

Low dose spinal anaesthesia in elderly & critically ill patients

Abstract

This study was carried on in prince Rashid military hospital in the period July 2003–July 2004, on 12 old patients of both sexes. For whom an open reduction for fracture neck of femur was done under spinal anaesthesia by using just 1ml plane bupivacain 0.5% at L2-L3 intervertebral spaces.

Keywords: spinal anaesthesia, fracture of neck of femur, regional anaesthesia, low dose anaesthesia

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Objective

The aim of this study is to show the possibility of performing a major surgery, such as open reduction for fracture neck of femur under low dose spinal anaesthesia.

Background

It's well known that spinal anaesthesia which is very useful method to anesthetize patients for different kind of surgeries is associated with many unwanted side effects or complications by currently used doses of (2-3ml of 0.5% plane bupivacain), found in many studies and text boxes concerning with spinal anaesthesia. These unwanted side effects are:

- Cardiovascular instability (profound arterial hypotension and bradycardia), which is most commonly seen in spinal anaesthesia.
- Respiratory disturbances and other complications such as nausea and vomiting.

It's also known that there is an individual response to local anaesthetic agents, this individual response cannot be diagnosed before the administration of the spinal anaesthetic, so the same volume and concentration may cause profound hypotension bradycardia and prolonged motor block to some patients which expose the patient to serious complications not only during surgical intervention but in the recovery room and maybe later on in the ward, while the same dose on others may cause just minimal complications, on the other hand, others may not respond. These variabilities of responses among patients represent one of the disadvantages of the spinal anaesthesia and limit the whole number of patients who can be anesthetized using this technique. Also many surgical procedures were cancelled because the patients were considered unfit for G.A and spinal anaesthesia which may carry a high risk if a volume of (2-3ml of 0.5% plane bupivacain) is used.¹⁻⁴

Methods and patients

Patients under study were elderly and their ages were 60-89 years. They were 7 males and 5 females. Main body weight: 65 kg for females and 75 kg for males.

Height: 155 cm for females and 170 cm for males.

No pre-medications were prescribed for any of them, but verbal reassurance was done in preoperative visit. Under complete sterile

technique, spinal anaesthesia was done at L2 or L3 intervertebral spaces, in sitting or lateral position. Spinal needle (Atkinson), length: 88mm, gauge: 22 was used. A volume of 1ml of plane bupivacain 0.5% was given to all patients under study indifferent to their age, sex and body weight. The rate of administration of the drug was 10-15 seconds. The analgesic effect and the level of it were tested by using pinprick technique. Lactated ringers were the I.V fluid used for all patients. Continuous monitoring of blood pressure and E.C.G and respiratory rate were done to all patients by using non-invasive techniques.

Results

The results of this study are shown (according to the strength of analgesia and strength of the motor block using (1ml of 0.5% plane bupivacain) in the following tables (Table 1 & 2).

Table 1 The strength of the sensory block in this study is reflected by the patients feeling of pain before and during the surgery using the verbal answers of the patients according to a numerical scale from 0-10 (0: no pain, 10: severe pain)

Score	0	4	10	Total
No. of Patients	7	3	2	12

Table 2 Shows the Motor Block which was assessed using Bromage scale

Score	3	2	0	Total
No. of Patients	2	8	2	12

0=no block.

1=inability to raise the extended leg.

2=inability to flex the knee.

3=inability to flex the ankle joint or first digit of the foot.

Discussion

As shown in the tables above 7 out of 12 patients representing 58.3% of patients had received their operations without undesirable side effects. Two patients representing 16.6% showed increased sensitivity to the anesthesia reflected by hypotension 80/30 and profound motor block. They were diabetic obese with ischemic heart disease and their age was above 75. This condition was treated promptly with mild trendelenburg position, increasing the rate of I.V fluid, and ephedrine 6mg I.V. Three patients representing 25% of cases required supplementary I.V analgesia and 5ml of 2% xylocaine via epidural catheter by the end of the surgery (at skin closure) after

they began to feel moderate pain, because the operation was extended for more than one hour.

In two patients representing 16.6% the anesthesia was inefficient (failed) and they were given general anesthesia. In 8 out of 12 patients representing 66.6% showed moderate motor block.

Complications

- Hypotension of 80/30mmhg was seen in two patients representing 16.6%.
- Nausea was seen in two patients and was associated with hypotension.
- Mild hypotension of not more than 20-30% of initial blood pressure recorded before giving spinal anesthesia was seen in 75% patients.

Advantages and Disadvantages

According to preciously shown results we can talk about many advantages of this dose of bupivacain used in spinal anesthesia in this study.

The Advantages are:

- Excellent analgesia can be achieved using only 1ml of 0.5% of plane bupivacain (required for some surgical interventions ex: O.R.F).
- Cardiovascular stability (minimal or no changes of blood pressure and heart rate).
- No effect on respiratory function.
- Mild to moderate motor block which leads to early mobilization of the patients.
- Also measurements and cautions taken to avoid hypotension during and after surgery (preloading the patient with I.V fluid and wrapping the lower limbs with elastic material which maybe essential for currently used spinal anesthesia using 2-3ml of 0.5% plane bupivacain or any equivalent dose of other local anesthetics) are less important by using this technique.
- Decreases the incidence of nausea and vomiting and even loss of consciousness secondary to hypotension and bradycardia- also it decreases the incidence of unpleasant sensation of relatively prolonged paralyses and paresthesia which may be extended up to 8 hours , which is not infrequently seen by using relatively high doses of spinal anesthesia.

The Disadvantages are:

- This low dose is not effective on some patients and partially effective on others.
- The duration of analgesia obtained is limited to 45-60 minutes.
- To overcome these disadvantages:

d. A suitable spinal subarachnoid catheter which can be inserted in subarachnoid space makes it easy to top up the dose if the spinal block wears off earlier before accomplishing the surgery or the block is partially effective. And also may be used for post operative pain management.

e. Epidural catheter may help improving the quality of this method, but of less importance than spinal catheter, especially in cases where low volume of anesthetic drug is mandatory.

The above mentioned ideas lead to talk about minimal effective dose of spinal anesthetic drug, which indicates that , that dose of local anesthetic drug which can produce required surgical analgesia with minimal or no undesired side effects or complications. A spinal catheter may offer the opportunity to adjust the dose of spinal anesthetic drug as needed starting with lower doses especially in cases where G.A or S.A carry the same risk to the patient, and in difficult situations where the anesthetic is reluctant to choose the anesthetic technique or to postpone the operation, the low dose spinal anesthesia (single or via spinal catheter maybe the answer). Thus reduces the contraindication to spinal anesthesia just to those well known absolute contraindications like patients' refusal, local infection, septicemia, shock and coagulopathy. Furthermore the spinal catheter may make the day case surgery under mobile spinal anesthesia more possible.

Conclusion

Low dose spinal anaesthesia is safe, reliable, and can be the method of choice especially in elderly and critical ill patients. Its advantages exceed its disadvantages. A spinal or epidural catheter may add to this method more important means to increase its efficiency by increasing its advantages and decreasing its disadvantages.

Conflicts of Interest

The authors do not have any Conflict of interests.

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