



TEMPORARY CROSS CLAMPING OF THE INFRARENAL ABDOMINAL AORTA DURING CESAREAN SECTION TO CONTROL OPERATIVE BLOOD LOSS IN PLACENTA PREVIA – CASE REPORT.

Dr. Chandrika. B. S

Senior Resident. ORCID: 0009-0005-2716-6443

Dr. Shobha Dhayalan*

Assistant Professor. *Corresponding Author ORCID: 0009-0003-1255-3702

Dr. Sanjana Keerthy R

Post Graduate. ORCID: 0009-0000-8030-6103

Dr. Keerthana. M. T

Post Graduate. ORCID: 0009-0006-3255-3517

ABSTRACT Incidence of placenta previa is seen to be increasing in the recent obstetric practice and hence is a common situation faced by the anesthesiologists. Infra abdominal aortic cross clamping during a caesarean section is a relatively innovative and upcoming approach being adopted by surgeons in order to control intraoperative bleeding and limit the associated morbidity and mortality levels. It is essential for the anesthesiologists and surgeons to work as a team and thoroughly understand the risk factors, physiological changes and complications of the procedure in order to successfully manage such cases with abnormal placentations. This article is a case report describing our preliminary experience with aortic cross clamping in a case of caesarean section for placenta previa.

KEYWORDS : Placenta Previa, Aortic Cross Clamping, Infra renal Abdominal Aorta.

INTRODUCTION

Placenta previa is characterized by the abnormal implantation of placental tissue overlying the endocervical os. It is associated with severe maternal and fetal morbidity and mortality. The strongest risk factor for placenta previa is previous cesarean deliveries¹.

Cesarean delivery is identified as the only safe and appropriate mode of delivery for pregnancies with placenta previa². Such abnormal placentation, if unexpectedly encountered at the time of delivery can lead to catastrophic consequences, such as uterine rupture, massive hemorrhage, and even maternal death³.

Temporary cross-clamping of the infrarenal abdominal aorta (IAA) during Cesarean section to control operative blood loss in invasive placentation is a relatively innovative procedure, and till date, there are only limited evidence as to the effectiveness and safety of this interventional procedure in the reduction of operative blood loss during caesarean section⁴.

During open abdominal surgery, interrupting the blood flow through the aorta by applying a cross-clamp is often a key step to allow for surgical repair.

As a consequence, ischemia is induced in parts of the body distal to the clamp site. This significant alteration in the blood flow is almost always associated with hemodynamic changes. Upon release of the cross-clamp, the blood flow is restored, triggering an ischemia-reperfusion response, leading to many pathophysiological processes such as inflammation, hormonal changes, and metabolite circulation that could lead to injury in many organ systems and may significantly influence the postoperative outcome⁴.

In this case report, we describe our preliminary experience of using temporary cross-clamping of the IAA for controlling operative blood loss during caesarean section in abnormal placentation.

CASE REPORT:

A 38-year-old female, Gravida-2, para-1 was admitted at 38 weeks' gestation for caesarean delivery with placenta previa. The parturient previous pregnancy was delivered by caesarean section at term in view of transverse lie, 1.5 years back under subarachnoid blockade.

The obstetric growth scan done at 32 weeks of gestational age revealed the presence of placenta in the lower uterine segments with both anterior and posterior components completely covering the internal OS, suggestive of complete placenta previa. MRI of the pelvis showed that placenta is located in the lower uterine segment and noted to cover

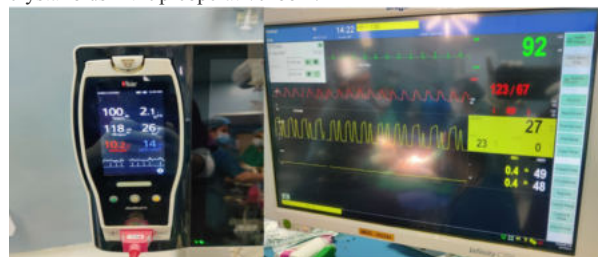
internal OS completely, suggestive of placenta previa with no obvious features of placenta accreta.

After detailed counselling, the parturient was explained about the risks of massive hemorrhage, including the need for peripartum hysterectomy. She was thoroughly explained the procedure of temporary cross clamping of the abdominal aorta during caesarean section for controlling intraoperative blood loss.

The parturient preoperative hemoglobin was 11.2 gm/dl, platelets of 2.5 Lakhs with normal coagulation profile. Her airway examination was normal with an MPT of grade 2. NPO status was adequate with 8 hours of fasting.



Two 18G IV cannulas were secured on bilateral upper limbs. A central venous catheter was secured under local anesthesia on right IJV preoperatively. The parturient was preloaded with 1000ml of crystalloids in the preoperative room.



Inj. Methylprednisolone 1g IV was administered 30 mins before induction. Inj. Tranexamic acid 1g IV was given preoperatively.

Baseline ABG values were obtained.

The parturient was shifted on OT table and standard monitors were connected. Masimo was connected. Baseline parameter values recorded – NIBP, PR, SpO₂, IBP, ECG, EtCO₂.

The parturient was adequately preoxygenated, premedicated with Inj. Glycopyrrolate 0.2mg IV, Inj. Fentanyl 50mcg IV, induced with Inj. Propofol 100mg. Inj. Succinylcholine 100mg IV given as a part of RSI, gentle laryngoscopy done after 1 minute and parturient intubated using a 7mm cuffed endotracheal tube. Bilateral air entry confirmed, and tube fixed at 19cms, and patient put on ventilator on pressure control mode with an inspiratory pressure of 18 and PEEP of 5cmH₂O. Sevoflurane was used at 1-2%, O₂: Air:50:50 at 4L/min. Arterial line secured on Left radial artery and connected to monitor along with transducers. Inj. Paracetamol 1g IV given.

Classical caesarean section was done, anteriorly situated placenta was cut through and a live male baby was extracted by vertex, weighing 3.11kg and cord clamped. Inj. Fentanyl 50mcg IV was repeated after fetal extraction. Apgar score of the baby was 8 and 10 at 1 and 5 minutes respectively.

Placenta and membranes expelled intoto, bleeding noted from placental bed, uterus exteriorized, Retroperitoneal dissection was done and the IAA was separated from Inferior Vena cava between the fourth lumbar vertebra and aortic bifurcation.

After administration of 5000IU of Inj. Heparin for thromboprophylaxis, the aorta was cross clamped using Panicker's clamp about 2 centimeters distal to the bifurcation. Clamping time was noted down. ABG was repeated 15 mins after clamping.

During the surgical procedure, pulse oximetry was established to monitor the arterial oxygen saturation of both feet. Temperature, pedal arterial pulsation and segmental lower limb blood pressure were regularly checked to monitor any potential ischemic or thrombotic injury of lower limbs.

Uterus closed in layers, cervico-isthemic suturing done. Bilateral tubectomy done.

The duration of aortic cross clamping was 17 mins and estimated blood loss was about 600ml which was lower than our anticipated blood loss of > 2,500 mL, judging from our past experience in similar cases. After clamp release, reperfusion to the lower limb were confirmed by palpation of pedal artery pulsations.

ABG values were again repeated 30 mins after clamp was released and were normal.

Local infiltration with Inj. Bupivacaine 0.25% 10cc given around the wound and skin closure done, inhalational agent cut off, reversal was administered and the parturient was extubated on table.

Total duration of surgery was around 60 mins. By the end of the procedure around 2000ml of crystalloids were given. The urine output was around 200ml and clear.

The parturient was shifted to ICU for hemodynamic monitoring and discharged later without any postoperative complications.

DISCUSSION:

Placenta previa is the most common cause of massive obstetric hemorrhage and is associated with an increased incidence of massive transfusion, prolonged surgery and length of hospital stay. With changing obstetrical practice and particularly the increase in the Caesarean section rate, anesthesiologists are more frequently faced with the problem of placenta accreta. A multi-disciplinary team (including obstetricians, neonatologists, midwives, anesthetists, critical care staff) should be approached to manage these patients¹.

The aorta at the thoracic or abdominal levels is cross-clamped during surgical procedures for trauma and sometimes for resuscitation; more often, however, it is cross-clamped for surgical treatment of abdominal, thoracic, or thoracoabdominal aneurysm or of peripheral vascular disease complicated by ischemia of the lower extremities, kidneys, or intestines⁵.

In cases of placenta previa presenting with intraoperative bleeding the aorta can be manually cross clamped by applying direct pressure infra-arenally, thus compressing the aorta against the vertebral column. This simple and effective measure can be done quickly by the obstetrician or his assistant in case of uncontrolled bleeding and requires no dissection. In cases with anticipated or radiologically confirmed placenta previa aortic cross clamping can be planned and executed. Cross clamping the aorta will reduce the pulse-pressure and heavy bleeding at the surgical site. This will not only allow better visualization of the operative site but will also enable the anesthetist to gain control of hemodynamic status.

The temporary occlusion of the aorta and the subsequent reinstatement of blood flow to previously ischemic areas are the most critical steps during open aortic repair. The complications that result are due to pathophysiologic disturbances that occur during cross-clamping and unclamping of the aorta. The level of aortic cross-clamping, the species, the baseline condition of the heart, and the anesthetic management during surgery and experiments, with their effects on myocardial status and vascular tone. All of these factors alter the hemodynamic responses to aortic cross-clamping and unclamping⁵.

Hemodynamic changes: After applying a clamp on the aorta, an increase in the arterial blood pressure and systemic vascular resistance (SVR) is almost uniformly observed. The removal of the aortic cross-clamp is consistently associated with a significant reduction in vascular resistance and a consequent decrease in arterial blood pressure. The blood vessels in the previously ischemic areas are severely dilated because of the accumulation of adenosine, lactate, and CO₂ during the time of ischemia. Metabolic acidosis and increased lactate levels develop in the ischemic areas distal to the aortic cross-clamp. The degree of acidosis and increase in the lactate concentration depend on the duration of aortic clamping and the underlying disease of the patient¹.

Although theoretically, infrarenal aortic clamping is much safer than suprarenal aortic clamping, it is recommended that the shortest possible occlusion time should be less than 60 minutes⁵.

CONCLUSION:

Anesthetic management of such cases includes understanding and anticipating the complications and being meticulously prepared. They keep crystalloid, colloids, blood and blood products ready. To establish IV access beforehand, keenly monitor all the standard parameters, monitor the clamping time and inform surgeons accordingly and take appropriate measures in case of untoward events. Most importantly it involves having a healthy discussion about the plan, steps, anticipated duration and complications with the surgical team, keeping the patient calm preinduction, taking them into confidence and acting quickly to save the two lives.

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