Maternal and neonatal outcomes based on appropriateness of indication and timing of surgery in red code caesarean section: a multicentre retrospective study

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Objective. A red code (RC) cesarean section (CS) is an emergency for maternal and/or fetal life. We evaluated maternal and neonatal outcomes in a series of RC CS, in relation to the level of maternal unit, indications and surgical times.

Materials and Methods. Multicentre retrospective study in 2 second-level university hospitals and 2 first-level community hospitals on all women who underwent RC CS between 2018 and 2021. An independent team of experts performed retrospective audits to assess appropriateness of indications, procedures and outcomes.

Results. Among the 25065 deliveries, 4783 were CS (19.1%), 168 of which (3.5%) were RC. The most frequent indication was non-reassuring fetal heart rate tracing (41.7%). Two indications were independently associated with worse perinatal outcomes: umbilical artery lactate > 7 mmol/L (P = 0.023) and base excess (BE) ≥ 16 mmol/L (p = 0.016). Rates of appropriate indications were higher in the second-level hospitals (80.2% vs 65%, p = 0.036), as were rates of neonatal intubation (p = 0.001) and neonatal ICU admission (p = 0.001). Appropriate indications for RC CS correlated with higher maternal blood loss (p = 0.02), lactate values > 7 mmol/L (p = 0.001) and neonatal resuscitation (p = 0.02). After correcting for the appropriateness of indications, the time between decision and delivery (DDI-mean 21.0 minutes) was not associated with worse neonatal outcomes.

Conclusions. The DDI is not significantly associated with neonatal outcomes, as opposed to the appropriateness, which is associated with worse outcomes. First level maternal units guarantee safety comparable to second-level, but with lower rates of appropriate indications.