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SCIENTIFIC ARTICLE

A prospective, randomized, blinded-endpoint, controlled study – continuous epidural infusion versus programmed intermittent epidural bolus in labor analgesia

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KEYWORDS
Analgesia;
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Abstract
Background: There is evidence that administration of a programmed intermittent epidural bolus (PIEB) compared to continuous epidural infusion (CEI) leads to greater analgesia efficacy and maternal satisfaction with decreased anesthetic interventions.
Methods: In this study, 166 women with viable pregnancies were included. After an epidural loading dose of 10 mL with Ropivacaine 0.16% plus Sufentanil 10 μg, parturient were randomly assigned to one of three regimens: A – Ropivacaine 0.15% plus Sufentanil 0.2 μg/mL solution as continuous epidural infusion (5 mL/h, beginning immediately after the initial bolus); B – Ropivacaine 0.1% plus Sufentanil 0.2 μg/mL as programmed intermittent epidural bolus and C – Same solution as group A as programmed intermittent epidural bolus. PIEB regimens were programmed as 10 mL/h starting 60 min after the initial bolus. Rescue boluses of 5 mL of the same solution were administered, with the infusion pump. We evaluated maternal satisfaction using a verbal numeric scale from 0 to 10. We also evaluated adverse, maternal and neonatal outcomes.
Results: We analyzed 130 pregnants (A = 60; B = 33; C = 37). The median verbal numeric scale for maternal satisfaction was 8.8 in group A; 8.6 in group B and 8.6 in group C ($p = 0.83$). We found a higher caesarean delivery rate in group A (56.7%; $p = 0.02$). No differences in motor block, instrumental delivery rate and neonatal outcomes were observed.
Conclusions: Maintenance of epidural analgesia with programmed intermittent epidural bolus is associated with a reduced incidence of caesarean delivery with equally high maternal satisfaction and no adverse outcomes.

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PALAVRAS-CHAVE
Analgesia;
Epidural;
Técnicas de analgesia epidural;
Infusão;
Analgesia obstétrica;
Bolus intermitente programado

Estudo prospectivo, randômico, controlado e de avaliação cega do desfecho – infusão peridural contínua *versus bolus* epidural intermitente programado em analgesia de parto

Resumo
Justificativa: Há evidências de que a administração de um *bolus* epidural intermitente programado (BEIP) comparada à infusão epidural contínua (IEC) resulta em maior eficácia da analgesia e da satisfação materna, com redução das intervenções anestésicas.
Métodos: Neste estudo, 166 mulheres com gravidezes viáveis foram incluídas. Após uma dose epidural de 10 mL de Ropivacaína a 0,16% e adição de 10 μg de Sufentanil, as parturientes foram aleatoriamente designadas para um dos três regimes: A - ropivacaína a 0,15% mais solução de sufentanil (0,2 μg/mL) como infusão peridural contínua (5 mL/h, começando imediatamente após o *bolus* inicial); B - ropivacaína a 0,1% mais sufentanil (0,2 μg/mL) como *bolus* epidural intermitente programado; C - solução idêntica à do Grupo A com *bolus* epidural intermitente programado. Os regimes BEIP foram programados como 10 mL por hora, iniciando 60 minutos após o *bolus* inicial. *Bolus* de resgate de 5 mL da mesma solução foram administrados com bomba de infusão. A satisfação materna foi avaliada utilizando uma escala numérica verbal de 0 a 10. Também avaliamos os resultados adversos maternais e neonatais.
Resultados: Foram avaliadas 30 gestantes (A = 60, B = 33; C = 37) foram avaliados. A mediana na escala numérica verbal para a satisfação materna foi de 8,8 no grupo A; 8,6 no grupo B e 8,6 no grupo C ($p = 0,83$). Encontramos uma taxa mais elevada para parto cesário no grupo A (56,7%; $p = 0,02$). Não observamos diferenças no bloqueio motor, taxa de parto instrumental e resultados neonatais.
Conclusões: A manutenção da analgesia peridural com *bolus* epidural intermitente programado está associada a uma redução da incidência de parto cesariano com satisfação materna igualmente elevada e sem resultados adversos.

Introduction

Childbirth is one of the most painful experiences for woman.[1] The degree of pain experienced and the quality of pain relief affect patient's satisfaction with the birthing process, an important outcome of the quality of care, contributing to long-term emotional and psychological effects.[2]

Neuraxial analgesic techniques outdid parenteral, inhalatory and non-pharmacologic measures in labor analgesia.[3] Maintenance technique for epidural labor analgesia has changed from intermittent manual bolus – with an increased risk for contamination, drug error and wider variation in pain relief[4] – to continuous epidural infusion (CEI) with or without patient controlled epidural analgesia (PCEA). The later provides a smoother analgesic experience but local anesthetic consumption is usually higher and motor block may be more prominent,[5] with a likely increase in rates of dystocia and instrumental deliveries.[6]

There is evidence that administration of an epidural bolus leads to greater analgesia efficacy[7–9] and maternal satisfaction with reduced local anesthetic consumption and anesthetic interventions.[4,5,10–12] However no study, to date, has included all women with viable pregnancies and programmed intermittent epidural bolus (PIEB) regiments differ significantly among studies.

We hypothesized that, even at lower local anesthetic concentrations, PIEB is associated with similar or higher outcomes comparing to CEI. The primary outcome of this study is to compare maternal satisfaction, with PIEB at different local anesthetic concentrations, to standard CEI in labor analgesia.

Methods

We conducted a prospective, randomized, blinded-endpoint, controlled study between April and June 2013, approved by the Clinical Research and Ethics Committee of Funchal's Central Hospital.

Women with viable pregnancies who requested labor analgesia, with a cervical dilation >3 cm and <5 cm and with a baseline pain score (assessed at the peak of the contraction) from 5 to 10 in verbal numeric scale (VNS) of pain, were included. Written informed consent was obtained from all subjects or the parents or legal guardians, for minor subjects. Women who had received parenteral opioids, who did not speak the language or were unable to perform motor block evaluation tests, were excluded from the study.

Immediately before initiation of analgesia, a crystalloid infusion of 500 mL (Ringer lactate) was started. Maternal heart rate, non-invasive arterial blood pressure, and fetal heart rate tracing were assessed. Epidural analgesia was initiated in sitting position at the L3–4 or L4–5 interspace using the loss of resistance to saline technique with an 18-gauge Tuohy epidural needle. 3–4 cm of the closed-end, multiorifice epidural catheter was inserted into the epidural space