Case Report

Combined sciatic and femoral block in a rare case of residual pituitary adenoma with overt hypothyroidism for tibial fracture fixation

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Abstract

Objective: Pituitary Adenoma with overt hypothyroidism coming for non neurological emergency surgery is a challenge to the anesthetist due to the risks of pituitary apoplexy during spinal and general anesthesia and the risk of myxoedema coma. Our objective is to present one such rare case which was successfully managed with combined sciatic and femoral block. **Case Report:** An 18 year old male patient with residual pituitary adenoma came to our hospital for tibia fracture fixation. Preoperative thyroid function tests revealed overt hypothyroidism (T.S.H. 11.3 mIu/ml, T3 40 ng/dl T4 1.59ug/dl). Combined femoral and sciatic nerve block was planned. Epidural anesthesia was kept as a backup plan. Sciatic block was given with the classic approach of Labat. Inj lignocaine 2% 10 ml with injlevobupivacaine 0.5% 20ml with inj. dexamethasone 8mg as additive was injected. 15 ml of 0.5% bupivacaine plus 5 ml of 2% lignocaine adrenaline was injected for femoral block. Inj hydrocortisone 100mg was administered intravenously in view of surgical stress. Preventive measures were taken to avoid hypothermia. Surgery was successfully performed in supine position and lasted for two and half hours. **Conclusions:** We conclude that peripheral nerve blockade can successfully overcome all the challenges associated with general and regional anesthesia in a rare case of Pituitary adenoma with overt hypothyroidism coming for emergency surgery.

Keywords: Pituitary adenoma, Sciatico-femoral block, Hypothyroidism, Apoplexy.

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INTRODUCTION

Anesthesia in patients with pituitary adenoma undergoing non neurosurgical cases is a challenge to anesthesiologist due to sudden changes that occur in intracranial hemodynamics during administration of spinal or general anesthesia.[1] These changes may cause sudden infarction or hemorrhage in the gland resulting in its rapid enlargement which may compress surrounding structures like optic chiasma, third, fourth and sixth cranial nerves. The resulting pituitary necrosis may cause endocrinopathy.[2]This clinical syndrome, termed as Pituitary apoplexy is characterized clinically by persistent headache, double vision, episodic emesis which if left untreated may result in permanent neurological deficit in the form of permanent vision loss and third nerve palsy.[3] In hypersecreting pituitary adenoma, increased levels of growth hormone leads to Acromegaly. Such patients have macroglossia, thickened laryngeal and pharyngeal soft tissues and protruding mandible making their airway difficult. Hypertension, cardiomegaly, impaired left ventricular function and impaired glucose tolerance are the other anesthetic considerations.[4] In rare cases, pituitary adenoma coexists with autoimmune hypothyroidism.[5]Hypothyroidism further complicates the course of anesthetic management with the risks of myocardial depression, baroreceptor dysfunction, decreased hypoxic and hypercapnic pulmonary drive, electrolyte imbalances, hypothermia, sensitivity to anesthetic drugs, delayed recovery and hypothyroid coma.[6]

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We present here one such patient with pituitary adenoma who was successfully managed with combined sciatic and femoral block for tibial fracture fixation avoiding the risks of spinal and general anesthesia.

CASE REPORT

An 18 year old male patient came to our hospital for tibial fracture fixation. Three years back he was operated for pituitary adenoma. He had macroglossia and protruding mandible with no history of sleep apnea. The cardio-respiratory system examination was normal. Apart from unilateral loss of vision, rest of the neurological examination revealed no abnormality.

A present CT scan showed residual pituitary tumor. Routine hematological, biochemical tests and echocardiography were normal. Chest and neck X-rays showed no evidence of tracheal compression and deviation. Preoperative thyroid function tests revealed overt hypothyroidism (T.S.H. 11.3 mIu/ml, T3 40 ng/dl T4 1.59ug/dl). Patient was started on 150 ug of l-thyroxine two days before surgery. Indirect laryngoscopy documented no vocal cord dysfunction and normal pharyngeal structures. Combined femoral and sciatic nerve block was planned. Epidural anesthesia was kept as a backup plan.

In lateral position, sciatic block was given with the classic approach of Labat using 22-G 10-cm needle (B-BRAUN, stimuplex needle). Motor responses of plantar flexion were elicited at one mAmp and one Hz. Inj bupivacaine 30 ml, 0.25% was injected. The patient was made supine for femoral block. A 22-G, 5cm nerve locator needle was used and 15 ml of 0.5% bupivacaine plus 5 ml of 2% lignocaine was injected after eliciting patellar ascension with a firm distal digital pressure. After 20 minutes of femoral block, the patient was totally relieved of pain. Inj hydrocortisone 100mg was administered intravenously in view of surgical stress. Intra operative monitoring included Spo2, ECG and noninvasive blood pressure. Hemodynamicswere normal throughout the procedure. Preventive measures were taken to avoid hypothermia. Surgery was successfully performed in supine position and lasted for two and half hours. Post surgery the patient had an uneventful recovery and was discharged on the tenth day.

DISCUSSION

The pituitary gland lies within the sellatursica. The floor and anterior wall of the sella are formed by the sphenoid air sinus, the posterior wall by the clivus and the roof by the invagination of dura through which the pituitary stalk passes. The lateral walls are bounded by the cavernous sinuses which contain the carotid arteries and the third, fourth and sixth cranial nerves.[4] Most pituitary tumours arise from the anterior part of the gland majority being benign adenomas. Pituitary adenomas account for 10–15% of intracranial neoplasms. Pituitary lesions may present as (i) hormonal hypersecretion syndromes, such as hyperprolactinaemia, acromegaly and Cushing's disease; (ii) mass effect, for example visual disturbance or raised intracranial pressure; (iii) non-specific, for example infertility, headache, epilepsy or pituitary hypofunction; (iv) incidental, such as those detected during imaging for other conditions.[7] Pituitary gland lies outside the blood brain barrier. It is supplied by branches of internal carotid artery; inferior and superior hypophyseal arteries.[8] Pituitary adenomas are unique in the sense they have 5.4 times higher risk of intratumour bleeding than all other intracranial tumours.[3] The pituitary gland is supplied by end arteries which are poorly innervated and operate at low hydrostatic pressure. The vessels within the tumor are smaller, poorly fenestrated with irregular ruptured basement membrane. Also the expanding mass may itself compress the infundibulum or the superior hypophyseal artery and hinder blood supply to the entire anterior lobe. Due to these anatomical changes, adenomatous pituitary gland is susceptible to infarction as a result of minor changes in perfusion pressure.[2] Another mechanism of apoplexy is decrease in CSF pressure following CSF leak during lumbar puncture. Minor alterations in pressure gradients within the skull during mechanical ventilation may result in apoplexy.

Anesthesia concerns in Acromegaly with overt hypothyroidism

Our patient was a rare case where pituitary adenoma coexisted with autoimmune hypothyroidism. Pituitary adenoma with acromegaly and hypothyroidism posted for non neurological surgery can pose problems for general as well as regional anesthesia especially spinal anesthesia.

General anesthesia and Acromegaly

Hypertension associated with laryngoscopy and intraoperative mechanical ventilation can lead to increase in ICP and cause pituitary apoplexy. Also acromegaly presents with difficult airway. Four grades of airway involvement have been described: grade 1, no significant involvement; grade 2, nasal and pharyngeal mucosa hypertrophy but normal cords and glottis; grade 3, glottic involvement including glottic stenosis or vocal cord paresis; and grade 4, combination of grades 2 and 3, i.e. glottic and soft tissue abnormalities.[9] Additional features of macroglossia, enlarged lower jaw and thickened pharyngeal and laryngeal tissues, epiglottis and aryepiglottic folds seen in acromegaly can lead to difficult laryngoscopy and obstructive sleep apnea. Indirect laryngoscopy and soft tissue neck X-rays are recommended. Ventilation with a bag and mask in acromegalic patients may be difficult due to receding chin

and need an oral airway.4 Tracheal intubation proceeds uneventfully in the majority of patients if long-bladed laryngoscopes are used. The intubating laryngeal mask airway and fibreoptic laryngoscopy are safe alternatives.[4] Tracheostomy has been recommended for grades 3 and 4.
Impaired left ventricular function, hypertension, cardiomyopathy, arrhythmias, coronary artery disease, impaired glucose tolerance are commonly seen. Echocardiography can determine preoperative pulmonary and ventricular functions. Tough skin, carpel tunnel syndrome, arthropathy, myopathy can present problems during peripheral venous access and positioning.

General anesthesia and Hypothyroidism

Emergency surgery in this group is risky because of anticipated cardiovascular instability and myxoedema coma. Because of an increased incidence of adrenocortical insufficiency and a reduced adrenocorticotropic hormone response to stress, hypothyroid patients should receive hydrocortisone cover during periods of increased surgical stress in the dose of 100 -300 mg.[6]
These patients have reduced stroke volume, heart rate and blood volume. Peripheral vascular resistance is increased. Cardiomegaly, cardiomyopathy, ischemic heart disease, anemia, pericardial effusion may occur. Numbers and sensitivity of the β receptors is decreased. Baroreceptor reflex is blunted. Patients may easily develop hypotension in the post induction period and the ventilatory response to hypoxia and hypercarbia may be decreased.
Hypothyroid patients are supposed to be more sensitive to anesthetic drugs and inhalational agents. The observed decrease in the MAC value for inhaled anesthetics is probably due to decreased cardiac output and blood volume as well as decreased metabolism and excretion.[6] Hypotension and coagulopathy in hypothyroid patient can precipitate apoplexy in pituitary adenoma.

Regional anesthesia

Spinal anesthesia leads to CSF leak and hypotension causing decreased skull pressure. This has been found to precipitate pituitary apoplexy.[2] Hence we avoided spinal in this patient.
CSF pressure rises significantly even with 10 ml of bupivacaine administration in the epidural space in patients with reduced intracranial compliance.[4] This may lead to apoplexy in pituitary adenoma. Also there is a possible risk of accidental dural puncture during placement of epidural catheter. Performance of epidural by an experienced anaesthesiologist, use of ultrasound, if available, to measure the depth of needle placement and slow administration of drug may minimise this risk. Hence we kept epidural as our second choice.

CONCLUSION

We believe that Pituatary adenoma co-existing with overt hypothyroidism coming for lower limb emergency surgery can be successfully managed with peripheral nerve blockade avoiding all the above discussed risks with general and neuraxial blockade that may occur in such patient.

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