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Research Article

Single dose spinal analgesia: Is it a good alternative to epidural analgesia in controlling labour pain?



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Abstract Objectives: Regional anaesthesia is considered the optimal technique for obstetric patients; nevertheless, the optimal method of regional anaesthesia for delivery remains to be determined. In our study we investigate the safety, efficacy and cost benefits of single-dose spinal analgesia in comparison with epidural analgesia during labour.

Study design: In our study women in advanced labour were randomly allocated into two equal groups using a computer-generated randomization table, one group (spinal group = S group) were given 3.75 mg hyperbaric bupivacaine + 25 µg fentanyl with 0.75 ml saline, the other group (Epidural group = E group) were given 4 ml bupivacaine with 4 ml saline and 1 ml (50 µg) fentanyl pain intensity was recorded by the parturient on a visual analogue scale. The quality of pain relief was also rated with a verbal score directly after delivery. Side effects, such as hypotension, Pruritus, sedation, nausea and motor block were noted. Obstetric parameters were followed and recorded, Apgar score were noted, and all the results were compared in the two groups.

Results: Onset of sensory block (detected by pin-prick test) was early (4.4 ± 1.5 min vs 12.5 ± 2.3 min, $p < 0.001$) and duration of sensory block was longer (120.4 ± 15.6 vs 103.2 ± 18.3 min, $p < 0.001$) in S group compared to E group, time to reach maximum dermatome level of sensory block (T_{10}) was shorter in S than E group (8.3 ± 2.4 min vs 22.4 ± 5.7 min, $p < 0.001$), two segment regression occur late in S group compared to E group (75.6 ± 12.5 min vs 66.3 ± 9.4 min, $p < 0.001$). Visual analogue scores after 5, 15, 30, 60, 90, 120 and 150 min were lower in S group compared to E group, all the previous result is statically significant ($p < 0.001$).

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88% of the parturients in S group vs 60% in E group scored the analgesic quality as excellent, the mean duration of analgesia (Mean \pm SD) was longer in S group compared to E group. 8% of parturients in S group vs 14% of parturients in E group had hypotension. Motor block, sedation and nausea were 2–6% in both groups. Pruritus was seen in 60% in E group vs 25% in spinal one. No caesarean section was performed. Vacuum extraction was done in 15% vs 25% among S group and E group respectively. Oxytocin augmentation was needed in 48% vs 62% of the parturients among S group and E group respectively. Faetal heart rate disturbances following the spinal block were seen in 2 cases. Apgar score were high and no neonate had Apgar score < 7 in both group. The overall cost was lower in S group compared to E group.

Conclusions: Based on the results of our study we concluded that single dose spinal analgesia is a good alternative to epidural analgesia in controlling labour pain i.e. spinal compared to epidural is more easy performed, faster, less expensive, and provide effective analgesia.

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1. Introduction

The terms “regional anaesthesia”, “spinal block” and “epidural block” are often used interchangeably. This is incorrect. Both spinal and epidural block are subsets of regional anaesthetic.

Spinal block differs from an epidural block in a number of ways. Firstly, a smaller needle is used to perform a spinal block than an epidural block. Secondly, the drugs are injected into the cerebrospinal fluid that bathes the spinal cord. In order to do that the needle makes a tiny hole in the dura, which is a tissue encasing the spinal cord and the cerebrospinal fluid. Small doses of local anaesthetic are required because they spread more easily in the spinal fluid [1]. With an epidural block, the drugs are delivered outside the dura, in the epidural space, hence the name for the block. Occasionally, the dura can be inadvertently breached in performing an epidural block, known as a dural puncture. Larger doses of local anaesthetic are required because the spread is through tissues rather than fluid [2]. Thirdly, a spinal block is a single injection of local anaesthetic medications and so there is only one opportunity to deliver the medications. With an epidural, a catheter sits in an epidural space so drugs can be delivered as needed to extend the duration of the block. An epidural block can be made to last longer than a spinal block [3].

Regional analgesia/anaesthesia is nowadays considered the optimal technique for obstetric patients. Maternal mortality under regional anaesthesia is 16 times lower than under general anaesthesia, mainly due to reduced the risk of gastric aspiration which is the major cause of direct maternal death [4]. Nevertheless, the optimal method of regional anaesthesia for delivery and caesarean section remains to be determined.

Spinal anaesthesia has the advantage that profound nerve block can be produced in lower half of the body by the relatively simple injection of a small amount of local anaesthetic. However, the greatest challenge in spinal anaesthesia is to control the spread of local anaesthetic through the cerebrospinal fluid (CSF) to provide a block which is adequate for the proposed surgery without unnecessary extensive spread, and increased risk of complications [5].

Spinal anaesthetic technique when used for obstetric purpose might be accompanied by side effects like hypotension, nausea and vomiting. Prolonged hypotension causes faetal bradycardia and acidaemia, which can further compromise critical faetal status. Therefore, extensive clinical investigation is dedicated to issues of optimal dose and combination of

drugs which would balance haemodynamic stability and effective analgesia [6]. In our study we use small dose of local anaesthetic drug with small dose opioids to overcome the above mentioned side effect.

Most of the previously performed studies concentrated on the effect of low-dose spinal anaesthesia as a part of combined spinal–epidural anaesthesia (CSE) in labour, and did not use low dose spinal anaesthesia only they concluded that low-dose spinal combined with epidural analgesia offers several theoretical advantages. The onset of block is faster and block is potentially denser in comparison with conventional epidural analgesia [7]. Another advantage associated with CSE analgesia is adequate analgesia provided by small doses of local anaesthetics and opioids which cause less haemodynamic compromise than conventional epidural anaesthesia [8]. In our study we investigate the analgesic effect of low dose spinal anaesthesia, the maternal and faetal outcome and we verified that low dose spinal anaesthesia is sufficient technique for labour and can be used instead of CSE and produce satisfactory results for the mother and the baby as well.

Traditional epidural analgesia is the most common technique for labour analgesia and also for caesarean section when there is an indwelling epidural catheter present and when epidural anaesthesia offers advantages over spinal anaesthesia for example in morbidly obese parturients. The major disadvantage of epidural analgesia is the slow onset of action, prolonged labour, and use of Oxytocin augmentations and increased incidence of instrumental vaginal delivery. Haemodynamic instability, although less pronounced than in traditional spinal anaesthesia, might be of clinical relevance, as well. Another problem is reduced mobility due to motor effects of local anaesthetics which can cause discomfort and reduce maternal satisfaction [9].

The maternal and faetal effects of analgesia during labour remain central to discussions among patients, anaesthesiologists, and obstetrical caregivers. A number of randomized trials have taught to address the effects of different strategies for analgesia on maternal and faetal outcomes. Despite this effort, it has become increasingly clear that potentially unwanted effects of analgesia for women in labour and their children cannot be determined easily. Remaining controversies in obstetrical anaesthesia include that over the effects of regional anaesthesia on the progress and outcome of labour, as well as that over its effects on the neonate [10].

The aim of our study is to proof that single dose spinal analgesia is efficient, faster, easily performed and less expensive

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