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Case Report

ANESTHETIC MANAGEMENT OF PATIENT WITH PRIMARY PULMONARY HYPERTENSION FOR- HERNIA REPAIR

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ABSTRACT

Patients with pulmonary hypertension are at high risk for anaesthesia and surgery. Pulmonary hypertension was previously divided into primary and secondary categories; Primary pulmonary hypertension described an idiopathic hypertensive vasculopathy exclusively affecting pulmonary circulation, whereas secondary pulmonary hypertension was associated with a casual underlying disease process. However, identification of a gene responsible for the inherited forms of this disease has prompted a revised classification of pulmonary hypertension. New classification distinguishes conditions that directly affect pulmonary arterial tree from those primarily affecting the pulmonary venous system or respiratory structure and functions. The term primary pulmonary hypertension has now more accurately been replaced by idiopathic PAH, when supported by genetic etiology familial PAH; the term secondary pulmonary hypertension has been abandoned. PPH is a rare form of an unusually aggressive, a progressive and often fatal disease with female predominance in the ratio, female: male 1.7:1. As per the available literature the risks associated with primary pulmonary hypertension seems to be more frequent than those related to secondary pulmonary hypertension. Occasionally these patients may be presented for the anaesthesia for non cardiac surgeries. These patients are considered to be at high risk for anaesthesia due to high possibility of perioperative complications and mortality. The ideal anesthetic technique involves maintenance of stable pulmonary and systemic hemodynamic parameters with adequate venous return without reducing systemic vascular resistance. Anesthesia requires invasive cardiovascular monitoring. Here we present a case report of a 34 year old man with severe Primary pulmonary hypertension (PPH) who successfully underwent right sided inguinal hernioplasty under regional anesthesia technique, modified hernia block.

Keywords: *Primary Pulmonary Hypertension, Regional Anesthesia Technique, Hernia Block, Hernioplasty*

INTRODUCTION

Primary pulmonary hypertension (PPH) also referred as idiopathic pulmonary hypertension is a rare progressive fatal disease associated with high mortality due to the stress of surgery and anesthesia (Breen and Johnzen, 1991; Burrows *et al.*, 1986). Patients with PPH undergoing noncardiac surgery with general anesthesia carry an elevated risk of perioperative morbidity and mortality due to right ventricular failure. Variables in clinical history, preoperative electrocardiographic findings, abnormal 2D echo parameters and intraoperative factors like hypoxemia, hypotension and dysrhythmias predict peri-operative morbidity and mortality. Systemic hypertension and peroperative variables may predict an increased length of hospital stay after surgery. Elevated pulmonary vascular resistance results in right sided heart failure. Prevalence of PPH is more in females, with maximum incidence in the young in their 3rd or 4th decade of life. Available literature on the subject is mostly on obstetrics patient management and repair of congenital heart defects.

In the present report we describe anesthetic management of a patient with severe primary pulmonary hypertension who successfully underwent right sided inguinal hernioplasty under regional anesthesia technique, modified hernia block.

Case Report

CASES

A 34years old male patient weighing 75kg presented to surgical out- patient department (OPD) with chief complaint of swelling in the right inguinal region since 1½ years with the clinical evidence of indirect inguinal hernia. He was a known case of primary pulmonary hypertension diagnosed 3¼ years ago, on regular treatment with tablet Sildenafil 50mgOD, T Bosentan 62.5mg OD and T Pantoprazole 40mgOD.

Pre –operatively, apart from exertional dyspnoea (grade-II), he was asymptomaic. Physical examination revealed moderate obesity, pulse rate of 84 $min^{-}1$, blood pressure 120/78 mm Hg and room air oxygen saturation (SpO2)95%. With no rise in jugular venous pressure (JVP). His lungs were clear to auscultate and cardiac examination showed regular rate and rhythm with loud P2. Chest radiograph showed increased prominence of the central pulmonary vessels and normal lung fields. Electrocardiography revealed P pulmonale, right axis deviation with right ventricular hypertrophy. Two- dimensional Echocardiography (2D-Echo) with color Doppler revealed right atrial enlargement, a dilated hypo- kinetic right ventricle, a D-shaped septum (consistent with right ventricular pressure overload), dilated pulmonary trunk, dilated pulmonary arteries and a good left ventricular function with ejection fraction 58% with an estimated pulmonary artery (PA) systolic pressure of 75 mm Hg. His hemoglobin was 12g%, haematocrit 40% and platelet count of 150000 /mm^3. Arterial blood gas (ABG) on room air was pH of 7.42, PaO2 62 mmHg, PaCO2 44mmHg, bicarbonate 23.7$molL^{-11}$ and arterial oxygen saturation (SaO2)95%. Cardiologist evaluated and opined the patient as a high risk case for surgical intervention with possibility of fatal outcome in the peri-operative period due to severe PPH.

He was pre-medicated with Ranitidine 150mg orally on the night before the surgery. The patient was taken to the operation theatre with American Society Anesthesiologists (ASA) Grade III physical status, with informed consent. In the operation theatre, a good intravenous (IV) access was secured with a wide bore cannula. Standard monitors, an arterial line and a central venous catheter were placed. The surgery planned under right sided Ilioinguinal and iliohypogastric nerve block (modified hernia block).

Then, after aseptic preparation Ilioinguinal and iliohypogastric nerve block (modified hernia block) attempted. Initially, right anterior superior iliac spine identified and mark was made 2cm medial and 2cm superior from it. After infiltration of site with local anesthetic, a small puncture was made in the skin with a sharp 23G hypodermic needle to allow subsequent negotiation of 20G blunt needle. Needle was inserted through the puncture site perpendicular to the skin. Increased resistance was met as the needle encountered the external oblique muscle; a loss of resistance was appreciated as the needle passed through the muscle to lie between it and the internal oblique muscle. After the initial loss of resistance and negative needle aspiration for blood 2ml of local anesthetic mixture, (0.5% bupivacaine + 2% lignocaine, 1:200000 adrenalines) was injected. The needle was then, advanced further to encounter another resistance, the internal oblique muscle. Again loss of resistance was appreciated, once the needle passed through the internal oblique muscle, to lie between it and transverses abdominus muscle. With the second loss of resistance, another 2 ml of local anesthetic was administered. The needle was then withdrawn to the skin and redirected at a 45 degrees medially, to again pierce the external and then internal oblique muscles. After each loss of resistance, 2 ml of local anesthetic solution again administered. The needle was then returned to skin and inserted 45 degrees laterally procedure was repeated. Thus a total of 12 ml of local anesthetic solution placed in a fan like distribution between the external and internal oblique and the internal and transverses abdominus muscles. Subsequently, genitofemoral nerve block was supplemented to ilioinguinal and iliohypogastric nerve block for enhancing the efficacy of regional block. Genitofemoral nerve block was performed immediately proximal to the pubic tubercle on the line joining anterior superior iliac spine with pubic symphysis with 5ml of LA agents in both the directions. Further, 5ml of LA was loaded and handed over to the assistant, assisting the surgeon for injecting at the neck of the hernia sac by the surgeon before opening the sac in order to avoid discomfort to the patient, due to retraction during surgery. 28ml of LA (14 ml 0.5% Bupivacaine and 14 ml 2% lignocaine with1:200,000 adrenaline) was used for the entire procedure. Fifteen minutes after completion of the block, the skin of the lower abdominal wall and inguinal region was assessed for anesthesia and confirming the adequacy of block surgery was started. Perioperatively,

CVP was used as a guide to administer i.v. fluids and was maintained around 10 cm of H_20. Volume over load was avoided as it could easily precipitate right ventricular failure in such cases. Intra-operatively oxygen saturation, ECG, NIBP monitored. Surgical procedure lasted for 1 hr and 15 minutes without any significant changes in heart rate, blood pressure or CVP. Post operatively, patient was observed in the post operative recovery room for 1 hr and then shifted to the surgical intensive care unit (SICU). Pain relief achieved with Diclofenac sodium (Justin) suppository 100 mg BD and Inj Tramadol 50 mg IV BD for 2 days, remaining part of postoperative stay was uneventful. He was treated with T Sildenafil 50 mg OD and T Bosenton 62.5 mg OD post operatively; remained clinically stable and was discharged on 10^{th} postoperative day after being asked to come for regular follow-up in the surgery and cardiology departments.

DISCUSSION

Pulmonary hypertension is defined as sustained elevation in mean pulmonary artery pressure >25mmHg at rest or 30mmHg with exercise, in the absence of left sided pressures (Gaine and Rubin, 1999). When PAH is present in the absence of an identifiable cause or associated underlying disease it is referred as idiopathic PAH (IPAH) .The median life expectancy from the time of diagnosis in patients with IPAH before the availability of disease – specific therapy was only 2.8 years. Discoveries in three main pathobiologic pathways (nitricoxide, endothelin and prostacyclin) of the disease process have revolutionized our approach to the treatment of PAH (Faber and Loscalzo, 2004). Recently, IV epiprostenol is successful in lengthening the life expectancy but it is very costly and not easily available (Rosalyn *et al.,* 2001). In PPH, Electrocardiography (ECG) signs of right heart compromise include right axis deviation, right ventricular hypertrophy and peaked P wave. However, the ECG lacks sufficient accuracy as the screening tool for the detection of PAH. Radiographic signs of pulmonary hypertension include enlarged main and hilar pulmonary arterial shadows with attenuation of peripheral pulmonary vascular markings and right ventricular enlargement. Even though these findings may be helpful in advanced cases, they are neither specific nor sensitive enough by themselves. The most useful and accessible imaging modality for diagnostic purpose is echocardiography (Currie *et al.,* 1985), providing quantitative estimation of pulmonary arterial pressure and assessment of associated anatomical abnormalities such as right ventricular enlargement. Pulmonary artery catheterization is the gold standard to confirm the presence and severity of pulmonary hypertension; it may also be useful in establishing the cause and determining the severity of IPAH. The operative and preoperative anesthetic management of patients with pulmonary hypertension undergoing non-cardiac surgery has received little attention in the literature. Most discussion has been limited to obstetrical anesthesia case reports in adults and repair of congenital heart defects in pediatric patients (Breen and Johnzen, 1991; Burrows *et al.,* 1986; Antanasoff *et al.,* 1990). Armstrong has described the use of a combination of general anesthesia and epidural analgesia (Armstrong 1992). Mallampatti used epidural anesthesia for cholecystectomy (Mallampati, 1993), and Antanasoff P et al used it (epidural anesthesia) for cesarean section (Antanasoff *et al.,* 1990). In the peri-operative period the risk of right heart failure or sudden death is significant in patients with PPH with progressive or acute increases in PAP due to increased RV after load, inadequate RV preload, hypoxemia, dysrhythmias or pulmonary embolism (George 2000).

Conclusion

In conclusion, although PPH is rare, there are special considerations to the anaesthetic management in patients with severe PPH. In the perioperative period increased RV after load, inadequate RV preload, hypoxemia, dysrythmias or pulmonary embolism can lead to right heart failure or sudden death with progressive or acute increases in PAP. Main goal is to avoid further increase in RV after load, inadequate preload, hypoxia, dysrhythmias and thromboembolic complications. During initial evaluation, this patient's pulmonary hypertension seemed to be severe enough to avoid major surgery. However, with proper pre-operative evaluation and anesthesia plan he successfully underwent major surgery under modified hernia block.

REFERENCES

Antanasoff P, Alen E, Schmid ER and Parsch T (1990). Epidural anaesthesia for caesarean section in a patient with severe pulmonary hypertension. *Acta Anaesthesiologica Scandinavica* **34** 75-77.

Armstrong P (1992). Thorasic epidural anaesthesia and primary pulmonary hypertension. *Anaesthesia* **47** 496-499.

Blaaise G, Langaleben D and Hubert B (2003). Pulmonary arterial hypertension: Pathophysiology and anaesthetic approach. *Anaesthesiology* **99** 1-36.

Breen TW and Johnzen JA (1991). Pulmonary hypertension and Cardiomyopathy Anaesthesia management for caesarean section. *Canadian Journal of Anesthesia* **38** 895-899.

Burrows FA, Klink JR, Robinovitch M and Bhon DJ (1986). Pulmonary hypertension in children: Perioperative management. *Canadian Anesthesiologists' Society Journal* **33** 606-628.

Currie PJ, Seward JB and Chan K L (1985). Continuous wave Doppler determination of right ventricular pressure: a simultaneous Doppler-catheterization study in 127 patients. *Journal of the American College of Cardiology* **6** 750-756.

Faber HW and Loscalzo J (2004). Mechanisms of disease. *The New England Journal of Medicine* **351** 1655.

Gaine SP and Rubin LJ (1999). Primary pulmonary hypertension. *Lancet* **353** 74-76.

George F Rich (2000). Perioperative management of the patient with pulmonary hypertension and right heart failure. *American Society of Anesthesiologists Resident Component* 1351-1357.

Hoper MM, Galle N and Simonneau G *et al.*, (2002). New treatment of pulmonary arterial hypertension. *American Journal of Respiratory and Critical Care Medicine* **165** 1209-1216.

Lewis J Rubin (1997). Primary pulmonary hypertension. *New England Journal of Medicine* **336** 111-117.

Mallampati SR (1993). Low thoracic epidural anaesthesia for elective cholesystectomy in a patient with congenital heart disease and pulmonary hypertension. *Canadian Anesthesiologists' Society Journal* **2** 159-168.

Myles PS (1994). Anaesthetic management for laproscopic Sterilizationand termination of pregnancy in a patient with severe primary pulmonary hypertension. *Anaesth Intensive Care* **22** 465-469.

Robert M, Ronald G Pearl and Rodriguez MD (1998). Pulmonary hypertension and Major Surgery. *Anaesthsia –Analgesia* **87** 812-815.

Roberts NV and Kest PS (1990). Pulmonary hypertension and pregnancy: a lethal combination. *Anaesth Intensive Care* **18** 366-374.

Rosalyn S, Divina T, Gayle O, Alexander G and Duarte (2001). Pregnancy and Primary Pulmonary Hypertension –successful outcome with epoprostenol therapy. *Chest* **119** 973-975.

Rossler P and Lambert TF (1986). Anaesthesia for caesarean section in the presence of primary pulmonary hypertension. *Anaesth Intensive Care*