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Case Report Open Access

Anesthesia for a Cesarean Section in a Patient with a Congenital Heart Disease and Complete Placenta Previa

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Abstract

Pregnant patients with Congenital heart disease (CHD) make for a unique challenge to the obstetrician and anesthesiologist, when the patient has to undergo emergency cesarean section. Managing high-risk parturient requires a thorough understanding of the hemodynamic changes of pregnancy, its effect on the patient and physiology of the abnormal heart. Beyond this, our patient presented with placenta previa and vaginal bleeding. This combination of factors makes this case a worst-case scenario for any anesthesiologist. There is limited data in the literature on these combination factors. CHD is becoming the most common source of cardiac problems in pregnant patients but non-corrected cardiac defect patient are rare cases in the obstetric department. In adult population, chronic non-palliated congenital heart lesions present new difficult situations for the anesthesiologist working with high-risk obstetric anesthesia. This case report makes a successful cesarean section in a CHD patient in emergency condition.

A 27 year old female from Rio de Janeiro, Brazil; Gravida 1, Para 0, at 30 weeks gestation age was admitted to Pedro Ernesto University Hospital (HUPE) high risk maternity ward in Rio de Janeiro, she had a history of endocarditis in 2005. The patient was diagnosed with a complete placenta previa and was admitted to have a scheduled cesarean section. At 31 weeks of gestation the patient presented vaginal bleeding, the probable diagnosis was of placenta previa bleeding and emergency cesarean section was indicated. The anesthesia technique was general anesthesia with inhaled and intravenous anesthetic agents in rapid sequence induction. The newborn was delivered quickly with APGAR score 8 after 5 minutes. Postoperatively, the patient was admitted to the intensive care unit (ICU) for close monitoring of vital signs and post-operative care. The case report will include details in pre-operative, peri-operative and post-operative outcome of the patient.

Keywords: Congenital heart disease; Placenta previa; Cesarean section; Anesthesia

Introduction

Medical advances in the past 40 years have increased survival and decreased morbidity of patients with a variety of clinical disorders. With conservative or surgical therapies, children with CHD can now reach adulthood end up resuming a normal life. These patients reach childbearing age and represent an enormous challenge to obstetricians and anesthesiologists alike. Patients with CHD are more at risk for obstetric complications and have a higher morbidity during surgical procedures.

Our objective is to discuss the current anesthetic management of pregnant patients with uncommon congenital cardiac condition. We will discuss the case of a young patient with CHD that had an obstetrical complication undergoing Caesarean section in emergency condition. Understanding the physiology of pregnancy and the patho-physiology of the underlying cardiac disease is important when providing anaesthesia for high-risk obstetric patients. This paper presents a pregnant patient with CHD with a complete placenta previa, blood loss that could have developed in bad outcome. By sharing our approach, we hope to help other clinicians in their management of patients with CHD.

Case Report

A 27 years old Caucasian woman from Rio de Janeiro, Gravida 1, Para 0, with 30 weeks gestational age, weighing 62kg and a height of 1.70m, was admitted to the Hospital University Pedro Ernesto (HUPE) high risk maternity ward with placenta previa (Figure 1). She was admitted for close monitoring, lung maturity therapy was taken in consideration for the fetus to prepare the patient for a scheduled Cesarean section at 36 weeks. With 31 weeks gestation the patient developed with bleeding from the planceta previa and emergency Cesarean section was indicated.

On physical examination, the patient was anxious but cooperative, with cyanosis +/4, clubbing of the fingers, diaphoresis, lower lib edema, a 4/6 cardiac murmur on the pulmonary focal point, pulmonary exam was normal, with no order findings. Blood work (prior to bleeding)

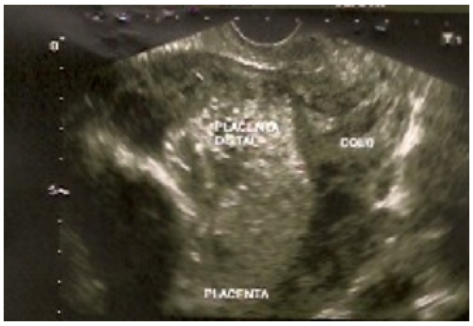

Figure 1: Complete Placenta Previa

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was, Hematocrit 47%, Leucocytes 124 x 10^3/mm^3, Hemoglobin 16 g/dl, platelets 171,000/ mm^3, glycemia 92 mg/dl. Her vital signs were: heart rate of 115 beats/min, blood pressure of 140/65 mmHg, body temperature 36.8°C.

Echocardiogram reported CHD presenting a transposition of great arteries (TGA), pulmonary stenosis, ventricular septum defect (VSD) and hypoplasic left ventricle, resuming in a complex congenital cardiac disease with preserved global systolic function and no signs of valvular vegetation. She had a history of endocarditis in 2005. During her prenatal check-up at 21 weeks gestation, she was diagnosed with placenta previa and was admitted for follow-up by the obstetrics department at HUPE. At 31 weeks the patient developed moderated vaginal bleeding. She was transferred to the operation room (OR) with suspicion of bleeding of placenta previa. The anesthesiology team performed a quick pre-operation examination in which the patient reported a recent meal, fruits and water two hours prior to the bleeding. She also reported prior drug allergy to sulfonamide. Her airways had a Mallampatti score of I with a good mouth opening and well neck extension, suggestive of an easy intubation. ASA score III-E.

Anesthetic Technique

Informed consent was obtained. Monitoring consisted of 5 leads ECG, pulse-oximetry, IMAP left radial artery was cannulated by 20G arterial cannula on the right arm, capnography and gas analyzer (Datex-Ohmeda/GE). The MAP was 80 mmHg, Pulse 105 beats/min, SpO_2 84%.

General anesthesia in rapid sequence was started. Pre-oxigenation for 3 minutes was given and induction was performed: Lidocaine 40mg was followed by Etomidate 15mg, Alfentanyl 1000µg, succinylcholine 80mg waited for 30 second and intubated with a cuff 7.5mm tube using sellick maneuver, anesthesia was maintained with sevoflurane (1 MAC). The newborn was delivered quickly with APGAR score 8 after 5minutes.

Patient experienced minimal hemodynamic change. Blood gas sample was taken (Table 1). Cefazolin 2g, dexamethazone 10mg, ondasetrone 4mg and methamizol 2g were administered during the procedure. Oxitocyn 10U was also administered in slow drip (60 min) to avoid increase vascular pulmonary resistance, avoiding a right to left shunt [1]. The patient was extubated after the procedure in the OR without complaint.

Discussion

TGA is a common with an incidence of 19.3 to 33.8: 100,000 new born and 7% to 8% of all CHDs, more frequent male than female 2:1 and has no relation to chromosome illnesses. In many cases, TGA is accompanied by other heart defects, the most common type being intracardiac shunts such as atrial septal defect (ASD).

pH	7.34	
pCO_2	42	mmHg
pO_2	63	mmHg
Na	135	mmol/L
K	3.7	mmol/L
Ca	0.99	mmol/L
Blood Gluc.	102	mg/dl
Lactic acid	1.4	U/L
Htc.	36	%
HCO_3	22.3	mM
TCO_2	24	mM
BE	-3	U/l
SO_2	90	%
Hgb.	11.2	mg/dl

Table 1: Peri-operatory BG

Critical for survival, the lesion requires intracardiac shunting for mixing of blood and adequate oxygenation. Left unrepaired, these lesions typically result in severe pulmonary hypertension and are usually fatal. In this case, the patient had some symptoms but no hard evidence to suspect Eisenmenger's syndrome.

TGA is a discordance of the ventricles and great vessels, resulting in a parallel circulation. The oxygenated blood from the lungs goes to the pulmonary veins, then to the left atrium, followed to the left ventricle, pulmonary artery and then the lungs. Deoxygenated blood enters right atrium to go to the right ventricle and through the aorta. Considerations for these patients are right ventricular failure and atrial arrhythmias.

Unique considerations include stenosis at the anatamotic sites (PA or aorta) and pulmonary valve or aortic insufficiency. Congenitally corrected TGA does not require surgical correction. However, the anatomic right ventricle serves as the systemic ventricle, resulting in an increased incidence of heart failure over time.

Cardiac MRI is a useful tool for delineating the anatomy and identification of conduit or vessel abnormalities. Very few cases have been reported of patient with CHD undergoing cesarean section. Most cases involve corrected TGA, leaving an enigmatic outcome to this particular case. The patient presented complex challenges and debatable arguments related to the choice of anesthesia technique even if the surgery was to be performed in elective surgery circumstances or if the pregnancy was taken to term [2].

During any pregnancy, the nasopharyngeal, oropharyngeal, and respiratory tract mucosa swell. Therefore, intubation and suctioning may lead to mucosal injury and bleeding. Endotracheal intubation must be performed quickly because pregnant patients have lower oxygen reserves because of the decrease in FRC. Ventilate pregnant patients to maintain their $PaCO_2$ at approximately 30 mm Hg, the normal level during pregnancy. Avoid respiratory alkalosis because it may decrease uterine blood flow and, hence, fetal oxygenation. Avoid high ventilatory pressures at the expense of a rise in $PaCO_2$.

Both techniques regional or general anesthesia can be used. When anesthetizing patients with CHD, using either technique, the following factors must be kept in mind; prevention of accidental intravenous infusion of air bubbles, when planning epidural anesthesia, loss of resistance to saline rather than air should be used to identify the epidural space, a slow onset of epidural anesthesia is preferred, as rapid decrease in systemic vascular resistance (SVR) could result in reversal of shunt with maternal hypoxemia [3]. Supplemental O_2 should be given to the patient throughout the procedure if regional technique is used. Hypoxaemia, hypercarbia and acidosis should be avoided as they may result in increased pulmonary vascular resistance (PVR) and reversal of shunt flow. Regional technique should be used with extreme caution. Single shot spinal anaesthesia should be avoided, because of rapid on-set and hemodynamical effect. Slow induction of epidural is advisable [1,4,5]. In this case, the selection for general anesthesia technique was preferred, because of time efficiency and hemodynamic stability should be a priority, since the cesarean section was performed under emergency circumstances general anesthesia becomes the ideal technique [6-12].

Antibiotic Prophylaxis

The patient had two risk factors for infectious endocarditis, history of previous endocarditis and high-risk cardiopathy. Batectemia occurring in parturient is uncommon, reported in about 1-5 % of patients undergoing vaginal or cesarean delivery [13].

Antibiotic prophylaxis is recommended for patients in the high and moderate-risk categories only in the presence of suspected bacteremia or active intraamniotic infection. Bacteremia is found in 1% to 5% of deliveries, with a possible increased risk with manual removal of the placenta. The American Heart Association (AHA) guidelines state that delivery by cesarean section and vaginal delivery (in the absence of infection) do not require endocarditis prophylaxis except in high-risk patients [9]. When infection is suspected or documented, prophylaxis for suspected bacteremia is recommended for the high-risk and moderate-risk groups, but not for the negligible-risk group. However, in clinical practice endocarditis prophylaxis, when indicated, is often routinely started at onset of active labor because it is difficult to predict which deliveries become complicated with risk of bacteremia. This liberal policy could theoretically promote bacterial resistance [13,14].

Conclusion

The challenges of a CHD plus the obstetric complication require great team approach for patient safety. Despite published reports of generally safe course of pregnancy in patients with CHD, patients with poor cardiac performance need early involvement of a multi-disciplinary team including cardiologist, obstetrician in addition to anesthesiologists. Careful antenatal surveillance for the magnitude of cardiac dysfunction is recommended and cardiology consultation would be recommended for referral and continuous follow-ups during the perinatal period. The use of general anesthesia in this case is needed to maintain the patient hemodynamically stable. A neuroaxial block could develop the possibility of significant hemodynamic disturbances particularly with neuroaxial sympathectomy and unstable blood pressure. This patient had no diagnosis defined at the time of the surgery but cardiac illness was cyanotic of nature. Women should be aware of the risk involved her condition and what would be a pregnancy with their heart condition. Any high-risk pregnancy and specially one in which the carrier has a cardiac illness, should be counseled accordingly before even considering having a child [15-17].

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