

An Observational Prospective Cohort Study of Incidence of Spinal Failure And Need of Supplement

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Abstract: A prospective cohort study was conducted in 277 patients undergoing elective upper abdominal surgery under spinal anaesthesia from August 2015 to July 2016 in a teaching hospital in Western UP in order to determine the total and partial spinal failure.

Keywords: Spinal Anaesthesia, upper abdominal surgery, General Anaesthesia

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1. Introduction

Regional and general anesthesia are commonly used for upper abdominal surgery and both have their own advantage and disadvantage. General anaesthesia for upper abdominal surgery needs more drugs and postoperative monitoring. In case of spinal anaesthesia ,it provides excellent muscle relaxation and avoids the risk associated with general anaesthesia. When it is necessary to convert spinal anaesthesia (SA) into general anaesthesia (GA) or needs drug supplementation. The anesthesiologist is frustrated and stressed by unexpected loss of time. Failure of spinal anaesthesia can be partial or complete. Spinal anaesthesia was considered to be failed if anaesthesia and analgesia have not been achieved with in 10 minutes of intrathecal deposition of heavy Bupivacain ^{1,2}. Complete failure was defined as no sensory or motor blocked.In some patients the onset of spinal anaesthesia is rapid , but it can be slow in some patients , so ‘ticture of time ‘should always be allowed .³ If block has not developed with in 15 minutes some additional maneuver is needed.Partial failure was defined as inadequate extent of block so that patient *needs drug* supplement for surgery. Management of partial anaesthesia could be done by giving supplement like injection Butraphenol and injection Tramadol. Complete failure could be managed by giving second spinal anaesthesia. If the surgery has already been started it can be managed by injection Butorphenol (1-2mg), injection Tramadol 3mg/kg body weight, oxygen and nitrous oxide mixture or converting it into general anaesthesia.

II. Material Methods

This prospective cohort study was conducted in a teaching hospital AMU, Aligarh from August 2015 to July 2016. Patients between 18 to 65 years and ASA1 and ASA2 status undergoing elective upper abdominal surgeries were included. Patients with severe valvular disease, neurological problems, coagulopathy and spinal pathology were excluded. All the spinal anaesthesia were performed by trained anesthetist. After institutional ethics committee approval and informed written consent was taken from all patients, and evaluated clinically. All routine investigations reviewed preoperatively. Tab. Alprazolam (0.25mg) was given one night before surgery. In the operative room, intravenous line was secured by placing 20G IV cannula, all essential monitor were placed including noninvasive blood pressure, electrocardiogram and pulse oxymeter. Each patients were preloaded with 500-1000ml of ringer lactate solution. Spinal anaesthesia was performed in sitting position with legs hanging down from the other side of the table and resting on the stool. After all aseptic precaution subarachnoid block was performed at L3-L4 level and 3.5ml of 0.5% heavy Bupivacaine was given by 25G Quinck’s needle, and kept the patient supine and tilt the table by 10 degree trendelenburg position. The extent of the sensory block was elicited by pin prick response. The motor blockade was checked by modified baronage scale.

- 0- Full movement
- 1- Inability to raise extended leg but can bend the knee
- 2- Inability to bend the knee but can flex the ankle
- 3- No movement

Effective spinal anaesthesia was ascertained when patients felt no pain at incision site and if patients felt traction pain during surgery intravenous anaesthesia was supplemented. Spinal anaesthesia was repeated when motor block was inadequate for surgery. After spinal anaesthesia injection midazolam 1mg given to all patients. Those patients who complained of significant pain injection Butorphenol 1- 2mg was given alone or with injection tramadol 3mg/kg. If patients still complaint of pain and or distress even after administration of these drugs, then the patients were intubated and general anaesthesia was given.

III. Result

The mean age of the patients in the study were 46.52 ± 11.7 With average from 18 to 65years out of 277 patients. 210 patients need no supplementation ,23 patients had mild pain at the time of application of retractors and they needs injection Butorphenols 1-2mg, 23 patients had moderate pain so they need injection Butorphenol 1-2mg and injection Tramadol 2-3mg/kg given slowly. Out of 277 patients 11 patients had given O2 and nitrous oxide in a ratio of 30:70% and supplements with Propofol and ventilated with Bain circuits. In 3 patients spinal had been repeated because there was unsatisfactory result after 10 minutes of spinal anaesthesia, 5 patients develop severe pain after starting of surgery and not relived by supplements' drugs .In 2 patients we are not able to perform spinal anaesthesia

Table -1 Need of further Analgesic, anxiolytic or anesthetic measures

Analgesic, anxiolytic or anesthetic measures	No;	%
SAB+Midazolam	210	75%
SAB+Midazolam+Butorphenol	23	8.3
SAB+Midazolam+Butorphenol+Tramadol	23	8.3
SAB+O2+N2O(30:70)+Propofol	11	3.9
Converted into general anaesthesia	5	1.8
Repeated	3	1.0%
Impossible to perform	3	1.0

Total number of patients needed some intervention was 64 that is 23%,out of these 5 patients (1.8%) were converted into general anaesthesia .In 3 cases (1.0%) spinal anaesthesia had to be repeated ,8.3% of patients needed mild to moderate analgesic supplements .In 3 (1.1%) patients the procedure could not be performed.

IV. Discussion

The word failure implies that a spinal anaesthesia was attempted but no block occurred or a the block was inadequate for the surgery, in our study the incidence of total failure was 2.8% which was lower than Shreshtha and colleagues 6.1%⁴ and Adenkon c and similar to Abraham et al 2.5%^{5,6} In our study spinal failure necessarily converted to General Anaesthesia was 1% which was higher than 0.5% reported by Sng et al⁷ and 0.7% by Rajbhandari et al,⁸ but lower than 2.5% to 17%^{9,10,11} reported by different authors. The reported spinal failure rate vary from 0.46% to 35%¹² The lower rate of failure founded in our study is because Spinal provided by an experienced anesthesiologist who is competent to perform and supervised standardization of the technique, and careful checking of the extension of the sensory block. In our study 20% patients needed supplementation analgesia which is very higher than others 1.8% reported by shrathen et al 10.9%⁴ reported by Garry et al¹¹. 6.4% reported by Adenekan et al and 11.9% reported by Abraham and Jacob^{5,6} because in our institution most of the surgery were gall bladder surgery which need higher sensory level T4 .

We observed that 5 cases (1.8%) converted in General anaesthesia .The Royal Collage of Anaesthetists suggest that, in keeping with the best practice, the conversion rate from neuraxial anaesthesia to general anaesthesia should be less than 3% for non – elective caesarean section.¹³ B. Lsng , Y.Lim, A.T.H. sia showed failure rate of 0.5% . This result has conflict with our result. In three patients spinal had been repeated. Inadequate level of block may be result of needle misplacement during injection , which is often associated with a lack of free flow of C.S.F. if sensory block was absent despite the presence of free- flow CSF . Hoppe et al¹⁴ suggested that Tavlov cyst might have been entered this may explain failure of spinal anaesthesia despite of proper technique ,though we did not investigated this in our patients, the other reason for failure of spinal anaesthesia include sacral misdistribution of local anaesthesia, ductal ectasia cyst and simple anatomic sacral restriction.^{15 16}Some time defective batches of Bupivacain could be a cause of frequent failure.especially when cases are clustered together^{16 -17}. Only minimal percentage of patients was is impossible to find the space in our study 3 patients that is 1.1% this problem occurred in all these patients they are more than 65 year old.

V. Conclusion

spinal anaesthesia using 3.5 ml heavy bupivacaine produces reliable anaesthesia for, after spinal failure repeated injection showed effectiveness without side effects. The conversion rate to GA is very low and rarely

produces fatal complication which mainly occurs in the aged population. x-ray spine is useful in aged patients. it can prevent multiple needle insertion.

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