CATEGORY C: PATIENT SAFETY/INNOVATION/CLINICAL QUALITY IMPROVEMENT

Automated mandatory bolus versus continuous basal infusion for maintenance of epidural analgesia in labor: systematic review and meta-analysis

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Background: Epidural analgesia is conventionally delivered as continuous basal infusion (BI) with or without patient-controlled epidural analgesia. Recent developments involve using automated mandatory bolus (AMB) in place of BI. Randomized controlled trials (RCTs) comparing both methods reported conflicting findings, this meta-analysis assesses the effects of AMB versus BI in maintaining epidural analgesia in labor.

Methodology: Database were searched to select eligible RCTs. Three primary outcomes, incidence of breakthrough pain, cesarean delivery, and instrumental delivery, were analyzed using Mantel-Haenszel method. Four secondary outcomes, labor analgesia duration, hourly local anesthetic (LA) consumption, maternal satisfaction, and Apgar score, were analyzed using inverse variance method.

Results: 17 RCTs (1778 participants) were included. AMB compared to BI significantly reduces the risk of breakthrough pain by 38% (RR 95% CI 0.45 to 0.84) and hourly LA consumption by a mean difference of -0.99 ml h^{-1} (95% CI -1.51 to -0.47). The difference between AMB and BI is not significant for cesarean delivery incidence, instrumental delivery incidence, and labor analgesia duration in overall population. Importantly, AMB significantly reduces instrumental deliveries in PCEA and nulliparous subgroups by 27% (RR 95% CI 0.55 to 0.98) and 24% (RR 95% CI 0.58 to 0.99) respectively. AMB also significantly reduces labor analgesia duration in PCEA and nulliparous subgroups by mean differences of –13.93 min (95% CI -18.07 to -9.78) and –13.66 min (95% CI -21.62 to -5.70) respectively. There were reports of increased or equal maternal satisfaction with AMB compared to BI. No difference in Apgar scores was found.

Conclusion: AMB has better outcomes compared to BI in reducing breakthrough pain and LA consumption. The beneficial effects of AMB in reducing instrumental deliveries and labor analgesia duration are found in PCEA and nulliparous subgroups. AMB has improved analgesic efficacy and is an alternative to BI in maintaining epidural analgesia in labor.

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