CASE REPORT

Anaesthetic Management for Transurethral Resection of the Prostate in a Patient with Previously Undiagnosed Ebstein's Anomaly.

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ABSTRACT

Improved survival among patients with congenital heart disease has resulted in a growing number of adults presenting for non-cardiac surgery. Ebstein's anomaly is a rare congenital malformation of the tricuspid valve characterised by right ventricular dysfunction, susceptibility to arrhythmias, and intracardiac shunting, each of which poses distinct anaesthetic challenges. We report the perioperative management of an elderly patient with previously undiagnosed Ebstein's anomaly undergoing transurethral resection of the prostate (TURP).

A 70-year-old man with hypertension and chronic kidney disease was scheduled for elective TURP. Preoperative electrocardiography demonstrated right atrial enlargement and right bundle branch block, prompting further evaluation. Transthoracic echocardiography identified Ebstein's anomaly with severe tricuspid regurgitation, an ostium secundum atrial septal defect with bidirectional shunting, severe pulmonary arterial hypertension, and borderline right ventricular dysfunction. Following multidisciplinary review, a decision was made to proceed with intrathecal ropivacaine under continuous invasive haemodynamic monitoring and appropriate precautions against paradoxical embolism. The patient's cardiovascular stability was successfully managed with carefully titrated phenylephrine, allowing the surgery to proceed without any adverse events.

An elderly patient with previously undiagnosed Ebstein's anomaly was managed successfully through proper preoperative assessment, multidisciplinary planning, and vigilant intraoperative monitoring. Anaesthetic management in this case highlights that spinal anaesthesia is a viable strategy for TURP in carefully selected patients with complex right-heart physiology. This case also emphasises the importance of maintaining a broad differential diagnosis during preoperative evaluation, particularly in elderly patients in whom congenital cardiac pathology may be ignored in favour of more common acquired conditions.

Keywords: Adult congenital heart disease, Ebstein's anomaly, Transurethral resection of prostate.

Introduction

Advances in medical and surgical management have significantly improved survival in patients with congenital heart disease, resulting in a growing population of adults with congenital heart disease (ACHD). Recent estimates suggest a prevalence of approximately 2.4 per 1,000 adults in India.1 As this population ages, anaesthesiologists increasingly encounter patients with ACHD presenting for non-cardiac surgery who require careful perioperative evaluation and individualised anaesthetic strategies.2

Ebstein's anomaly is a rare congenital malformation accounting for less than 1% of all congenital heart defects. It is characterised by apical displacement of the septal and posterior leaflets of the tricuspid valve. This in turn leads to atrialisation of a portion of the right ventricle and severe tricuspid regurgitation.3 Ebstein's anomaly results in a dilated right atrium and reduced functional right ventricular capacity, predisposing patients to right-sided heart failure, arrhythmias, and intracardiac shunting.4

Clinical manifestations of Ebstein's anomaly vary widely, ranging from severe cyanosis in infancy to asymptomatic survival into adulthood. Many patients also have associated interatrial communications, such as an atrial septal defect (ASD) or a patent foramen ovale, which may predispose to right-to-left shunting and paradoxical air embolism.4 The presence of complex right heart physiology makes procedures such as TURP, where fluid absorption and haemodynamic changes may occur particularly challenging . We report the successful anaesthetic management of an elderly patient with previously undiagnosed Ebstein's anomaly undergoing TURP under spinal anaesthesia, and discuss the key perioperative considerations.

Case Report

A 70-year-old male with symptomatic benign prostatic enlargement was scheduled for TURP. He had a five-year history of hypertension controlled with oral cilnidipine.Preoperative evaluation revealed cardiac abnormalities that prompted further workup.

Chest radiography demonstrated marked right atrial enlargement. Electrocardiography showed right bundle branch block with Q waves in leads III and aVF. Routine laboratory investigations were within normal limits except for elevated blood urea nitrogen and serum creatinine, consistent with underlying chronic kidney disease.

Transthoracic echocardiography revealed severe tricuspid regurgitation with a markedly dilated right atrium and atrialisation of the right ventricle. An ostium secundum ASD with bidirectional shunting and severe pulmonary arterial hypertension were identified. The septal leaflet of the tricuspid valve was displaced apically by 22 mm, satisfying established diagnostic criteria for Ebstein's anomaly. 3 Left ventricular systolic function was preserved with an ejection fraction of 69%. Tricuspid annular plane systolic excursion (TAPSE) was 16 mm, indicating borderline right ventricular dysfunction.
We opted for spinal anaesthesia to avoid the haemodynamic consequences of general anaesthesia and positive-pressure ventilation. These will impair the venous return which in turn worsens the right ventricular function of the patient.

Baseline haemodynamic parameters were normal, blood pressure 150/90 mmHg, heart rate 76 beats min ¹, and oxygen saturation 100% on supplemental oxygen. Standard monitoring was established, comprising continuous electrocardiography, pulse oximetry, capnography, temperature monitoring, and invasive arterial blood pressure measurement via a radial arterial cannula. Air-eliminating filters were incorporated into all intravenous infusion lines, and meticulous de-airing of syringes and tubing was performed to reduce the risk of paradoxical air embolism through the intracardiac communication.

Spinal anaesthesia was performed at the L3–L4 interspace in the lateral decubitus position using a 25-gauge Quincke spinal needle. Intrathecal ropivacaine 0.75% (2 mL; 15 mg) was administered, producing a sensory block to the T10 dermatome. This was particularly important in this patient, where maintenance of systemic vascular resistance and right ventricular preload was essential.

Haemodynamic parameters remained stable throughout the intraoperative period, with occasional mild hypotension managed with intravenous phenylephrine boluses of 100 µg.

The procedure lasted approximately one hour. Approximately 24 litres of isotonic saline irrigation fluid were used with bipolar TURP. Intraoperative blood loss was minimal. The patient was transferred to the postoperative intensive care unit for continued monitoring. No arrhythmias, hypoxaemia, or haemodynamic instability were observed in the perioperative period, and recovery was uneventful.

Discussion

Advances in medical and surgical management of congenital heart disease have resulted in markedly improved survival into adulthood, generating a growing population of adults with congenital heart disease (ACHD) who present for non-cardiac surgery.[1] Anaesthesiologists are therefore increasingly confronted with complex congenital cardiac physiology in the perioperative setting. So a thorough understanding of cardiac lesion specific haemodynamics and their anaesthetic implications is mandatory.2

Ebstein's anomaly is defined by apical displacement of the septal and posterior tricuspid valve leaflets, resulting in atrialisation of a portion of the right ventricle, severe tricuspid regurgitation, and marked right atrial enlargement.[3] These structural derangements collectively reduce functional right ventricular capacity and predispose patients to supra ventricular arrhythmias, right-sided heart failure, and intracardiac shunting through associated atrial communications. Accordingly, anaesthetic management must prioritise the maintenance of adequate venous return, avoidance of abrupt reductions in systemic vascular resistance, prevention of pulmonary vasoconstriction, and prompt treatment of haemodynamically significant arrhythmias. We preferred Ropivacaine over bupivacaine for spinal anaesthesia due to its more favourable haemodynamic profile and lower propensity to produce profound sympathetic blockade, thereby facilitating better preservation of systemic vascular resistance and right ventricular preload in this patient.6

Several features of the present case merit particular attention. First, a de novo diagnosis of Ebstein's anomaly in an elderly patient is uncommon. Symptoms such as dyspnoea, fatigue, and reduced exercise tolerance are frequently attributed to more prevalent conditions in this age group including coronary artery disease and hypertensive heart disease. An underlying congenital cardiac pathology may therefore remain undetected until detailed preoperative evaluation prompts further investigation. Recognition of the congenital lesion carries direct clinical significance, as the haemodynamic goals and anaesthetic strategy differ considerably from those applicable to acquired cardiac disease.

Second, the surgical procedure itself introduces additional complexity. Transurethral resection of the prostate (TURP) involves continuous bladder irrigation, and systemic absorption of irrigation fluid can produce clinically important haemodynamic and electrolyte disturbances. Conventional mono-polar TURP requires hypo-osmolar irrigants such as glycine, which may cause dilutional hyponatraemia and the well-described TURP syndrome.7 The widespread adoption of bipolar electrosurgical technology now permits the use of isotonic saline irrigation, substantially reducing the risks of electrolyte disturbance and neurological sequelae

associated with fluid absorption.8,9

This technological advance is of particular importance in patients with Ebstein's anomaly. Electrolyte imbalance and rapid intravascular volume shifts may exacerbate right ventricular dysfunction and precipitate arrhythmias, while even isotonic fluid absorption may elevate right atrial pressure and worsen tricuspid regurgitation. Meticulous intraoperative fluid management and continuous haemodynamic monitoring therefore remain essential regardless of the irrigation strategy employed.

Case reports describing anaesthetic management in patients with Ebstein's anomaly undergoing non-cardiac surgery have consistently stressed the avoidance of haemodynamic instability and the preservation of sinus rhythm.10,11,12,13 The majority of reported cases involve general anaesthesia for abdominal or obstetric procedures, with a smaller number demonstrating successful application of carefully titrated regional anaesthesia. However, descriptions of elderly patients with previously undiagnosed Ebstein's anomaly undergoing TURP remain exceedingly rare in the literature.

This case shows that spinal anaesthesia, in combination with haemodynamic monitoring and bipolar TURP using isotonic saline irrigation, can be safely employed in carefully selected patients with complex right-heart physiology. More broadly, this case reinforces the importance of systematic preoperative evaluation, the recognition of congenital cardiac pathology even in elderly patients, and the contribution of modern surgical and anaesthetic techniques to improved perioperative outcomes.

Clinical Relevance

• Adults with congenital heart disease, including Ebstein's anomaly, are presenting with increasing frequency for non-cardiac surgery. So anaesthesiologists should be familiar with the associated perioperative risks and lesion-specific haemodynamic goals.

• Anaesthetic objectives include maintaining adequate venous return, avoiding abrupt reductions in systemic vascular resistance, minimising pulmonary vasoconstriction, and preventing arrhythmias.

• Low-dose spinal anaesthesia with invasive haemodynamic monitoring is a safe and effective option for TURP in appropriately selected patients with Ebstein's anomaly.

• Precautions against paradoxical air embolism are mandatory in all patients with known intracardiac communications.

Clinical Relevance

Patient Consent: *Informed consent was obtained from the patient for publication of this case report and any accompanying data.*

Conflict of interest:

Nil

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