EFFECTS OF PRE-MEDICATION WITH ATROPINE ON THE BLOOD PRESSURE OF PARTURIENT UNDERGOING CAESARIAN SECTION UNDER SPINAL ANAESTHESIA

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SUMMARY

Objective: The effect of atropine given as a prophylactic intravenous bolus on the incidence and severity of hypotension was studied in 30 patients undergoing Caesarian section under spinal (subarachnoid) anaesthesia between January and September 1999.
Method: Following the establishment of spinal anaesthesia, the patients were randomized to receive an immediate intravenous bolus of normal saline (Group A, n = 12) or 0.6mg of atropine sulphate (Group B, n = 18) in 2ml. Arterial blood pressure and heart rate were recorded every 3 minutes. The patients were asked to report any symptoms of nausea or fainting.
Results: Both the incidence and severity of hypotension were reduced in the patients that had atropine prophylaxis (Group B) compared with the control group that received normal saline (Group A). The difference, however, did not reach statistical significance when tested with Chi-square statistic.
Conclusion: In view of the improved maternal haemodynamic parameters, parturients undergoing Caesarian section under spinal anaesthesia may benefit from a prophylactic intravenous bolus of atropine.

Key Words: *Obstetric anaesthesia, Spinal Anaesthesia, Subarachnoid anaesthesia, Atropine prophylaxis.*

INTRODUCTION

Gravid women are particularly susceptible to hypotension during regional anaesthesia because of aortocaval compression and the physiological and pathological changes that often accompany pregnancy. Maternal hypotension during spinal anaesthesia has an incidence of 30% to 80%, depending on the definition of hypotension used, height of sympathetic blockade achieved and technique of prophylaxis[1]. It (maternal hypotension) has adverse effect on the neonate through placental hypoperfusion, and can lead to unpleasant maternal symptoms presumably via cerebral hypoperfusion. Pre-loading of the circulation with fluid and left uterine displacement to avoid aortocaval compression have been shown to significantly reduce the incidence of maternal hypotension and are now the standard requirements for spinal subarachnoid block for Caesarian section. However, despite these preventive measures, there may still be hypotension in some patients. In such situations, a vasopressor such as ephedrine may be required.
The aim of this study was to assess the effect of prophylactic atropine given as an intravenous bolus on the incidence and severity of hypotension.

PATIENTS AND METHODS

With informed consent and approval by the Ethics committee of the University of Nigeria Teaching Hospital, Enugu, 30 ASA (American Society of Anesthesiologists) 1 and 2 full term parturients scheduled for elective cesarean section formed the subjects of this study. Exclusion criteria included patients with hypovolaemia, coagulopathy, severe pre-eclampsia, local sepsis at the site of lumbar puncture and allergy to amide local anaesthetics. Following intravenous preload with 1 litre of compound sodium lactate over 10 minutes, patients received intrathecal injection of 2.5ml of 0.5% hyperbaric bupivacaine via a 22 gauge spinal needle at L2/3 or L3/4 inter-vertebral space in a sitting position. Patients were immediately placed supine with a left lateral tilt and oxygen is administered by face mask.

They were next randomized to receive an intravenous bolus of normal saline (Group A, n = 12) or 0.6mg of atropine in 2ml. The height of sensory block was recorded as loss of pinprick sensation while the degree of motor block was assessed by noting the time at which patients could no longer raise the extended leg through 30 degrees.

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Blood pressure was recorded every 3 minutes using a sphygmomanometer cuff and stethoscope. Pulse rate was also recorded by digital palpation of the radial artery. Patients were asked to report any symptoms of nausea or fainting. All patients received 10 units oxytocin following delivery.

RESULTS

The 2 groups were comparable in terms of age, weight and height of block achieved. Hypotension was defined as more than 30 percent drop in systolic blood pressure from baseline or a reading below 90mmHg.

Table 1
Systolic Blood Pressure in Group A Patients

Serial Number	Baseline SBP* (mmHg)	Lowest SBP (mmHg) During Surgery	% Drop in SBP from Baseline
1	130	90	30.76
2	130	105	19.23
3	130	100	23.08
4	145	100	31.10
5	125	100	20
6	140	95	32.14
7	110	90	18.18
8	120	105	12.5
9	140	105	25
10	125	110	12
11	115	90	12.7
12	145	110	24.14

*SBP = Systolic Blood Pressure

In group A, 3 patients out of 12 had hypotension. A drop of 32.14% (from 140 to 95mmHg) was recorded in one of the patients, see table 1. Table 2 shows that only 1 of the 18 parturients who received prophylactic atropine had hypotension and the greatest drop from baseline blood pressure in group B was 25.5% (from 135 to 100mmHg). Table 3 shows that 25% of those in group A had hypotension while only 5.5% of group B patients had hypotension.

Table 2
Systolic Blood Pressures in Group B Patients

Serial Number	Baseline SBP* (mmHg)	Lowest SBP (mmHg) During Surgery	% Drop in SBP from Baseline
1	140	125	10.7
2	120	110	8
3	125	120	4
4	120	100	16.7
5	140	120	14.28
6	135	110	18.5
7	135	100	25.9
8	130	110	15.4
9	135	120	11
10	120	105	12.5
11	130	120	7.6
12	135	120	11
13	120	110	8
14	120	105	12.5
15	150	125	16.7
16	130	115	11.5
17	115	88	23.5
18	125	105	12

*SBP=Systolic Blood Pressure

Table 3
Determination of the Chi Square Statistic

	Group A	Group B
Number of patients	12	18
Number of Cases of Hypotension	3	1
Percentage	25	5.5

*$X^2 = 2.613$; DF = 1, $p>0.20$

The results show that the incidence and severity of hypotension were reduced in patients who received prophylactic intravenous atropine compared with those who received normal saline placebo.

This difference, analyzed with the Chi Square statistic however, did not reach statistical significance, $p > 0.20$.

DISCUSSION

Regional anaesthesia, epidural or subarachnoid, is now the anaesthetic method of choice for caesarean section delivery[1]. It demands as much skill, experience and

understanding as general anaesthesia in the obstetric patient. For safe and successful anaesthesia, the basic essentials are:

a. A properly trained anaesthetist
b. A trained anaesthetic assistant
c. A surgeon able to operate gently and quietly and
d. Full facilities available for general anaesthesia and resuscitation.

Hypotension is a common complication of spinal anaesthesia and may be profound enough to cause cardiovascular collapse and cardiac arrest[2,3,4,5,6]. The causes of hypotension include sympathetic nerve blockade and aortocarval compression and its incidence is about 90% in obstetric patients who do not receive proper prophylaxis[7]. Preloading of the circulation with about 1 liter of crystalloid and left uterine displacement have been shown to significantly reduce this incidence and are now standard requirements for spinal block for caesarean section[8]. However, despite these preventive measures, there may still be hypotension in some patients. Acute and severe hypotension accompanies abnormally high blocks, especially those of rapid onset, and should be anticipated if the patient becomes pale or complains of any of the following symptoms:

i. Feeling faint
ii. Nausea
iii. Difficulty with breathing
iv. Difficulty with coughing
v. Tingling or numbness of upper limbs or face

When hypotension occurs a vasopressor is required. Ephedrine is the vasopressor of choice because studies have shown that it maintains uterine blood flow better than other vasopressors[9]. It is the only sympathomimetic known to have no adverse effect on placental blood flow[1]. The dose is 5-6mg and this is given intravenously.

Ephedrine is not readily available in this centre. In this study atropine 0.6mg was given intravenously immediately after intrathecal injection of the local anaesthetic agent. Atropine is a naturally occurring anticholinergic drug. It is the drug of choice for treating intra-operative bradycardia resulting from increased parasympathetic nervous system activity[10]. It also has muscarinic blocking (vagolytic) effects and causes an increase in the heart rate.

Bradycardia may occur during spinal anaesthesia because of

i. Neurogenic factors in awake, anxious patients, i.e. vaso-vagal syndrome.
ii. Block of the cardiac sympathetic fibres (T1-T4).

Obstruction of the inferior vena cava by the gravid uterus reduces venous return to the heart with a resultant decrease in stroke volume and bradycardia combine to cause hypotension. It was expected that the atropine prophylaxis by increasing the heart rate will compensate for the decreased stroke volume and maintain blood pressure.

In this study only 5.5% of the mothers who received prophylactic atropine had hypotension intra-operatively while 25% of those who did not receive atropine had hypotension. In group B, the lowest drop in systolic blood pressure was from 115mmHg to 88mmHg, which is a 23.5% drop from the baseline. In group A the lowest was from 140mmHg to 95mmHg, which is a 32.14% drop. This shows that prophylactic atropine may have some value in reducing both the incidence and severity of hypotension in spinal anaesthesia. It may be suggested that parturients for elective caesarean section under spinal anaesthesia be given prophylaxis of 0.6mg atropine intravenously. Sedatives administered intravenously (e.g. midazolam 1-2mg) to reduce the anxiety that may occur due to the increase in heart rate.

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