# Repeat Spinal Anaesthesia for Caesarean Section: An Experience at Paropakar Maternity and Women's Hospital

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**Aims**: This study aims to review the haemodynamic effects of the repeat spinal anaesthesia and to identify the different doses of bupivacaine heavy used for the repeat spinal anaesthesia for the failed spinal in caesarean section.

**Methods**: This study was conducted by reviewing medical anaesthesia records of the cases of the repeat spinal aesthesia regarding any adverse haemodynamic effects. The second dose of bupivacaine heavy, maximum sensory blockade and intraoperative events like bradycardia, hypotension, high spinal, nausea vomiting, conversion to general anaesthesia and inadequate block were also reviewed.

**Results:** Out of 8040 caesarean section under subarachnoid block, 51(0.63%) cases were conducted under repeat spinal anaesthesia from April 2014 to December 2016. All the cases had complete spinal failure with no sensory and motor effects even after 10 minutes of the intrathecal injection. The second dose of bupivacaine heavy used was variable but reduced than the first dose. The most common adverse effect was hypotension (27.5%). 50% of cases were uneventful. One case was converted to general anaesthesia even after repeat spinal anaesthesia and 9.8% cases had high spinal above T4.

**Conclusions:** Repeat administration of bupivacaine heavy in reduced dose and volume can be used in complete failure of administration of first spinal anaesthesia. However, it always requires careful assessment and the judicious monitoring.

**Keywords:** caesarean section, failed spinal, repeat spinal

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## INTRODUCTION

Spinal anaesthesia is the most common anaesthetic technique for caesarean section. It avoids the risk associated with the general anaesthesia in pregnant patients. But sometimes failed spinal anaesthesia causes dilemma for giving general anaesthesia or repeat spinal. The risk of general anaesthesia in parturients cannot be underestimated. Spinal aesthesia reduces the risk of aspiration and difficulty in airway management in pregnant patients and provides better mother and child bonding. The incidence of failed spinal varies from 4% to 17% and more in teaching institute.[1] It has been lesser than one percent in modern day practice.[2]

Shrestha et al[3] found 4.3% incidence of the spinal failure rate requiring conversion to general anaesthesia for caesarean section in our setup. Failed spinal is defined as spinal anaesthesia was attempted, but without resulting in a sensory block or a block that resulted is inadequate for that surgery.[1] Spinal anaesthesia with bupivacaine is considered to have failed if anaesthesia and analgesia have not been achieved within 10 min of successful intrathecal deposition of hyperbaric bupivacaine.[4] The major issues and controversies associated with repeat spinal for failure of spinal anaesthesia are: dose of bupivacaine heavy, insufficient literatures, risks of high spinal and the haemodynamic instability is due to excessive spread of spinal anaesthetics and presence of skilled anaesthesia personnel who can intubate for safety. The objective of this study is to review the cases done in repeat spinal anaesthesia for identifying the doses of bupivacaine and adverse effects of repeat spinal anaesthesia.

## METHODS

This retrospective cross sectional study was conducted in Paropakar Maternity and Women's Hospital after ethical approval from the institutional review committee. The anaesthesia records of cases of caesarean section under subarachnoid block from April 2014 to December 2016 were reviewed and cases with repeat spinal were identified. Data collected were patients profile like weight, height, age, first dose

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of inj. bupivacaine heavy, type of needle used, 2nd dose of bupivacaine heavy and the maximum sensory level after 10 minutes of repeat spinal. The adverse effects like hypotension, bradycardia, hypotension and bradycardia, high spinal and nausea-vomiting were also noted. Regarding the adequacy of the repeat spinal, the conversion to general anaesthesia and requirements for the supplemental anaesthetics and analgesics were also collected from the data. Data were entered in Microsoft Office Excel Worksheet and statistical analysis was done using SPSS version 16.0. Descriptive statistic was used to calculate the non categorical data.

## RESULTS

Patient's age ranges from 18-38 years, body weight varies from 48-87 kg, height varies from 120-192 cm (Table-1). The incidence of the repeat spinal anaesthesia is 0.63% (Table-2).

All the 51 cases were complete spinal failure without motor and sensory block even after 10 minutes of spinal injection: 48 cases had single attempts and 3 cases had multiple attempts. The spinal needle used was Quincke 25 Gauge and the dose of 0.5% Inj Bupivacaine heavy 2.2 ml was used in all the cases in the first attempt of spinal anaesthesia.

**Table 1: Demographic data**

| Demographic data | Range |
|---|---|
| Age(years) | 18-38 |
| Weight(Kg) | 48-87 |
| Height(cm) | 120-192 |

**Table 2: Incidence of repeat spinal**

| Anaesthesia | Total cases (8040) |
|---|---|
| Spinal anaesthesia | 8040 |
| Repeat spinal anaesthesia | 51 (0.63%) |

Different dosages of inj. bupivacaine heavy were used for repeat spinal anaesthesia like 1 ml (5 mg), 1.2 ml (6 mg), 1.5 ml (7.5 mg), 1.8 ml (9 mg) or 2 ml (10 mg). The most common dose was 1.5 ml (7.5 mg) in 49% of the cases. The most of the cases (68%) had highest sensory level of T4 after 10 min of repeat spinal anaesthesia. The incidence of high block defined as sensory level above T4 was 9.8% (Table-3).

**Table 3: Sensory level after 10 min of repeat spinal**

| Dermatome level | No. of cases | % | Incidence of high block |
|---|---|---|---|
| Cervical C3/4 | 1 | 1.96 | 9.8% |
| T2 | 3 | 5.89 | |
| T3 | 1 | 1.96 | |
| T4 | 35 | 68 | |
| T6 | 9 | 17 | |
| T8 | 2 | 3.9 | |

Hypotension was the commonest adverse effects (27.45%). 50% cases were uneventful (Table-4). One of the cases had conversion to general anaesthesia despite of repeat subarachnoid block. Six cases required supplementation with fentanyl, ketamine, midazolam and propofol.

**Table 4: Adverse Effects**

| Events | No. of cases | % |
|---|---|---|
| Bradycardia | 1 | 1.96 |
| Hypotension | 14 | 27.45 |
| Bradycardia+Hypotension | 1 | 1.96 |
| High Spinal | 5 | 9.8 |
| Nausea and vomiting | 0 | 0 |
| Uneventful | 26 | 50 |

## DISCUSSION

In this study, 50% of cases were uneventful even after repeat subarachnoid block. The most common complication was hypotension (27.45%). The incidence of high spinal was 9.8% The most used dose of bupivacaine heavy was 1.5 ml (7.5 mg) in 25 (49%) cases followed by 2 ml (10 mg) in 15 (29%) cases which is the highest volume used. In a prospective study of repeat spinal in different surgeries by Abraham and Philips, the incidence of spinal failure was 2.4% and the repeat dose of bupivacaine was also reduced to 2.2 ml in all the cases.[5] The most common side effect was hypotension similar to our study. In the study of failed spinal anaesthesia undergoing caesarean section and its management by Pokharel, the repeat dose of bupivacaine heavy was reduced to 1.8 ml (9 mg). They have found 55.5% of case were uneventful which is almost similar to this study (50%).[6] The most common side effect was hypotension (22.2%) and one patient had high spinal managed with bag and mask ventilation. One case was converted to general anaesthesia even after repeat spinal which is similar to this study.

In a case report by Kumar et al, the repeat spinal was given after failed spinal for caesarean section in kyphoscoliotic patient using reduced volume of 1.5

ml.[7] The hypotension was the adverse effect managed with vasoconstrictior and rest of the course was uneventful.

Since the standard dose for repeat hyperbaric bupivacaine is still controversial, in the prospective study by Bhar et al[8], they compared two different doses (10 mg and 12 mg) of hyperbaric (0.05%) bupivacaine for repeat spinal anesthesia. They found that the incidence of hypotension, bradycardia, respiratory complication and nausea vomiting are significantly higher in Group A (12 mg) compared to group B (10 mg) ($p<0.05$).The incidence of hypotension was 42% in group A compared to 23% in group B. In our study the incidence of hypotension was 27.45% which is higher than group B but less than Group A. None of the cases has nausea vomiting in our study. The incidence of bradycardia in group A was 12% versus 2% in group B, which is almost similar to our case (1.96%). These differences can be due to reduced volume of hyperbaric bupivacaine in group B and in our study different doses of hyperbaric bupivacaine have been found for repeat spinal. The most common dose used was 1.5 ml which is lesser than the study by Bhar et al.[8] In group B, 4 (8%) patients had supplemental analgesics compared to 6 (11%) in our study. This can be due difference in doses of bupivacaine. The high spinal was in 3 cases (6%) in group A which is lesser than this study 5 (9.8%). The various factors affecting the level of block and spread of local anaesthetics could produce this difference.[9] Hence, it can be said that spinal anaesthesia can be safely repeated in case of spinal failure but volume of hyperbaric bupivacaine used were reduced in all cases. The safety of regional spinal or epidural anaesthesia over general anaesthesia for caesarean section cannot be denied due to aspiration risk and difficult intubation in parturients. In cases of single attempt of spinal anaesthesia when failed and time permits to delay the surgery, repeat spinal can be a good choice for an expert to avoid the complications of general anaesthesia in caesarean section. However, the adverse effects like hypotension bradycardia and high spinal still can occur but they can be successfully managed discussed in previous studies.[6,7,12] However, this always requires careful sensory and motor assessment (Bromage scale) with vigilant haemodynamic monitoring.

Common technical errors which attribute to failed spinal anaesthesia despite successful cerebrospinal fluid (CSF) tap are the improper rate of injection, entering intrathecal space at a lower spinal level than required surgical level, needlepoint partly outside of dural sac and needle in the ventral epidural region.[1] Spinal anaesthesia is the widely used anaesthetic technique for caesarean section but having an occasional failure rate between 2% and 4% in current literature.[10] In the current literature, only two attempts are recommended since multiple punctures can cause nerve injury and predispose to haematoma formation.[11]

## CONCLUSIONS

In case of caesarean section, complete failure of spinal anaesthesia without motor and sensory effects can be managed with at least one attempt of repeat spinal anaesthesia to avoid the complications of general anaesthesia. However, it always requires careful assessment and monitoring.

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