



CESAREAN DELIVERY ON MATERNAL REQUEST (CDMR)

Cesarean section (c-section) is the surgical procedure most frequently performed in women with the aim of reducing maternal and perinatal morbidity and mortality. Historically, indications have varied. In Ancient Rome, the *Lex Cesarea* mandated that in all cases where a pregnant woman died, this surgery should be performed in order to save the foetus (1). Before the 16th century and because of religious influence, the requirement was to perform the procedure in all women who died before delivery, for the purpose of burying the two bodies separately. The first known report of a woman who survived cesarean section dates back to the 16th century and, since that time, it continued to be indicated only in cases where vaginal delivery was considered risky for the mother or the foetus. Gradually, the frequency with which the procedure was performed increased supported by enhanced safety of surgical procedures in general, better anaesthetic techniques and cultural changes among physicians and women alike (2). Recently, a new concept has been introduced, namely cesarean delivery on maternal request (CDMR), presumed to occur provided the mother is fully informed of short and long-term benefits and risks both for her as well as the baby.

In 2015, the World Health Organisation (WHO) stated that the ideal C-section rate should be lower than 15%, and that rates above 10% are not associated with reduced maternal or neonatal mortality (3). However, despite this recommendation, the rate of c-sections in the world has been on the rise, reaching close to 23% in 1989, and 33% in 2011 in the United

States (4) while in Colombia the reported figure was 24.9% in 1998 and 46.6% in 2014, showing a higher increase in the United States (4). In Colombia, although the rate of perinatal mortality for every 1000 pregnancies of more than 7 months has decreased from 24 to 14 per thousand during the time period between 2000-2010, and the neonatal mortality rate has dropped from 7.5 to 5.6 for every thousand live births between 2005-2012 (5), these reductions do not correlate with the epidemic increase in the rates of cesarean sections.

There are no reliable statistics regarding the impact of CDMR on the overall rate of c-sections in our setting, but it is believed to be growing like in other countries. In the United States, it is estimated to account for 4-18% of all c-sections (6), 7.7% in Scotland (7), and 26.8% in Northern Australia (8), with varying degrees of acceptance by healthcare practitioners. Between 2001 and 2002 the level of acceptance among North American obstetricians was 46% (9), while, in 2006, out of 1031 ACOG gynaecologists, 20% reported that they would request a c-section for their wives, and 53% recognised having performed the procedure for the same reason once or twice per month (10). That same year, out of 1222 gynaecologists members of SEGO in Spain, 57.8% reported that they would refuse to perform a cesarean delivery on maternal request in cases of primigravidae with cephalic presentation, while 24.8% reported that they would perform it, and the remaining 17.4% did not take a stance (11). No level of acceptance of CDMR is known among gynaecologists in Colombia, but it might be high, reflecting in part the dramatic

increase of this procedure over the past few years, greater in some regions of the country such as the departments of the Caribbean region (5).

There are no good quality studies at the present time regarding risks and benefits of CDMR, and the few that exist are retrospective and limited to short-term results. In a systematic review of cohort and case-control studies conducted by the National Institutes of Health in the United States (12), it was found that only two maternal short-term results, bleeding and length of hospital stay, reached a moderate level of evidence, with post-partum haemorrhage being less frequent in cases of planned c-section compared to unplanned c-section and planned vaginal delivery. In contrast, length of stay was longer in the case of c-section compared to vaginal delivery; however, results for c-section include both planned as well as unplanned procedures. Though with low-quality evidence, it was found that there was a lower frequency of infections, anaesthetic complications, placenta praevia and discontinuation of breastfeeding in cases of planned vaginal delivery. Infection rates were lower in the cases of planned versus unplanned c-sections; the majority of the anaesthetic complications were associated with general anaesthesia, more frequently used in emergent c-section considering that regional anaesthesia is almost always the choice in planned c-section because it entails a lower risk of complications. Regarding placenta praevia, there is increasingly consistent evidence of the higher risk in cases of prior c-section and the number of placenta praevia with the concomitant higher risk of placenta accreta (13), and the associated complications such as need for hysterectomy, blood product transfusion, admission to the intensive care unit, and thrombotic complications.

In the systematic review mentioned above (12), there was low quality evidence in favour of CDMR in terms of urinary (UI) and faecal incontinence (FI), and maternal obstetric trauma. However, it is not clear whether the increased frequency of UI or FI in planned vaginal delivery has an impact over time, and

apparently there is no difference when the woman reaches 50 years of age. Moreover, this incontinence is more related to the number of pregnancies and maternal age rather than the form of delivery itself.

In terms of neonatal outcomes, moderate-quality evidence was found in favour of planned delivery as relates to respiratory morbidity because of a greater frequency of transient neonatal tachypnea and mild respiratory distress syndrome in planned c-section cases, with a very low frequency of severe respiratory failure or pulmonary hypertension. With weak-quality evidence, a shorter neonatal length of stay was found for planned delivery, while lower frequency of neonatal mortality, intracranial bleeding and clavicular fracture was found for planned c-section. However, delivery-associated foetal mortality was present after 41 weeks. At present, most institutions promote delivery before 41 weeks, minimising this potential difference.

In our setting, the first study regarding the perinatal impact of cesarean delivery on maternal request is the one published in this volume by the Sarmiento-Rodríguez group working in a private teaching hospital. It is a prospective cohort study with 931 low risk pregnant women 18 to 45 years of age delivering at term (gestational age over 37 weeks) between June 2008 and April 2012. The study subjects were invited to participate and to sign the informed consent before 36 weeks of pregnancy during their antenatal consultation. Of the 931 pregnant women, 214 (22.9%) were taken to cesarean delivery on maternal request (CDMR), 341 (36.63%) went into spontaneous labour (SL) and 376 (40.38%) were started on labour induction (LI) for medical and obstetric reasons or because of unsatisfactory foetal status evidenced on foetal monitoring. The main maternal endpoint was a composite variable called maternal outcome which included any complication such as the need for transfusion, hysterectomy, need for intensive care, obstetric trauma and post-partum infection. The primary neonatal endpoint was another composite variable called primary neonatal

outcome that included 5 minute Apgar less than 7, low birth weight, cephalohematoma, jaundice, hypoglycemia, hypokalemia, neonatal sepsis, transient tachypnea of the newborn, hyaline membrane disease, necrotising enterocolitis, pneumonia, asphyxia, meconium aspiration, potentially dangerous events, malformations, need for intubation and neonatal death.

The authors found a lower risk of adverse maternal outcomes in the CDMR group compared to the SL group (OR = 0.21; 95% CI: 0.05-0.97), and no difference between SL and LI (OR = 0.93; 95% CI: 0.42-2.06). As for primary neonatal outcomes, a lower risk was also found in the CDMR group as compared to the SL group (OR = 0.59; 95% CI: 0.36-0.93), with no differences between SL and LI (OR = 0.84; 95% CI: 0.59-1.21). Therefore, the authors conclude that in low risk pregnant women entering a standardized protocol, CDMR is associated with the lowest rate of adverse maternal and perinatal outcomes and suggest the need for future studies in order to determine long-term safety.

The results of this study could encourage the medical community to promote CDMR, but caution must be exercised when interpreting these results, because of several reasons:

1. The authors do not report results for all the patients invited to take part in the study. They state that the invitation was made before 36 weeks but the results only include pregnant women who reached 39 weeks (attrition bias) and there is no information regarding the proportion or the outcomes of subjects not included in the results, hence the impossibility to determine the direction in which the estimator obtained is affected (OR). If results of previous studies showing a higher number of complications in patients taken to elective c-section versus SL are taken into consideration, non-inclusion of these pregnant women increases the probability of finding outcomes in favour of CDMR.
2. Maternal and foetal outcomes are presented as a composite variable, creating the benefit of greater power. However, combining variables obscures what happens with each of the individual variables, and not all outcomes have the same clinical impact (14). Maternal results show that the SL group had a lower need for transfusion than the CDMR group (0.3% vs. 0.5%) and a higher frequency of maternal obstetric trauma (2.1% vs. 0%), but no mention is made of what is considered obstetric trauma or of the reasons that led to transfusion, a complication that may constitute a criterion for extremely severe maternal morbidity. Regarding neonatal outcomes, the most frequent complication was jaundice, accounting for 78.84% (149 of 189) of the total neonatal complications, but it is unlikely that this complication is related to the form of delivery. This is in contrast with low 5 minute Apgar, neonatal death, meconium aspiration, inadequate transition, transient tachypnea of the newborn and the need of intubation, all of which are related to the form of birth. However, these were infrequent complications, with tachypnea showing the highest incidence, especially in the c-section group, followed by inadequate transition, which was more frequent in the SL group.
3. The study also compares the cohort of pregnant women taken to CDMR with those with LI and finds a higher frequency of complications in the latter group. However, it is worth noting that labour inductions were due to maternal or obstetric indications or to suspected unsatisfactory foetal status, which constitutes a selection bias leading to a finding of worse results in this group as compared to the SL and CDMR groups.
4. Of the population included in the study, 84.6% was covered by private medical insurance, unlike the vast majority of pregnant women in Colombia who are under the subsidized or contributive health insurance systems. For this reason, results cannot be generalized.

The practice of medicine involves consideration of ethical principles such as beneficence, which consists of offering practices designed to increase benefits and reduce risks. Regarding the form of delivery, evidence is consistent regarding the lower risk and the greater benefit of vaginal delivery over c-section. However, when it comes to elective c-section and CDMR after 39 weeks, this difference between benefits and risks in relation to SL seem to balance out, although to this date there is no good quality evidence that could enable medical practitioners to make a strong recommendation for c-section. On the other hand, under the principle of autonomy that seeks to guarantee the patient's right to decide whether to accept or reject the interventions offered by the healthcare staff, the pregnant woman may request a c-section, and that request must be honoured. However, this decision must be made by a patient who is informed and fully aware of demonstrated benefits and risks. Notwithstanding, a study (15) found that the role of the treating physician was among the main determinants influencing the pregnant woman's decision regarding the form of delivery, and that it is more relevant when vaginal delivery is desired and the final decision becomes a request for c-section.

In conclusion, CDMR is an increasingly frequent procedure for which there is no high quality evidence showing that it results in greater benefits and lower risks than spontaneous vaginal delivery in the short term, and there are no studies assessing the frequency of long-term complications such as placenta praevia, placenta accreta and cesarean section scar pregnancy. Maternal request for a c-section must come after careful consideration of the short and long-term benefits and risks of the procedure, information that cannot usually be provided in full during a single visit. In fact, this is a continuous process that must occur throughout antenatal care. Inevitably, the treating physician plays an important role in this decision by influencing the mother in accordance with his/her own knowledge, beliefs and convenience.

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