontaneous or induced. This **cohort** study, conducted in Latin America on 97,095 deliveries, showed the increased rate of caesarean deliveries does not necessarily lead to an improvement of maternal and neonatal prognosis.

Neonatal evolution has been tightly correlated with presentation at birth. Foetal mortality of 9.69% and neonatal mortality (before hospital discharge) of 8.55% in the case of vaginal delivery with breech presentation is significantly higher as compared to elective caesarean section with the same presentation (0.96% foetal mortality and 1.79% neonatal mortality). The authors concluded that caesarean delivery had a protective effect on this group of pregnant women in the case of breech presentation. The protective effect on the foetal mortality in cephalic presentation was less obvious, with a neonatal mortality significantly higher associated with elective or *intrapartum* caesarean delivery. As the neonatal morbidity concerns, study results show that either *intrapartum* or elective caesarean, in the case of cephalic presentation, increases the risk for admission to the neonatal intensive care unit for more than seven days and also enhances the neonatal mortality risk after hospital discharge (this remains high even after the exclusion of all the caesareans with indication of foetal distress).

Absence of labour was a risk factor for admission to the neonatal intensive care unit for seven or more days and for the neonatal mortality after hospital discharge in the newborns delivered by elective caesarean section. In these cases, premature and/or precocious rupture of amniotic membranes may be protective. As maternal morbidity regards, study results reveal a severe increase of it in the case of elective/*intrapartum* caesarean compared to vaginal delivery, the antibiotic treatment being five-fold higher in caesarean sections.

The study conclusion was that caesarean delivery reduces the risks in breech presentation and the *intrapartum* foetal mortality risk in cephalic presentation, but increases the neonatal and maternal morbidity and mortality risk in cephalic presentation.

In a recent study (2009) published by Tita and colleagues [3] in The New England Journal of Medicine, authors showed pregnant women choosing planned caesarean before 39 weeks of gestation are two times more exposed to the risk of having a newborn with severe complications, including the risk for respiratory pathology requiring mechanical ventilation and intensive care unit admission. Authors assert the reason of conducting this study was the increase of caesarean deliveries rate in USA from 20.7% in 1996 to 31% in 2006, one of the reasons being that vaginal delivery is not performed after a caesarean delivery. The study was performed on 13,258 elective repeat caesarean deliveries. The aim of the study was to assess if in children born at 37 weeks of gestation by elective there are more frequent caesarean complications such as:

- respiratory distress syndrome and transient tachypnea of the newborn,
- neonatal sepsis,
- neonatal seizures,
- ulcero-necrotising enterocolitis,
- perinatal hypoxic-ischemic encephalopathy,
- necessity of ate ventilator support within 24 hours after birth,
- umbilical artery sanguine pH < 7,
- 5-minute Apgar score ≤ 3,
- admission to the neonatal intensive care unit or prolonged hospitalisation.

The study conclusions confirmed that “**precocious**” caesarean delivery before 39 weeks of gestation may be unfavourable to the neonatal prognosis. Newborns by elective repeat caesarean at 37 weeks of gestation are four times more predisposed to above mentioned complications as compared to those born in the same way at 39 weeks of gestation. Those born at 38 weeks carry only a two times higher risk. Tita and colleagues [3] consider “**a narrow window between 39 and 40 weeks of gestation is optimal for the newborn and any deviation before or after this week increases the neonatal risk**” in elective caesarean delivery.

Comparable results were obtained in a study performed within a university hospital in Denmark during 1998-2006 on 2,687 infants born by elective caesarean section as compared to 31,771 infants born by vaginal delivery or by caesarean as a result of an emergency during the labour. It has been concluded that newborns by elective caesarean at 37-39 weeks of gestation bear a 2 - 4 times higher risk to develop respiratory pathology as compared to vaginally delivered newborns. A decrease in the respiratory pathology might be achieved by planning the elective caesarean sections only after 39 weeks of gestation [3].

There are studies in the literature evaluating the individual risk for certain respiratory diseases in the context of birth by caesarean section. Sonia Hernandez-Diaz and colleagues [4], in a study conducted between 1998-2003 within Boston University, on 377 mother-child pairs with persistent pulmonary hypertension (PPHT) and 836 control pairs. Results showed the risk to develop PPHT is higher in the neonates born by caesarean section as compared to the infants born naturally [4].

In a paper published by the American College of Obstetricians and Gynecologists, the conclusion has been that PPHT is 5 times more frequent in caesarean section births. The authors presented the hypothesis of labour having a beneficial effect on the lungs of the newborn, therefore close neonatal monitoring in newborns by caesarean section, as well as inclusion of neonatal risk in the informed consent before surgery is mandatory.

Some studies identify **the neonatal pneumotorax** in approximately one thirds of newborns with iatrogenic syndrome of respiratory distress. More recently, severe pneumotorax and/or PPHT were observed in newborns delivered by elective caesarean section. The study published by Zanardo and colleague [5], on a group of 66,961 newborns on a two-year period, concluded that full-term birth by elective caesarean associates an increased risk for neonatal pneumotorax as compared to the emergency caesarean or vaginal deliveries. Performing the elective caesarean after 39 weeks of gestation would be expected to reduce the risk of iatrogenic neonatal pneumotorax.

The relationship between caesarean section and onset of **bronchial asthma** has been assessed by a group of researchers within Public Health and Environment National Institute in The Netherlands. The aim of the study was to determine the probability that newborns delivered by caesarean section to carry an increased risk to develop bronchial asthma during childhood. 2,917 children were included in the study and followed-up from birth to the 8 years of age. The authors’ conclusion was that children born by caesarean section bear a higher risk to develop bronchial asthma as compared to those born vaginally, especially in children from atopic parents. Caesarean increases the risk of sensitivity to common environmental allergens in children from non-allergic parents only.

A research by Queen’s University in Belfast examined 20 studies from 16 countries in which 10,000 **type I diabetes mellitus** children were analysed. The researchers discovered a 20% higher risk in children born by caesarean section to develop type I diabetes mellitus during childhood. Increase of this risk could not be explained by other associated factors, such as: birth weight, mother age, gestational diabetes or breastfeeding. Type I diabetes occurs when the immune system destroys the insulin producing cells in the pancreas. According to the theory of researchers in Belfast, normal development of newborn’s immune system is affected by caesarean section delivery, these children being firstly exposed to the bacteria in the hospital,

instead of being normally and naturally exposed to the maternal bacteria [6].

Summarising the above mentioned data and other recent results of researches focused on this theme, we may conclude the following risks are or become major for the neonate born by caesarean section.

**Neonatal death.** Although usually births by caesarean section need to be carried out in the benefit of the baby, there are major risks (often lethal) accompanying this type of birth. In a study conducted in California that included more than 580,000 births it has been ascertained that both children born by planned caesarean section and children born by unplanned caesarean section bear a four times higher risk of death before hospital discharge than children born vaginally (8 deaths per 10,000 birth for each planned or unplanned caesarean and 2 deaths per 10,000 births for vaginally born infants) [7].

**Respiratory problems.** The best described problems are the respiratory ones occurring in full-term newborns. These respiratory difficulties, known as transient tachypnea of the newborn (TTN), probably represent an outcome of the failure of foetal lung liquid reabsorption mechanism that starts automatically during vaginal birth. In a retrospective study performed on approximately 30,000 births results, TTN incidence is almost three-fold higher after birth by elective caesarean section than after vaginal birth (3.1% vs. 1.1%) [8].

**Bronchial asthma.** Several studies reported an association between birth by caesarean section and a subsequent development of bronchial asthma. One of these studies shows the risk to be hospitalised for bronchial asthma during childhood increases by 30% in the children born by caesarean section as compared to the children born vaginally [9].

**Iatrogenic prematurity** is related mainly to the cases of birth by planned caesarean section. It occasionally occurs even in full-term newborns, as stated in a study conducted on more than 170,000 births in UK.

**Birth trauma.** Children born by caesarean section are exposed to the risk for trauma, as a result of surgical lesions, chiefly in emergency deliveries. A recent study reports a traumatic lesions index after caesarean section of 3%.

**Failure of breastfeeding.** A meta-analysis of 9 studies shows that failure of breastfeeding in newborns by (mostly unplanned) caesarean section is significantly higher as compared with those naturally born. A study on 580,000 women in California showed that mothers who delivered by caesarean section, either planned or unplanned, presented two times more frequently noninitiation or insufficiency of breastfeeding during neonatal period as compared to those who delivered naturally.

#### Conclusions

1. There are currently sufficient arguments and evidences regarding the immediate or delayed risks for the neonates born by caesarean section vs. natural delivery.
2. The risks are variably, but significantly augmented when elective caesarean vs. *intrapartum* caesarean, elective caesarean at  $\leq 37$  weeks of gestation, as well as repeat caesarean is indicated.
3. Before deciding the type of delivery, the obstetrician has to carefully and judiciously analyse the advantages of each type (natural vs. caesarean) and, if necessary, to advise with the neonatologist concerning the necessity to extract the newborn by caesarean section.

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