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Research Paper

Effect on Apgar Score in Neonates Born to Mothers Undergoing General Anaesthesia Versus Spinal Anaesthesia for Elective Caesarean Section

Medical Science

KEYWORDS : Caesarean section. Apgar score. General anaesthesia. Spinal anaesthesia

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ABSTRACT

INTRODUCTION: There is no standard anaesthetic technique for caesarean section.General anaesthesia has been associated with higher mortality-morbidity to fetus and mother.Obstetric anaesthesia guidelines recommend regional anaesthesia over general anaesthesia for caesarean section to decrease the risk to both mother and fetus.

OBJECTIVE:To compare the APGAR score of full term neonates born to mother undergoing elective caesarean section under spinal anaesthesia or general anaesthesia and to evaluate whether spinal anaesthesia or general anaesthesia is better from fetus point of view.

MATERIAL and METHODS: After taking informed written consent 60 healthy full term patients presenting for elective caesarean section of ASA grade 1 and 2 were included in the study.30 patients were given general anaesthesia(group A) and 30 patients were given spinal anaesthesia(group B).APGAR scores were recorded at 1minute and 5 minute interval after each delivery.Time interval between induction/injection of anaesthesia and delivery of neonate were equal in both groups ranging from 5-10 minutes

RESULTS: 23 patients undergoing caesarean section under general anaesthesia gave birth to neonates with APGAR score≤6 at 1 minute where as only 8 patients under going caesarean section under spinal anaesthesia gave birth to neonates with APGAR score <6 at 1 minute. However APGAR score at 5 minutes in both groups were comparable as there was less difference in APGAR scores of babies born to mothers under general anaesthesia and spinal anaesthesia.

CONCLUSION: Spinal anaesthesia is safer and less depressent to neonates as compared to general anaesthesia.The neonates born to mothers under spinal anaesthesia tolerate the process of delivery much better than neonates born to mothers under general anaesthesia.

INTRODUCTION

Mother and fetal well being should be taken into account while planning for anaesthesia for caesarean section.Since two lives are involved special skill is required.The choice of anaesthesia depends upon indication for operation,its urgency, patients and obstetricians preference.General anaesthesia and spinal anaesthesia have their own advantages and risks for both mother and fetus.Spinal anaesthesia is more commonly used than epidural anaesthesia because of its rapid onset and lower incidence of failed block.In contrast to spinal anaesthesia general anaesthesia offers a reliable and rapid onset,control over airway and ventilation and potentially less hypotention.Drugs used in general anaesthesia for intravenous induction and muscle relaxation are depressant to fetus as they cross the placental barrier.Spinal anaesthesia causes sympathetic blockade which leads to hypotention.As a result hypoperfusion of uterus occurs which leads to fetal acidosis and fall in intervillous blood flow. Aim of anaesthetist is to choose the method which is safest and most comfortable to mother,least depressant to newborn and provides optimal working condition to obstetrician. APGAR score is the best parameter to assess the immediate condition of the baby.APGAR score at 1 minute determines how neonete tolerated the process of delivery and APGAR score at 5 minute determines how well neonate is adapting in environment outside mothers womb.

MATERIALS and METHODS

Type of study: Observational prospective study

Ethical consideration: Study was conducted after approval of ethical committee of hospital and informed written consent from patients.

PATIENTS:

A total of 60 consecutive pregnant women at term(>37 weeks) who were scheduled to undergo elective caesarean section participated in this study. The women were allocated into 2 equal groups(each 30),a general anaesthesia group(A) and a spinal anaesthesia group(B). They fulfilled the following inclusion criteria:ASA grade 1 women who had uncomplicated singleton cephalic pregnanacy with birth weight>2500 g who were indicated to undergo elective caesarean section due to previous caesarean section,precious baby and history of primary infertility.Exclusion criteria were:pregnancy with obstetric complications such as hypertension,oligohydroamnios,polyhydram nios,antipartum hemorrhage,suspected fetal abnormality,any coagulopathies,infection at site of regional anaesthesia or any sensitivity to drugs to be used.Preoperative evaluation for both groups included a detailed history,physical examination and investigations(haemoglobin level,platelet count,random blood glucose,serum creatinine,liver function test,prothrombin time,international normalised ratio (INR). Preoperative medications: ranitidine 50 mg intravenously and metaclopramide 10 mg intravenously 1-2 hrs prior to anaesthesia.Women in both groups were kept in the left lateral position(15 degree lateral tilt) till delivery to protect against supine hypotention syndrome.

TECHNIQUE:

On arrival to operating room all patients received standard continous monitoring in the form of 5 lead ECG,automated non-invasive blood pressure and heart rate monitoring(NIBP),pulse oximetry and capnography(after induction in group A patients),18 gauge cannula was inserted in peripheral vein and intravenous fluid (ringer lactate) was started.

FOR **GROUP A(GA)**:Patients were preoxygenated with 100% oxygen for 3-5 minutes,induction was done with inj thiopentone 5mg/kg intravenously,inj succnylcholine 1.5mg/kg intravenously. After endotracheal intubation maintainence was done with 50 % nitrous oxide with 50% oxygen and 0.5% isoflurane inhalation. Non depolarising muscle relaxant atracurium 0.5 mg/kg intravenously was given.After delivery of baby 10 units of oxytocin was given stat and 10 units was added to infusion.10 mg nalbuphine was given intravenously for analgesia to every patient after delivery.To reverse the effect of non depolarising muscle relaxant inj neostigmine 0.05mg/kg was given along with inj atropine 0.02mg/kg intravenously.

FOR **GROUP B(SA)**:After preloading the patient with 20ml/kg ringer lactate each patient was placed in left lateral position and space between 3rd and 4th lumbar spine was identified.

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After taking all aseptic precautions lumbar puncture was done with 25 gauge spinal needle(quinke) and 0.5 % , 3ml(15 mg) hyperbaric bupivacaine was administered with 25 mcg fentanyl. Immeditely after injection patient was placed in supine position with wedge under right hip for left uterine displacement.Time of induction,time of incision to skin and time of delivery of baby were noted.

NEWBORN MANAGEMENT: All newborns were attended by neonatologist after delivery of baby.Neonatologist who assessed the APGAR scores were blinded to the anaesthetic technique used.

RECORDING OF APGAR SCORE

In this study APGAR scores of all 60 patients were recorded by neonatologist.APGAR scores were recorded at 1 minute and 5 minute interval after delivery.Birth weight of every baby was recorded.APGAR score of each baby was compared with standard APGAR score chart as shown in TABLE A

TABLE A: APGAR ACORE

APGAR SCORE	0	1	2
Heart rate	Absent	<100	>100
Respiratory effort	Absent	Irregular	Good
Reflex irritability	No response	Grimace	Cough/ sneeze
Appearance(color)	Blue/Pale	Body pink with blue extremities	Completely pink
Muscle tone	Flaccid	Good tone	Spontaneous flexion

RESULTS:

Out of 30 patients who received general anaesthesia 23 patients gave birth to neonate having APGAR score < 6 at 1minute and APGAR score of other 7 patients were > 7.Twenty two patients with low APGAR scores at 1 minute were improved after resuscitation at 5 minute interval and showed APGAR score > 7.One neonate with low APGAR score at 1minute did not show any improvement on resuscitation and its APGAR score remained 6.Therefore under general anaesthesia neonates born to 29 patients had APGAR score > 7 at 5 minute interval and only one baby weighing 2700 grams did not improve on resuscitation and its APGAR score remained 6 at 5 minute interval.On the other hand out of 30 patients who received spinal anaesthesia only 8 patients gave birth to neonates with APGAR score < 6 at 1 minute who improved later on resuscitation.At 5 minute interval APGAR score of all 30 neonates born to patients under spinal anaesthesia were > 7(TABLE B)

Time interval between anaesthesia and delivery of neonates was equal in both groups ranging from 5 to 10 minutes(figure 1 and figure 2)

Both groups were comparable regarding the maternal age (TABLE C).

TABLE B:

APGAR SCORE	AT 1 MINUTE GA	AT 1 MINUTE SA	AT 5 MINUTE GA	AT 5 MINUTE SA
≥ 7	7 (23.3%)	22 (73.3%)	29 (96.6%)	30 (100%)
≤ 6	23 (76.6%)	8 (26.6%)	1 (3.3%)	0 (0%)

Maternal age in years	Group A (30)		Group B(30)			
	Mean	SD	Mean	SD	P value	
	26.93	±6.11	26.87	±5.22	0.96	P >0.05 Not significant

TABLE C:

Time taken from induction of anaesthesia to skin inscision and delivery of baby in Group 1(GA)

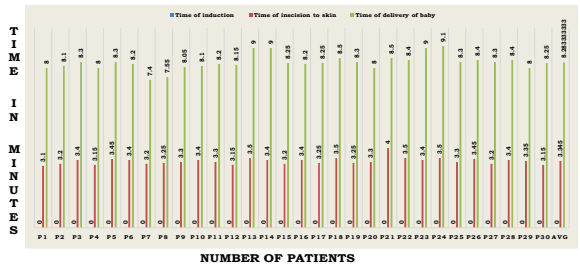
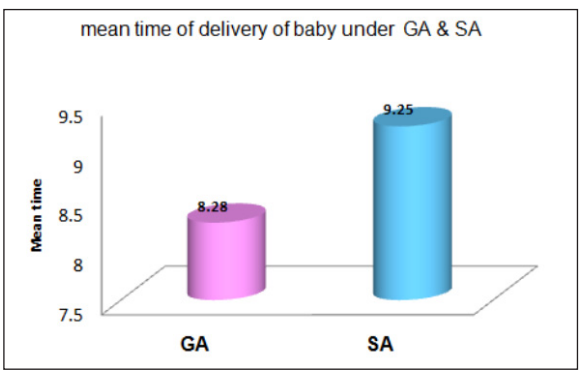
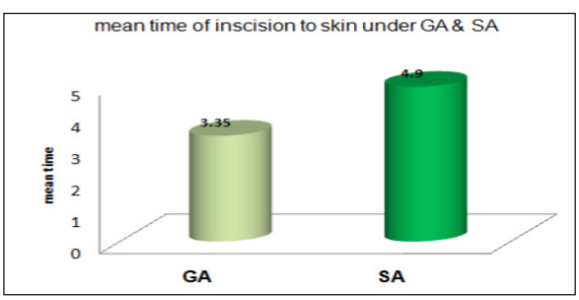


Figure 1





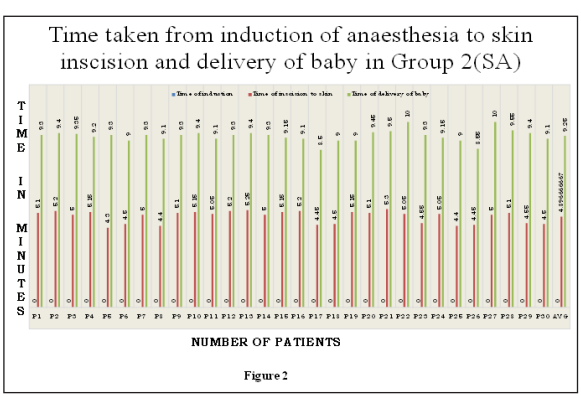


Figure 2

TABLE D

APGAR score			P value
	GA (in 1 minute)	SA (In 1 minute)	
≥7	7	22	0.0053
	GA (in 5 minutes)	SA (in 5 minutes)	
≥7	29	30	0.8964

STATISTICAL ANALYSIS:

In all tests the p value of less than 0.05 was accepted as indicating statistical significance.Data analysis was carried out using statistical package for social science(SPSS V 11.5).Chi square test was used for analysis of results for statistical significance as shown in TABLE D.

DISCUSSION:

Caeserean section is a life saving option for mother and baby and most of the time it is planned to do where there is suspicion of harm during normal vaginal delivery to mother or baby.The elective caesarean section is safe procedure when no other associated diseases are present and outcome of procedure is very hopeful and good for both mother and baby.Choice of anaesthetic technique for caesarean section has always been controversial and no technique is ideal for caesarean section.According to Robert et al[1] both general anaesthesia and regional anaesthesia have certain advantages and disadvantages and no anaesthesia is safer or hazardous. He showed regional anesthesia was associated with fetal acidemia, and had features of an acute respiratory type of academia and approximately 18% of infants had umbilical artery blood pH values of 7.19 or less. however some clinical studies suggested that there is little to choose between general and spinal for obstetric anesthesia with regards to their effect on fetal acid and base balance.[2] However for emergency caesarean section for fetal distress, spinal anesthesia shows better Apgar scores at 1 and 5 min when compared to general anaesthesia.[3,4]

Anaesthesia accounts 2-3% of maternal deaths.General anaesthesia is associated with high mortality, complications and increased blood loss during delivery[5] but still it is used in many cases in different setups. Before making plan of anaesthesia,the anaesthetist must weigh the risk involved in patients at high risk having cardiac diseases,hypertention and diabetes[6].The popularity of spinal anaesthesia is increasing and is recommended in different studies that it is associated with low mortality[7]. Due to increasing popularity of epidural anaesthesia/analgesia during labor pains,the rate of caesarean section is decreasing but it is more expensive and requires more skill and time.Similarly the babies delivered with help of epidural analgesia have good APGAR scores as compared to patients who refused epidural analgesia [8]. Kolatat et al, and Ong B Y, also found lower Apgar scores in the neonates whose mothers received general anesthesia.[9,10]. In a study done by Scott W. Roberts et al it was concluded that there is statistically significant risk of fetal acidemia of varying severity with the use of regional anaesthesia in women delivered by cesarean without labor. Umbilical artery blood PH values less than 7.10 were observed in 4% of fetuses, among whom 1% had PH values less than 6.99. On the other hand no infant had PH values less than 7.10 when general anaesthesia was used. They also concluded that the prevalence of low PH values was significantly increased in those infants exposed to any of regional anesthetic techniques compared to general anaesthesia[11,12,13]. General anesthesia is one of the major causes of maternal death in Pakistan. Despites the advances in anaesthetic techniques, monitoring facilities and availability of different drugs, young women are still dying of anaesthesia related complication[14]. In another study it was observed that Apgar scores of neonates whose mothers received general anaesthesia were lower than neonates whose mothers received spinal anaesthesia.[15]

In our study in group B Apgar score (≥7) at one minute was observed in 22(73.33%) neonates when compared to group A where 7(23.3%) neonates had Apgar score of ≥7 . Unsatisfactory Apgar score was observed in 23(76.6%) neonates in general anesthesia group as compared to 8(26.6%) of the neonates who received spinal anesthesia. Alfredo M et al, found lesser depressed newborns (1.1%) in the spinal group compared to 25.9% in the general anaesthesia group[16] .Acceptable Apgar score (≥7) at five minutes was significantly high in group B (SA) than group A (GA). In group B, it was observed in all 30(100%) neonates while in group A it was observed in 29(96.6%) neonates and Apgar score <7 were seen in 1(3.3%) neonates of group A (GA). Tabassum et al[17], found Apgar scores were higher at 01 and 5 min in spinal group compare to general anesthesia group($p<0.05$). however some authors found similar Apgar at 5 min in both the group[18,19]in a study done by Amomani OS,it was concluded that regional anesthesia (spinal/epidural) has better Apgar score at 1 and 5 mins when compared to general anaesthesia[20].

CONCLUSION:

Spinal anaesthesia is safer and less depressent to neonate as compared to general anaesthesia where intravenous induction agent and muscle relaxant are given.There is sisnificant difference between the effects of general anaesthesia and spinal anaesthesia on APGAR score of neonate at 1 minute interval ,however APGAR scores at 5 minute interval were comparable in both groups. APGAR score at 1 minute determines how baby tolerated the process of delivery and APGAR score at 5 minute determines how well baby is adapting in environment outside mothers womb.Neonates born to mothers undergoing elective cesarean section under spinal anaesthesia tolerate the process of delivery much better than the neonates born to mothers under general anaesthesia.Therefore from our study we conclude that spinal anaesthesia is safer for caesarean section in healthy patients than general anaesthesia.

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