

Comparing Effects of Spinal Versus General Anesthesia in Patients Undergoing Emergency Cesarean Sections: An Obstetrician's View

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ABSTRACT

OBJECTIVE: To compare the maternal and neonatal effects of spinal versus general anesthesia in terms of quality of analgesia, muscle relaxation, blood loss during surgery, postoperative analgesia requirement and apgar score.

STUDY DESIGN: Comparative study

PLACE AND DURATION: Department of Obstetrics and Gynecology, Jinnah Postgraduate Medical Centre, Karachi, from July 2004 till June 2005.

PATIENTS AND METHODS: Total 250 patients were included in the study. Informed consent was obtained. Spinal anesthesia (SA) was given to 100 patients and General anesthesia (GA) to 150 patients.

Maternal effects were observed in terms of quality of analgesia, muscle relaxation, blood loss and postoperative analgesia requirement. Neonates were assessed by Apgar score. Results were analyzed through SPSS version 10.0.

RESULTS: In the Spinal group, quality of analgesia and muscle relaxation was excellent (CI=95%). Blood loss and amount of blood transfusion was significantly less ($p=0.001$) in the spinal group. Apgar score at 1 minute was better in the spinal group but the difference at 5 minutes was insignificant. Postoperative analgesia requirement was also significantly less (p -value <0.001). There was one mortality due to Total Spinal block.

CONCLUSION: There remains no doubt that spinal anesthesia, whenever medically feasible, is superior to general anesthesia in emergency cesarean sections.

KEYWORDS: Spinal anesthesia, General anesthesia, Cesarean Section, Apgar score, Safety.

INTRODUCTION

Anesthetic mishaps still account for about 2.4% of deaths in the US and UK and are the sixth most frequent cause of maternal mortality in the United States.^{1,2} Anesthesia related maternal mortality has been halved over the last decade (surveyed 1980-1990). Most likely due to increased use of regional anesthesia, anesthesia related mortality is approximately 0.17/100,000 live births². The absolute number of deaths associated with regional anesthesia is down almost 80% but the absolute number of deaths involving general anesthesia (most frequently to airway problems) has not decreased.²

The incidence of failed intubations in obstetrics population is 1/250, approximately ten times more frequent than in general surgical patient population.³ Therefore, in the setting of emergency cesarean delivery; choice of general anesthesia may imply high risk of maternal mortality mainly due to failed airway management. Careful selection or exclusion of parturient as candidates for general anesthesia becomes crucial in the anesthetic management of emergency cesarean delivery.

Sub-arachnoids block has an edge over general an-

esthesia when used in obstetrics practice. Absence of placental cross-over of drugs means that neonate is born with good Apgar score and is not sedated. Suckling can be established soon after delivery and this may explain a higher frequency of successful breast feeding after regional anesthesia.⁴ A successful regional anesthesia effectively suppresses many of the pain mediated stress responses to surgery such as rise in blood pressure, heart rate and increase in plasma concentrations of catecholamines. The net advantage is that placental perfusion is maintained and the technique can be employed even in cases of fetal distress.⁶

The term spinal anesthesia denotes all forms of central blockade. The technique is basically that of lumbar puncture. Dura is penetrated with a needle and drug is deposited directly into the cerebrospinal fluid (CSF). It is widely used for cesarean sections as much smaller dose is required with negligible side effects.⁵ However, with any form of spinal block, anesthesiologist should be fully prepared to administer general anesthesia in case the need arises.

With this background, the rationale of the study is to compare the two techniques with regards to muscle

relaxation, blood loss during surgery, requirement for postoperative analgesia and apgar scores in our set up.

PATIENTS AND METHODS

This comparative study was conducted at Department of Obstetrics and Gynecology, Jinnah Postgraduate Medical Centre, Karachi, from July 2004 to June 2005. Patients indicated for emergency cesarean section were selected for this study, by non-probability purposive sampling technique. Unless contraindicated, the patients were placed in either group A (spinal) or group B (general) on their choice. The patients excluded from the study were those who refused to undergo the trial, gestation age <37 weeks with cardiac disease, coagulopathy, hypovolemia not responding to usual measures of hydration, antepartum hemorrhage, septicemia, acute neurological deficit. Details of the procedure was explained to the patient by anesthesiologist in the presence of obstetrician. Informed written consent was obtained. All patients giving consent for spinal anesthesia were pre-loaded with Haemacool 1000 ml intravenously. The 25 gauge spinal needle was used for the procedure and the block was performed in the sitting position. All aseptic measures were strictly observed. Bupivacaine 0.5% was injected in the sub-arachnoid space in dose of 2-2.5ml to get the desired block (T5-T6). Blood pressure and pulse were recorded before and after performing the block. The patient was immediately turned to supine position with an edge underneath to avoid aortocaval compression. Continuous monitoring of ECG, oxygen saturation and respiratory status was carried out. Sensory block was assessed by pin prick and graded from 1-4 as excellent, mild discomfort, discomfort requiring supplemental analgesia and inadequate block requiring general anesthesia. Muscle relaxation was assessed by obstetrician performing cesarean section and graded as good, fair and poor. Intra-operative blood loss was assessed by approximate estimation of sponges soaked, suction and loss on drapes. Number of blood transfusions were recorded. Results were analyzed using SPSS version 10.0. Comparison of percentages were done by applying Chi-square test of proportions. Continuous variables were analysed by applying t-test. Predetermined P-value was ≤ 0.05. Postoperative analgesia requirement was done at 2, 6, 12 and 24 hours interval. Diclofenac sodium 75 mg intramuscularly was given for pain relief. Patients were enquired about headache, backache and urinary problems. Neonatal assessment was done clinically by pediatrician using Apgar score at 1 minute and 5 minutes, as facilities for arterial blood gases is not available at our set up.

RESULTS

Total 250 cases of emergency c-section were included in the study. Among them 1 were given spinal anesthesia (group A) and 150 were given general anesthesia (group B). As per the assessment of anesthesiologist in majority (95%) of the cases analgesia was excellent. The obstetrician opined 95% good muscle relaxation (**Table I**). There was statistically significant difference in total blood loss between both groups. Amount of blood transfused was also highly significant between both groups (P<0.001). There was also highly significant difference in the apgar scores at 1 minute between both groups, however the difference in apgar scores at 5 minutes was not found statistically significant. The details of these comparisons are elaborated in **Table II**. There was a highly significant difference observed in postoperative parenteral analgesia requirement (**Figure I**).

**TABLE I:
QUALITY OF ANALGESIA AND MUSCLES
RELAXATION (n= 100)**

	Spinal Anesthesia
Quality of Analgesia (assessed by anesthesiologist)	
Excellent analgesia	95.0%
Grade-II analgesia	3.0%
Inadequate block	1.0%
High block (total spine)	1.0%
Quality of Muscle Relaxation (assessed by obstetricians)	
Good	95.0%
Fair	3.0%
Poor	2.0%

DISCUSSION

Cesarean section rates are high and increasing in some developing countries, ranging 12-26%.⁷ Similar patterns can be seen in Pakistan.⁸ The increased cesarean section rate has put negative impact on maternal health and obstetric cause.⁹

In this study, quality of muscle relaxation was found to be satisfactory. Blood loss during surgery is a cause of major concern for the surgeon as well as the anesthesiologist. All halogenated and inhalational agents cause relaxation of uterus in a dose dependant pattern. They also lead to increased bleeding during cesarean section and even to development of postpartum hemorrhage, if not used with caution.¹⁰ The reduction in blood loss as seen in our study in patients receiving spinal anesthesia may solve many problems. Postoperative pain is a significant cause of distress and contributes to many complicating factors like

**TABLE II:
TOTAL BLOOD LOSS, AMOUNT OF BLOOD
TRANSFUSED AND APGAR SCORE**

	Spinal An- esthesia (n= 100)	General Anesthesia (n=150)	P-value
Total Blood Loss			
500cc	70.0%	60.0%	0.03
500 - 1000 cc	20.0%	40.0%	0.01
> 1000 cc	3.0%	4.7%	ns
Amount of blood transfusion			
500cc	6.0%	60.0%	0.07
500 - 1000 cc	15.0%	78.5%	0.001
> 1000 cc	4.0%	84.0%	0.001
Patients with Blood Trans- fusion	56.6%	25.0%	0.001
Apgar Score 1 minute			
0 - 3	0.0%	0.0%	ns
3 - 5	1.0%	1.3%	ns
5 -7	5.0%	4.6%	ns
8 - 10	98.0%	48.6%	0.001
Apgar Score 5 minute			
0 - 3	0.0%	0.0%	ns
3 - 5	0.0%	0.0%	ns
5 -7	2.0%	2.0%	ns
8 - 10	98.0%	48.6%	0.001
ns = non-significant			

pulmonary infections and deep Vein thrombosis arising from inability to cough and to be up and about after surgery. The delayed recovery from sensory block is advantageous as patients would remain pain free for a longer time ¹¹

Clinically, neonatal outcome was assessed by Apgar score. The babies delivered in the spinal group had good Apgar score at 1 minute after delivery but the difference was insignificant in the two groups at 5 minutes. This is compatible with several studies showing no difference ^{12,13}. Apgar score depressed at 5 minutes may reflect preexisting fetal asphyxia rather than anesthetic effect. Marx and Colleagues¹⁴ demonstrated that considering time requirement for urgent delivery sub-arachnoid block was most suitable and safe in the presence of fetal distress. General anesthesia can reduce neurobehavioral scores for up to two days following delivery in comparison with regional anesthesia.

There was one mortality due to total spinal block and despite of immediate resuscitative measures and ventilatory support the patient did not survive. This potential life threatening complication can occur if inadvertent spinal injection is given through unrecognized penetration of dura. A review of series of complications of spinal and epidural blockade in obstetrics documented an incidence of approximately 1:3000 spinal procedures.¹⁶ This complication can be avoided by improving the skills of anesthetist in administering the block and by acquiring the services of an anesthetist trained in administering the block.

No case of severe hypotension was seen as these patients were hydrated well by preloading with colloids¹⁷. No significant change in fetal blood flow occurs if blood pressure is maintained under spinal anesthesia. Indices of uteroplacental and fetal blood flows are either unchanged or slightly improved by regional anesthesia, provided blood pressure and cardiac outputs are maintained.^{18,19}

Urinary retention was not a problem as these patients remained catheterized for 24 hours. Reduction in hospital stay and early mobilization are interlinked and can be exploited in view of the fact that the cost of medical services is limited in our country.

CONCLUSION

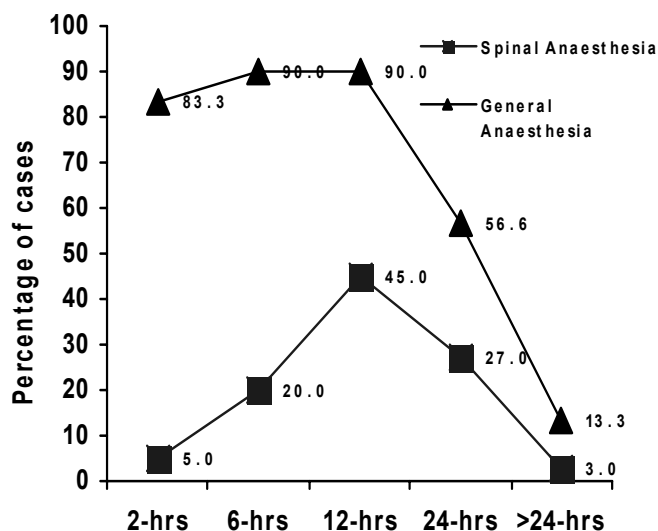
There remains no doubt that spinal anesthesia, whenever medically feasible, is superior to general anesthesia in emergency cesarean sections. However the advantages of spinal anesthesia can be gained only if skilled anesthetist is available in emergency hours.

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FIGURE I:

POST-OPERATIVE PARENTERAL ANALGESIA



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