Anaesthetic Implication of Von Hippel Lindau Disease

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Introduction

Von Hippel Lindau disease is an inherited autosomal dominant disorder with predilection to develop characteristic tumors in the cerebellar hemispheres (capillary hemangioblastomas), retina, brain stem and spinal cord [1]. Cerebellar tumors occur in about 60% of the patients with Von Hippel Lindau disease and brain stem tumors in 14 to 50 %. Accessible lesions are removed surgically [2]. Although benign, these tumors can cause symptoms secondary to pressure or hemorrhage and may be associated with pheochromocytoma. This report describes the anesthetic management of a unique case of Von Hippel Lindau disease in which cerebellar and spinal lesions were not associated with any evidence of pheochromocytoma but posed a hypertensive problem during the surgery.

Case Report

A 21-year-old man presented with complaints of progressive weakness of right lower limb for 3 months and low backache of 2 months duration. He denied history of trauma. Clinical examination revealed a well-built individual, a heart rate of 80 beats per minute, blood pressure of 160/90 mm Hg, with numbness and wasting of muscles of right lower limb. He had grade 3 and 4 power in right and left lower limbs respectively, with tenderness in lumbar spine and paraspinal muscle spasm. Routine laboratory examination revealed a hemoglobin of 16.1 gm/dl and blood sugar of 84 mg/dl. His metabolic and renal parameters and chest radiograph were normal. Electrocardiogram showed normal sinus rhythm, with q waves in leads II, III and aVf. Ophthalmic examination revealed retinal angiomas, berry aneurysms and papilloedema. Magnetic resonance imaging and ultrasonography of abdomen revealed multiple hemangioblastomas and syrinx in brain, spine and multiple bilateral renal cysts. A diagnosis of Von Hippel Lindau disease was confirmed and patient prepared for surgery. Preoperatively he was managed with tab atenolol 50 mg OD, tab amlodipine 5 mg OD, tab alprazolam

0.25 mg HS, tab diamox BD, mannitol and glycerol for control of blood pressure and rise in intracranial pressure. A work up for pheochromocytoma with MIBG scan and VMA level estimation was negative. He was accepted for occipital craniotomy and spinal cyst excision in a single stage in ASA – Class III (hypertension, multi-organ hemangioblastomas and weakness of right lower limb limiting his mobility) under general anaesthesia.

The patient was prepared preoperatively with tab diazepam 10 mg on the morning of surgery. In the operating room, the patient was placed in supine position and monitoring included ECG (3 lead), NIBP, pulse oximetry and intravenous access using a 16 G intravenous cannula. Under local analgesia a central venous catheter and left radial arterial line was established. During the placement of these invasive monitoring lines, the patient's blood pressure did not exceed 160/100 mm of Hg. He was administered metoprolol (2.5 mg), fentanyl (1.5 mg/kg), dexamethasone (8 mg) and ranitidine (50 mg) intravenously. Anaesthesia was induced with intravenous thiopentone sodium (300 mg) and maintained with nitrous oxide 50% and oxygen 50% with isoflurane 0.6% administered via a face mask. Vecuronium (6 mg) was used as muscle relaxant to facilitate endotracheal intubation. Lignocaine 100 mg was administered 90 seconds prior to intubation. Intubation with a size 8.5 mm internal diameter, cuffed, flexometallic endotracheal tube was smooth and atraumatic. The inhalational gas flow rates were reduced to low flows and anesthesia maintained with nitrous oxide 66% and oxygen 33% with isoflurane 0.5 to 1%. The patient was placed in prone position, avoiding any compression over the abdomen. To maintain smooth haemodynamics and to avoid surges of blood pressure rise, a nitroglycerine continuous infusion was started and titrated in accordance with blood pressure. A total of 1500 ml of lactated ringer, 500 ml of gelofusine (colloid) and 350 ml of blood was transfused. The total blood loss measured approximately 450 ml. Intraoperatively the blood pressure was maintained between 110/70 to 150/90 mm of mercury using nitroglycerine and heart rate between 70 to 80 per minute using metoprolol as infusion.

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Patient was administered 300 mg dilantin sodium in a slow normal saline drip for seizure prophylaxis. The surgery lasted for six hours and was uneventful, with successful removal of both the cranial and spinal lesions. Intraoperative arterial blood gas analysis was within acceptable limits. Analgesia was maintained with intravenous morphine in conventional doses intraoperatively.

Ondansetron (4 mg) was given intravenously towards the end of procedure to prevent postoperative nausea and vomiting. The patient was reversed with neostigmine (50 mg/kg) and glycopyrrolate (10 mg/kg) intravenously and extubated on the table after prior administration of lignocaine (60 mg) intravenously to ablate the stress response. Postoperatively, he was intact neurologically and was shifted to ICU for further care and management. The post operative analgesia was maintained with diclofenac sodium 75 mg 8 hourly intramuscularly. The stay in ICU was uneventful and did not require any anti hypertensives. The patient was discharged with an advice for review after 6 months.

Discussion

Von Hippel Lindau Disease is an autosomal dominant disorder with a prevalence of about 1 in 50,000. There is no sex predilection. Patients with retinal lesions present in their 20s while those with spinal cord or brain hemangioblastoma, generally, become symptomatic in their 4th decade [3]. The condition includes slowly growing cystic tumors that may present at any age. Hypernephroma, renal cell carcinoma, pheochromocytoma and cysts of kidneys, pancreas, epididymis or liver may also occur. Erythropoietin production by cerebellar hemangioblastomas may result in polycythemia [4]. Although benign, the tumors can cause symptoms secondary to pressure on surrounding structures or by virtue of hemorrhage. Symptoms of VHL vary among patients and depend on the size and location of the tumors. Symptoms may include headaches, problems with balance and walking, dizziness, weakness of the limbs, vision problems, and high blood pressure. Cysts (fluid filled sacs) and/or tumors (benign or cancerous) may develop around the hemangioblastomas and cause the symptoms listed above. Treatment of most cases of VHL usually involves surgery to remove the tumors before they become harmful. Certain tumors can be treated with focused high dose radiation. Individuals with VHL need careful monitoring by a physician familiar with the disorder. Management of anesthesia in patients of Von Hippel Lindau disease must consider the possible presence of pheochromocytomas. Undiagnosed pheochromocytoma carries a high risk of perioperative mortality and morbidity. In patients who are usually normotensive or have mild hypertension, the diagnosis is likely to be missed in the preoperative screening. Palpitation and headaches are frequent complaints and clinical signs of

hypermetabolic state with weight loss and abnormal carbohydrate metabolism are seen [5]. Exaggerated systemic hypertension and tachycardia, especially during direct laryngoscopy, was avoided using metoprolol 2.5 mg intravenously. Care was taken during prone positioning and handling of patient so as to avoid any position related injuries and undue pressures on eye, neck, thorax and abdomen which could have affected the intracranial pressure intraoperatively. The intraoperative fluid requirement and blood loss were managed optimally using CVP, invasive blood pressure, and clinical assessment as per guidelines. Despite premedicating with metoprolol, nitroglycerine continuous infusion was started to keep blood pressure under control and to reduce blood loss [6]. The use of beta-blockers without adequate arteriolar dilation can even precipitate pulmonary edema. We preferred isoflurane to halothane as inhalational agent, as halothane sensitizes the heart to arrhythmias in presence of catecholamines. The presence of spinal cord hemangioblastomas limited the use of epidural blockade for post operative pain relief, though some workers like Mohan Mugavar et al [7] have described the use of epidural blockade for post operative pain relief in managing a case of VHL syndrome for excision of cerebellar hemangioblastoma and pheochromocytoma surgery. Berl M et al [8] have described the successful use of epidural anesthesia for delivery and caesarian section in 3 cases of pregnancy with coexisting Von Hippel Lindau disease. The use of epidural analgesia is debatable, as there is a possibility of direct injury to the cord or its nerves and vessels by the epidural needle or catheter. We preferred to use conventional non steroidal anti-inflammatory drugs (diclofenac sodium) for post operative analgesia. The prognosis for patients with VHL depends on the location and complications of the tumors. Untreated, VHL may result in blindness and or permanent brain damage. Early detection and treatment improves the prognosis significantly. Death occurs due to complications of brain tumors or kidney cancer.

Conflicts of Interest

None identified

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Answer to the Quiz

Proximal Femoral Focal Deficiency

Proximal Femoral Focal Deficiency (PFFD) is a major congenital malformation of the proximal femur readily diagnosed at birth by its typical clinical picture [1]. The thigh is short and bulky, with flexion, abduction and lateral rotation at the hip. In 15%, the condition is bilateral and presents with asymmetrical dwarfism [2].

Absence of femoral head is difficult to comment upon in a new born on radiography. It may ossify later or connect with femur by a fibrous band which may be confirmed by recent imaging modalities. The radiograph of lower extremities (Fig 1) showed hypoplasia of the right proximal femur with corresponding shortening of the soft tissues and was diagnosed as Proximal Femoral Focal Deficiency (PFFD). It is a unique group of congenital femoral hypoplasias wherein there is a localized absence of proximal end of the femur involving the ileo-femoral joint and was recognized as a distinct type of skeletal limb deficiency in 1969 by Aitken and others [2,3]. It should be considered separate from other femoral deformities such as complete shaft absence, development of coxa vara and the generalized dysplasias [2,4].

Associated malformations are seen in 80% of cases with PFFD [1] and often include absence or severe hypoplasia of the fibula, tibial shortening and equinovalgus deformity of the foot. No associated malformation was seen in this case. Occasionally, flexion deformity of the knee, absent cruciate ligament of the knee, absent/hypoplastic patellae tarsal coalition or absence of part of the upper limb may be noted [1].

All patients with PFFD should undergo clinical and

radiographic evaluation to determine whether osseous and soft-tissue elements are present and then treated accordingly [2,4]. Ossification is often delayed or abnormal in young infants, thereby limiting radiographic evaluation. Magnetic resonance imaging (MRI) is useful in delineating the presence or absence of femoral head and nature of the proximal segment of the hip [5]. Sonographic evaluation of the hip is a useful adjunct to delineate hip position and morphology [6]. Treatment is determined by the specific problems presented by each individual case. The femur is lengthened at an appropriate age when the hip is stable [7]. Early detection is important to ensure successful corrective surgery and reduce complications.

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