

## Maternal Cardiac Arrest Immediate After Spinal Anesthesia for Cesarean Delivery: Case Report

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### ABSTRACT

Spinal anesthesia is regarded safe and effective for caesarean section if there is no contra indication for regional anesthesia. Major complications resulting from spinal anesthesia such as cardiac arrest are often times considered rare. This is a case of a 28-year-old prim gravid with unknown LMP claiming to be amenorrhoeic for the last 9 months, who came for emergency caesarean section on with indication of cephalo-pelvic disproportion (CPD) with associated with mal position. The patient was preloaded with 500 ml of normal saline few min before spinal anesthesia was given and suffered a cardiac arrest immediately after establishing SAB. She was successfully resuscitated with immediate chest compressions, adrenaline and oxygen and a live baby was delivered after cardiopulmonary resuscitation (CPR). The patient was admitted to post C/S ward and discharged home on her 5th post-operative day with no apparent residual damage.

**Keywords:** Cardiac arrest, Spinal anesthesia, Cesarean delivery

### ABBREVIATIONS

GA: General Appearance; PG: Primi Gravida; SSOL: Second Stage of Labor; CPD: Cephalo Pelvic Disproportion; C/S: Cesarean Section; CPR: Cardio Pulmonary Resuscitation; HTN: Hypertension; DM: Diabetes Mellitus; SOAP: Obstetric Anesthesia and Perinatology; LMP: Last Menstrual Period; FHB: Fetal Heart Beat; ANC: Anti Natal Care; CVS: Cardio Vascular System

### INTRODUCTION

Cardiac arrest in pregnancy is a rare event (affecting less than one in 20,000 women) [1]; however, a significant proportion of cases have a reversible etiology. Young, critically ill, pregnant women in cardiac arrest are thus considered to be more salvageable than most patients requiring cardiopulmonary resuscitation. With the rapid implementation of appropriate treatment, a 50% survival rate has been reported. Advanced Cardiovascular Life Support courses typically devote little or no attention to addressing interventions specific to obstetric patients, and significant gaps in provider knowledge have been documented in multiple reports. In 2014, the Society for Obstetric Anesthesia and Perinatology (SOAP) issued a consensus statement in which the need for health care provider education was emphasized and in 2015, the American Heart Association (AHA) published its first scientific statement on maternal cardiac arrest [1].

Subarachnoid anesthesia is a widely practiced technique for both elective and emergency procedures. It is recommended for both its efficacy and safety. Hemodynamic instability and cardiac arrest have been reported in healthy patients. Occasional case reports and a series of patients experiencing cardiac arrest have been reported in the American literature, but there is little in the European journals. We report a case of cardiac arrest, occurring in a parturient after a Caesarean section under subarachnoid block [2].

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Resuscitation of pregnant women is a challenging process as there are various anatomical and physiological changes that are, decrease in respiratory reserve volume. Furthermore, there is difficult airway resulting from pharyngeal edema, increased risk of aspiration due to relaxation of the esophageal sphincter, decreased effect of chest compressions as a result of decreased venous return leading to supine hypotension and obstruction of forward flow of blood by the gravid uterus, especially in cardiac arrest [3,4].

### CASE PRESENTATION

A 28 years old prim gravid with unknown LMP but claiming to be amenorrhic for 9months presented with pushing down pain and passage of liquor of 24 hours. She has ANC follow up and TAT immunized at other center, she has no history of DM, HTN, CVS disease and she has no danger signs such as blurred vision, bleeding, and epigastric pain and has no bad obstetric history.

### Physical examination

GA-she is in labor, Vital signs BP-120/75mmhg, PR-86, RR-20bpm, and Temp-35.80c, Abdomen term size, FHB-134bpm,

### Admission Diagnosis

3<sup>rd</sup> trimester +PG+SSOL 2nd to CPD secondary to mal position.

### Lab on admission

WBC-12.6x10<sup>3</sup>/ucl, RBC-3.35x10<sup>3</sup>, HGB-10.8gm/dl/HCT-33.8%, Pelatelete -167x10<sup>3</sup>/ucl and Urine-unremarkable.

Based on the indication senior obstetrician decided to perform cesarean section(C/S) with all the necessary preparation-IV line secured with 18 G and the patient was given 500ml of normal saline for preloading, Foley catheter inserted to monitor urine output and anesthetist on duty reviewed chart, took consent and pertinent history make sure no contraindications for spinal anesthesia and examined airway for difficulty and the patient was taken to operation theatre and the anesthetist put on common monitors:- Pulse oximetry, NIBP and to give spinal anesthesia.

### Procedure of Spinal anesthesia

The patient told to sit and the anesthetist positioned the patient and identified the lumbar space for puncture with the midwives assistance he gave 4ml of 0.5% heavily bupivacaine at L3/L4 interspaced, soon after putting the patient on supine the patient become unresponsive, apneic and no chest movement, BP un recordable and peripheral pulse not palpable, the team immediately started Chest compression and rescue breath at 30:2. S Patient was intubated with end tracheal tube number 7.0 ID fixed by another rescuer and tube was secured. Rescue breaths were given with manually at 12/min. Injection of adrenaline 1 mg IV was given twice 5 min apart and all others resuscitative

measures were taken. The patient was revived within 4 min of CPR and pulse comes and oxygen saturation was 45% then chest compression stopped while continuing the ventilation and placing the mother on left lateral tilt Blood pressure immediately increased from -70/45 mmhg to 95/63mmhg and oxygen saturation to 95%, the operation performed and the baby delivered by LUST C/S, the first min APGAR score was 3/10, the immediately the new born transferred to resuscitation area where the baby given suctioned and musk ventilation at rate of 40bpm given and the new born started breathing (5 min APGAR score -7/10), intraoperative the patient started spontaneous breathing and movement which is not comfortable for surgery and the anesthetist gave suxamethonium 50mg, ketamine 50mg, dexamethasone 4mg was given and controlled the ventilation. Finally, the patient was extubated after assessing her ability to protect her airway, vital signs in normal rage, conscious and obey command (opened her eye, mouth, protrude her tongue) and she was extubated with all necessary preparation in case she needs re-intubation and ICU admission. After extubation she was awake, vital sign stable and transferred to ward with her baby.

At ward with close monitoring of her vital signs, she was given Ceftriaxone 1gm IV BID, Metronidazole-500mg IV TID, and maintenance fluids (RL) and for analgesia tramadol 50mg.

### Condition at discharge

Stable, advised on exclusive breast feeding, and use of contraceptive and she was given certificate of C/S and discharged home on her 5<sup>th</sup> post-operative day.

### DISCUSSION

Cardiac arrest during subarachnoid anesthesia is an uncommon but well reported phenomenon. Bradycardia with resultant hypotension is thought to occur by two mechanisms. The first involves block of the cardio acceleratory sympathetic fibers, which may occur with a sensory block as low as T10, as it has been shown that the sensory-sympathetic differential may be up to six segments [5]. This allows unopposed parasympathetic input with a negative chronoscopic effect. The other mechanism is a manifestation of decreased venous return, which may trigger reflexes mediated by caval and atrial receptors, and the pacemaker stretch reflex [6,7]. Acute reductions in venous return have also been reported to activate the Benzold-Jarish reflex with resultant Bradycardia [8]. In some reports [9,10], patients responded promptly to atropine, ephedrine and external cardiac massage, cardiac output and consciousness being rapidly restored with no sequelae after the event. The series of patients reported by Caplan and colleagues [11] as a result of closed claims analysis, exhibited a different outcome and possibly a different pathogenesis. These patients showed marked similarities; all were young (mean age 35 yr), healthy (ASA I or II), had high sensory block, and

all experienced a poor outcome; six died and seven were severely neurologically damaged [10].

The patient was young, hemodynamically stable, with a high sensory block, but outcome was good. Cases of cardiac arrest after subarachnoid block that required protracted resuscitation and had a good outcome are rare. Perhaps this represents a lack of reporting or indicates that a high sympathetic block in some way complicates successful resuscitation. Detailed analysis of the closed claim cases reveals the importance of warning signs of the forthcoming arrest, usually Bradycardia or hypotension in the preceding 1-2 min [2].

The other mechanisms involved in cardiac arrest after spinal anesthesia include administration of excessive doses of local anesthetics in a previously hypovolemic patient which can be secondary to preoperative fasting, malnutrition, dehydration, use of diuretics or vasodilators. Even the perioperative events such as bleeding, changes in patient's positioning and others can be responsible for cessation of cardiac activity. It is generally recommended that the level of blockade should be limited to T<sub>6</sub> and hemodynamic reserves should be evaluated and monitored for any complication. The degree of bleeding should be observed regularly and replaced with blood whenever necessary, so as to reduce the morbidity and mortality [12].

### The present case

ASA grade I patients, who were preloaded with 500 ml of NS before conduction of spinal anesthesia, the possible cause of cardiac arrest may be the larger volume (4 ml of 0.5% heavy bupivacaine) used on top of this the mother is short and the operation table was slightly in tridilenberg position.

### CONCLUSION

Precaution must be exercised when administering spinal anesthesia for mothers for C/S delivery mainly on dose of local anesthetics and patient position immediately after the block done.

The knowledge of the physiological changes caused by spinal anesthesia and its complications, as well an adequate patient selection, and close monitoring the patient is extremely important. When a decision to use spinal anesthesia is made adequate monitoring, all necessary resuscitation drugs and equipment's should be ready before initiation of the block, and constant vigilance is of paramount importance. Epinephrine should be considered early in the treatment of sudden Bradycardia, especially if conventional doses of atropine or ephedrine are not effective.

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