

# Prophylactic antibiotics for caesarean section administered preoperatively rather than post cord clamping significantly reduces the rate of endometritis

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## Context

Antibiotic prophylaxis for women undergoing caesarean section (CS) has been proven to be beneficial in decreasing post-CS infectious morbidity in women at high-risk (in labour after membrane rupture), as well as low-risk (non-labouring with intact membranes).<sup>1</sup> Evidence-based guidelines recommend the use of prophylactic antibiotics before surgical incision. An exception is made for CS, where narrow-range antibiotics are administered after umbilical cord clamping because of putative neonatal benefit. The use of preincision, broad-spectrum antibiotics may result in a lower rate of maternal morbidity with no disadvantage to the neonate.<sup>2</sup> This systematic review and meta-analysis examines the maternal and neonatal infectious morbidity in women receiving preoperative prophylaxis for CS compared with those receiving post cord-clamping administration.

## Methods

This was a well-conducted review of randomised controlled trials (RCTs) of a single dose of any antibiotic comparing preoperative with post cord-clamping administration in women undergoing a CS (elective or emergency). The maternal outcomes included febrile morbidity, endometritis, wound infection or pyelonephritis. Neonatal outcomes included neonatal sepsis, neonatal septic workup and neonatal intensive care unit admission. Heterogeneity and publication bias were assessed. The review clearly stated the question being addressed, the search strategy, study selection, assessment of study quality, data extraction and synthesis, and it adhered to recognised protocols for systematic reviews and

meta-analyses from The Cochrane Collaboration and PRISMA. The results are reported as relative risk (RR) estimates and CI.

## Findings

Six RCTs met the inclusion criteria, reporting on 2313 women and 2345 neonates. Preoperative administration was associated with a significant (41%) reduction in the rate of endometritis as compared with post cord-clamping administration (RR=0.59, 95% CI 0.37 to 0.94). In the preoperative group, there were non-significant reductions in the rates of wound infection (RR=0.71, 95% CI 0.44 to 1.14), maternal febrile morbidity (RR=0.94, 95% CI 0.46 to 1.95), neonatal sepsis (RR=0.81, 95% CI 0.47 to 1.41), neonatal septic workup (RR=0.93, 95% CI 0.71 to 1.21) and neonatal intensive care unit admission (RR=0.92, 95% CI 0.65 to 1.28). There were non-significant increases in the rates of maternal pyelonephritis (RR=1.09, 95% CI 0.49 to 2.43) and neonatal pneumonia (RR=3.36, 95% CI 0.55 to 20.47).

## Commentary

This systematic review highlights the important debate on the timing of prophylactic antibiotics for CS<sup>2</sup> and confirms that preincisional rather than postcord clamping administration of antibiotics in women undergoing CS significantly reduces the rate of postoperative maternal infectious morbidity updating a previous systematic review.<sup>3</sup> Since meta-analyses are only as good as the quality of the studies they include, care must be taken that updated meta-analysis does not perpetuate earlier errors.<sup>4</sup> The studies included were heterogeneous with respect to sample sizes (which range from 90 to 741) and were downgraded to only moderate quality. Moreover the long-term effects on the offspring were not evaluated. To overcome this problem of pooling small-sized to medium-sized RCTs of only moderate quality and trying to make judgements on short-term and long-term outcome of the offspring, a large RCT is required. A sample size calculation of such a study reveals that the total numbers to be recruited exceed those accrued in the six studies included in this review.

The review did not discuss the use of narrow versus broad spectrum antibiotics for CS.<sup>2</sup> The use of narrow-range antibiotics administered after umbilical cord clamping rather than preincision broad-spectrum antibiotics is because of putative neonatal benefit. Since the initial composition of the infant gut microbiota is a key determinant in the development of childhood asthma and atopic disease, long-term follow-up of the neonatal and infant gut microbiome is essential if we are to examine the correlation between preincisional versus postcord clamping and narrow-range versus broad spectrum administration of antibiotics with respect to adverse infant outcome.<sup>5</sup> These unanswered questions leave the issue of the timing of antibiotic prophylaxis unsettled.

**Competing interests** None.

## References

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