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Epidural Anesthesia for Caesarean Section in a Primigravida with Eisenmenger's Syndrome with Severe Pulmonary Hypertension

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Case Report

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Abstract: Eisenmenger's syndrome includes pulmonary hypertension with reversed or bi-directional shunt associated with septal defects or a patent ductusarteriosus. Pregnancy carries high mortality rate with a cumulative risk of 30-70%. Hence pregnancy is not advisable.Here we present a case of a 32 year old primigravida who was admitted in medical ICU for complaints of grade IV dyspnea and palpitations and was stabilized in two weeks of treatment. She was diagnosed with Eisenmenger's syndrome with severe pulmonary hypertension and thereafter underwent an emergency caesarean section under epidural anesthesia successfully. There was no occurrence of any perioperative complication and she was discharged home after one week with advice of postoperative cardiac follow-up.
Keywords: Eisenmenger's syndrome, pulmonary hypertension, Epidural anesthesia, Caesarean section.

INTRODUCTION

Cardiac disease complicates0.2-4%pregnancies in western and 2% in developing countries which contributes to 20% of all maternal deaths. Congenital heart disease is most frequent (75-82%) with shunt lesions being prominent (20-65%)[1].

Fetal morbidity is secondary to preterm delivery and fetal growth restriction due to inadequate uteroplacental circulation, risk of congenital cardiovascular anomalies, sudden fetal death. Eisenmenger's syndrome is a severe pulmonary obstructive disease which develops due to consequence of large preexisting left to right shunt such that pulmonary artery pressure approaches systemic levels and direction of flow becomes bi-directional or right to left shunt. It was described in 1897, redefined by Wood in 1958[2].

Here pregnancy is usually associated with high mortality rate 30-70% [3,4]. Hence, there is need for early hospital admission, possibility of requiring critical care and central hemodynamic monitoring, induction of labour, shortening second stage of labour, endocarditis prophylaxis, anticoagulation therapy, proper selection of anesthesia technique, counseling to avoid future pregnancy.

We report the successful management for caesarean section in a patient with Eisenmenger's syndrome under epidural anesthesia.

CASE REPORT

A 32 year old primigravida was admitted in medical ICU at 32 weeks of gestation for complaints breathlessness NYHA grade II since 1 month which gradually progressed to NYHA grade IV and was associated with palpitations since 3 days and bilateral pedal edema. Saturation was 80% on room air. She was managed with noninvasive ventilation for 12 days. 2D-ECHO showed large subaortic ventricular septal defect of 21mm with bidirectional shunt and pulmonary arterial hypertension of 112mmHg. Inj.Nitroglycerine 1 µg/kg/min IV for 2 days, Inj.Clexane 0.6 mg subcutaneous for 5 days were given. Inj. Furosemide 20 mg IV TDS .Inj.Dexamethasone 8 mg TDS was supplemented for fetal maturity. Shifted to ward after stabilization, on nasal prongs O2 @ 4L/min, Oxygen saturation was 92%. She was scheduled for caesarean section at 34 weeks of gestation.

Preoperative assessment showed weight 50 kg, height 145 cm, pallor, bilateral pedal edema, JVP

normal, HR 102/min, BP 130/90 mmHg. RR 28-32/min, grade3 pansystolic murmur and basal crepitations were present. ECG showed right axis deviation, chest X-ray showed mild cardiomegaly. 2DEcho revealed large subaortic ventricular septal defect of 21 mm with inlet extension, bidirectional shunt, pulmonary arterial hypertension of 112 mm Hg, ejection fraction 50%. Pulmonary CT angiography showed main pulmonary artery diameter 3.7cm, right pulmonary artery 2cm, left pulmonary artery 2.2 cm, no evidence of pulmonary embolism, mosaic attenuation of bilateral lung fields, paraseptal emphysematous changes in right upper and middle lobe, left upper lobe, mild cardiomegaly with right ventricular hypertrophy and right atrial enlargement. Room air ABG: ph-7.37, paO2-52 mm Hg, paCO2-30 mm Hg, SaO2 85%. Hemoglobin 12.6 gm%, platelets-275000/mm3, prothrombin time 11.7 sec with INR of 0.8.Cardiologists advised to cut short second stage of labour, increased risk of CCF & mortality.

Care taken to avoid paradoxical embolism.Inj.Ondansetron 4mg IVgiven. IV Ampicilin 2gm for Infective endocarditis prophylaxis. The preinduction BP and HR were 130/80 mm Hg and 83/min regular respectively. CVP 10 cmH2O. Oxygen saturation was 85% on room air, 100% on oxygen supplementation via bains circuit. Under all aseptic precautions an epidural catheter inserted at L3-L4 intervertebral space in sitting position. Subarachnoid Inj. Fentanyl 25 microgram was given. Total 9 ml of 2% lignocaine given in incremental doses and a sensory block to T6 level achieved in 20 min. No further top up doses of epidural were required. Intra operatively 100% oxygen Supplementation was given. A live male baby with APGAR score 5 at 1 min and 6 at 5 min, weighing 1000 gm was delivered. Inj.Pitocin 5 Units intravenous bolus and intravenous infusion of 15 units was administered. Inj.furosemide 20 mg IV given after baby delivery. IV Midazolam 1mg given for anxiolysis. Patient remained hemodynamically stable- CVP 11 cm H2O, PR 92/min and BP 120/ 130 mm Hg, RR 32/min, oxygen saturation 98%. Ringer's solution 500 ml administered. Blood loss was 320 ml, urine output was 300 ml. Patient was shifted to ICU. Saturation maintained 96% on facemask with oxygen 4 L/min. Postoperative epidural analgesia given with Inj. Bupivaicaine (0.125%) 4ml with Inj. Fentanyl 50microgram for 24 hours. Epidural catheter was removed as the patient was to be started on Inj. heparin and shifted to ward after 2 days. Postoperative 2D-ECHO showed ejection fraction 60%, bidirectional shunt, eisenmenger's syndrome, PAP 92 mm Hg, reduced LA-LV dimensions. She was discharged after 10 days on tablet Lasix 20 mgBD.

DISCUSSION

Eisenmengers syndrome is a pulmonary vascular obstructive disease that develop as a consequence of a large preexisting left to right shunt such that pulmonary artery pressure approaches systemic levels that direction of flow becomes bidirectional on right to left. Pregnancy induced systemic vasodilatation is detrimental in parturients with eisenmenger's syndrome. Reduced SVR may increase right to left shunting and decrease pulmonary blood flow, leading to further hypoxemia. The progressive increase in plasma volume, which peaks at about 50% above baseline early in the third trimester, adds to the burden of a compromised right ventricle and may precipitate right heart failure. These patients present with clinical features like fainting, dyspnoea, cyanosis, hemoptysis, heart failure, stroke, thromboembolism, iron deficiency anemia. Thus our patient also presented at 32 weeks of gestation with NYHA grade IV dyspnea and palpitations. The preexisting pulmonary vascular disease restricts this increased flow of blood to the lungs and increases right ventricular work. As peripheral vascular resistance falls, the patient with eisnemenger's syndrome may augment the right to left shunting that exacerbates preexisting hypoxia, which in turn may cause more pulmonary vasoconstriction. At the time of labor and delivery acidosis and hypercarbia may further increase pulmonary vascular resistance. Hence her emergency caesarean delivery was done. Any hypovolemia resulting from blood loss or hypotension from a vasovagal response to pain may result in a sudden death. In addition death may also occur from pulmonary thromboembolism or pulmonary infarction, congestive heart failure, arrhythmias, stroke, infective endocarditis, paradoxical emboli, renal dysfunction, brain abscess and or there can be sudden death [5].

The degree of maternal hypoxemia is important predictor of fetal outcome; prepregnant arterial oxygen saturation of <85% associated with rates of live births as low as 12%, while saturation of >90% results in 92% of live births [6]. Hematocrit > 60%, arterial oxygen saturation <80%, right ventricular hypertension, syncopal attack and a fixed pulmonary hypertension not responsive to oxygen carries poor prognosis [7]. This is explained by high incidence of spontaneous abortion, 30-50% risk of premature delivery and low birth weights. This baby had low birth weight of 1000gm. In our patient supplementary oxygen improved saturation from 85% to 100% implying a reversible shunt.

Anesthetic management in pulmonary hypertension is controversial, requires balancing SVR and PVR. Inadvertent hypotension can occur with regional or general anesthesia. General anesthesia produces decrease in venous return and cardiac output due to myocardial depression and reduce SVR.

The hazards of general anesthesia are avoided by regional anesthesia, although the level of block might produce excessive sympathetic block and uncontrolled decrease in the SVR. Epidural anesthesia

has been used successfully because of its slow onset, minimal precipitous hemodynamic changes as compared to subarachnoid block.

Fluid management is a double edged sword. Cardiac output 50% above the baseline during second stage of labour can raise upto 80% due to abrupt increase in venous return after baby delivery because of autotransfusion and release of compression of inferior vena cava by gravid uterus. And there is continued autotransfusion of blood upto 24-72 hour's post-delivery increasing the risk of pulmonary edema. We provided adequate uterine tilt, monitored the urine output and hydration status to administer fluids judiciously fluids. Oxygen is a pulmonary vasodilator decreasing the blood flow across the right to left shunt thereby improving the saturation [8, 9]. So it should be provided throughout the perioperative period. With oxygen supplementation, our patient achieved a saturation of 98%. Thromboembolism prophylaxis should be encouraged by early ambulation and subcutaneous heparin. In our patient subcutaneous heparin was started on first postoperative day. She was discharged to ward on second day and home after 10 days on tablet Lasix 20 mg BD with advice of cardiac followup and avoidance of future pregnancy.

R.Kandasamy*et al.* [4] reported elective caesarean section under general anesthesia at 29 weeks due to severe IUGR. Patient had situsinvertus, secundum ASD and severe pulmonary hypertension 118/56. Preoperatively apart from cyanosis, she was asymptomatic. On 2nd postoperative day, episode of hypotension, hypoxia and anemia needed 16 days ICU management.

J.Rodrigues*et al*. [10] presented primigravida with eisenmenger's syndrome (large subacute VSD) with severe pulmonary hypertension who underwent emergency cesarean section under epidural anesthesia in a hospital that lacked agents to maintain the cardiovascular stability as well as monitoring equipment. Although successful intraoperative management, patient died on 3rd postoperative day following severe respiratory distress.

CONCLUSION

Pregnancy carries substantial maternal/fetal risks in patients with Eisenmenger's syndrome & pulmonary hypertension and should be discouraged [11]. Bed rest, heparin and oxygen therapy can produce satisfactory maternal and fetal outcome. Regional or general anesthesia is reported during casarean delivery. Vigilant monitoring in critical care is mandatory for postpartum period upto 1 week for anticipated complications like worsening of shunt, heart failure, and thromboembolism. Our case was managed successfully under epidural anesthesia without any morbidity.

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