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EDITORIAL I

Maintenance of epidural labour analgesia: bolus top-ups, continuous infusion, patient-controlled or super-tech?

For several decades intermittent top-ups (ITU) have been standard practice in many obstetric units. With the appearance of continuous epidural infusion analgesia (CEIA) pumps and equally fast of PCA pumps, these techniques have been compared with intermittent bolus administration.

Although the results of all comparative studies may seem rather confusing, it may be concluded that in general the three modalities offer satisfactory analgesia. In most studies comparing the three systems a continuous infusion was found to result in larger total and hourly doses [1, 2]. Much will depend on the dose and concentration of the loading dose, rate of infusion (sometimes being 12 ml/h or more), the concentrations used for infusion and demand dose, the way breakthrough pain is handled and whether Patient Controlled Epidural Analgesia (PCEA) was with or without a basal rate. A meta-analysis [3] comparing CEIA with pure demand PCEA demonstrated that PCEA decreased total and/or hourly consumption, reduced the number of interventions required to solve pain problems (thus reducing the total dose and workload) and enhanced maternal satisfaction as parturients are in self-control of their pain.

Despite commonly found differences in total dose consumption only occasionally a higher incidence in motor impairment was found with use of larger doses while it rarely resulted in different obstetrical or neonatal outcome.

In this issue Dorca and colleagues [4] report their study results comparing CEIA and PCEA. In the first place and not surprisingly PCEA treated patients had more peak pain moments inviting them to use the demand button. This was less in the CEIA group but obviously, and in accordance with most studies, it did not affect patient satisfaction.

Secondly, they found somewhat less consumption in the PCEA group thought not significant while more surprisingly motor block incidence and severity and instrumental delivery rate were significantly higher in the CEIA group. At first sight this may be difficult to understand considering the insignificant higher local anaesthetic doses given. It should be noticed that a rather large initial bolus doses was used i.e. 32.5 mg when also taking into account the test dose. Due to this some patients already had a significant degree of motor impairment during the first hour which was maintained and even worsened by the CEIA started immediately after this bolus.

Even if the total drug consumption in the PCEA group was not significantly less, the lock out interval of 15 minutes and a first demand mostly more remote from the loading dose might have allowed motor block recovery. But there is more. The lower incidence of motor block and hence instrumental delivery may be explained by a more extended (also more bilateral?) spread (also transforaminal escape?) of a bolus administration i.e. PCEA than of a continuous infusion.

The discussion of whether to select a bolus or an infusion is very actual. It has been demonstrated in vitro that the spread of a local anaesthetic may be better with a bolus dose than with a continuous administration [5]. It can be imagined that an infusion of 7 mL per hour, as was the case in Dorca's study, signifies only 2 drops per minute which may stick around the same dermatomal level and motor nerve fibres. A similar explanation has also been suggested by the authors. These physical differences between continuous and bolus administration may cast some doubts on the usefulness of a continuous infusion. Similarly the benefit of a background infusion during PCEA may be called into question although most studies seem to promote this modification to reduce breakthrough pain. A better

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spread of a bolus as compared to an infusion may also be supported by studies showing that large demand doses with longer lockout intervals are better than smaller doses with short lock-outs [6, 7]. The same concept has inspired some colleagues to demonstrate the superiority of an automated mandatory bolus during a PCEA modality in comparison with a basal rate [8, 9].

In conclusion, based on the available evidence, PCEA, despite a higher cost, is the best actual modality for labour pain treatment while dealing with inter-individual variability. If a basal rate is selected it should not exceed 5 mL/h. A low concentrated combination of a local anaesthetic and an opioid is the best guarantee for the lowest dose requirement and hence less risk of motor impairment, regardless of any proven benefit in terms of obstetrical or neonatal outcome. Trying to further reduce total dose consumption may increase the rate of additional interventions or patient demand dosing which may affect maternal satisfaction. More studies are required for further fine-tuning of the PCEA settings or changing to less conventional modalities such as computer-integrated or automated bolus delivery pump programs.

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