Spinal Anaesthesia Failure among Women Undergoing Caesarean Section in Kirtipur Hospital

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Aims: This study was done to find out the spinal anaesthesia failure rate necessitating the conversion to general anaesthesia and use of intraoperative supplemental analgesia.

Methods: This was a retrospective study undertaken in Kirtipur hospital in 660 patients. Spinal anaesthesia (0.5% heavy bupivacaine 2.2 ml) was given to women who had undergone elective or emergency caesarean section from January 2009 to December 2013.

Results: In this study spinal anaesthesia failure rate was 1.66% (n=11/660). Among them complete failed spinal anaesthesia rate was 0.75% (n=5/660) requiring conversion to general anaesthesia. Intraoperative supplemental analgesic and sedation like pethidine, ketamine or midazolam was required in 0.90% (n=6/660).

Conclusions: The failure rate of spinal anaesthesia given for caesarean section was low (1.66%) and it was within the acceptable range.

Keywords: caesarean section; failure rate; spinal anaesthesia.

INTRODUCTION

Spinal anaesthesia was introduced in 1899 to clinical use by August Bier. In the last five decades it has gained its popularity. "Experienced professional, healthy patient, correct technique, single puncture, adequate cerebrospinal fluid back flow, effective anaesthetic agent so, why did it fail? was the expression used by August Bier.[1] It is frequently used anaesthetic technique and success rate and patient satisfaction are generally high.[2] The use of regional anaesthesia has been increasing in obstetrics recently because it gives better maternal and fetal outcomes compared with general anaesthesia. Most women also prefer to be awake during caesarean delivery and women want to hear the first cry of their babies at birth.[3] The nearly no existing risk of systemic toxicity to the mother and fetus from the small dose of local anaesthetic used has endeared it to obstetric anaesthetists.[4]

There are reports of failed spinal anaesthesia and published failure rates range from 0.46%-17%.[5,6] In some cases of spinal anaesthesia failure supplemental analgesic is sufficient but some requires conversion to general anaesthesia. A spinal anaesthesia is considered to have failed if anaesthesia and analgesia have not taken effect within 10 minutes of successful intrathecal deposition of heavy bupivacaine and 25 minutes for plain bupivacaine.[7,8] Technical errors are common causes of failed spinal anaesthesia like: drug deposition at lower spinal level than surgical site, improper rate of injection, failure to recognize dural puncture, needle partly inside/ outside dural sac, needle in ventral epidural space and lateral horizontal position. Chemical interactions are also contributory like bloody tap cause hydrolysis of ester type anaesthetic by pseudocholinestarage, concentration errors, loss of potency by prolonged exposure to light, high cerebrospinal fluid PH, glucose causes hyperalgesia and spotty anaesthesia.[8] In some patients the onset of spinal anaesthesia is rapid, but it can be slow in some patients, so " tincture of time" should always be allowed.[9] If block has not developed within 15 minutes some additional maneuver is needed. Repeating the procedure or conversion to general anaesthesia is the only option.[10]

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METHODS

Six hundred and sixty women who underwent caesarean section under single shot spinal anaesthesia in the Kirtipur Hospital from January 2009 to December 2013 were studied retrospectively. Approval for this study was taken from the instutional review committee. Age, weight of the parturient, types and indications of caesarean section and American society of anaesthesiologists (ASA) physical status were analyzed. Contraindication to spinal anaesthesia such as coagulopathy, septicaemia, known spinal pathology, history of antepartum haemorrhage, allergy to local anaesthestic agents and patient refusal were excluded. After coming to operation theatre all parturient were preloaded with 500 ml Ringer lactate solution. The parturients were kept in sitting position and after all aseptic precaution 27-gauge pencil point spinal needle (whitarche) was inserted at third or fourth lumber space. After free flow of cerebrospinal fluid 2.2 ml (11 mg) of 0.5% bupivacaine heavy was administered. Patients were immediately kept on supine position with a wedge under right buttock and vitals were monitored. Effects were noted after 5 minutes, those who did not show effect in 5 minutes were watched for another 5 minutes and then they were tested for temperature sensation, pain at incision site, level of block and motor response by asking them to raise their legs. Parturients who felt pain after being pricked by a pin at the site of incision or could move her legs were considered as failed spinal anaesthesia, so general anaesthesia was given. Those who developed motor block of lower limbs but had pain sensation during surgery were supplemented with intravenous analgesia like pethidine or ketamine or midazolam. After the completion of surgery, the parturient were shifted to postoperative ward and observed for residual effects of anaesthesia and postoperative nausea and vomiting.

RESULTS

In our study six hundred and sixty caesarean sections were performed under spinal anaesthesia. The age of patients ranged from 19 years to 40 years. Five hundred and five (73.4%) were ASA physical status I and 155 (26.6%) were ASA physical status II. The patients weighed from 49 Kg to 88 Kg. There were 248 (37.5%) elective and 412 (62.5%) emergency caesarean sections. The main indication of caesarean section was fetal distress 265 (40.2%) followed by previous caesarean section 89 (13.5%). There were 11 cases with failed spinal anaesthesia among which 5 women had complete failure and were converted to general anaesthesia. Out of 5 complete failure spinal anaesthesia, 2 were performed by an anaesthesiologist and 3 by a nurse anaesthetist. Six cases had partial failure of spinal anaesthesia that required intraoperative supplementation of analgesia and sedation.

Table 1. Demographic characteristics (n=660).

Age	Number (%)
<19	31 (4.7)
20-24	186 (28)
25-29	293 (44.4)
30-34	116 (17.6)
35-39	31 (4.7)
> 40	3 (0.4)

Table 2. ASA physical status (n=660).

ASA Status	Number (%)
I	505 (73.4)
II	155 (26.6)

DISCUSSION

True failure of spinal anaesthesia should be differentiated from failure to depositing the drug in the subarachnoid space. The word failure implies that a spinal anaesthesia was attempted but no block resulted or a block that resulted was inadequate for that surgery. Due to concern about the potential risk associated with general anaesthesia, some of our patients were distressed when informed the need for conversion to general anaesthesia following the failure of the spinal anaesthesia. In our study the incidence of total failed spinal anaesthesia for caesarean section was 1.66% which was lower than 6%, 6% and 2.5% reported by Shrestha and collegue,[11] Adenekan et al,[16] Olateju SO and Abraham et al[17] respectively. In our study complete spinal failure necessitating conversion to general anaesthesia was 0.75%, which was higher than 0.5% reported by Sng et al[13] and lower than 2.5% to 17% reported by different authors.[4,10,11,16,]

If the patient could not move her lower limbs but felt pain over the incision site during surgery after having spinal anaesthesia then intravenous analgesia was supplemented. In our study 6 (0.9%) patients needed supplemental analgesia which was lower than 1.8% reported by Shrestha and his collegues,[11] 10.9% reported by Garry et al,[14] 6.4% reported by Adenekan et al[16] and 11.9% reported by Abraham and Jacob.[17]

In the United Kingdom, higher volume of hyperbaric bupivacaine is used for spinal anaesthesia and this has happened without higher incidence of complication. Immediate conversion to general anaesthesia after a single failed spinal anaesthesia can be safely avoided.

CONCLUSIONS

Spinal anaesthesia is a centenary technique, which is used universally by specialists and non-specialists and considered easy to execute by the majority of the professionals. It is subjected to occasional failure due to one of the several factors mentioned. Therefore, proper evaluation of the anatomy of the patient related to the procedure, judicious choice of needle and punctured site, careful storage of anaesthetic agents, selection of the dose and baricity, correct positioning of the patient during the puncture and shortly after the administration of the anaesthetic agent and until it is fixed to the tissue should be done to achieve better results.

DISCLOSURE

The authors report no conflicts of interest in this work.

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