

Perioperative Management of Hysterectomy in a Patient with Polycystic Kidney Disease

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ABSTRACT

Polycystic disease of the kidney, inherited as an autosomal dominant trait is characterised by progressive expansion of numerous fluid-filled cysts resulting in massive enlargement of the kidneys ultimately resulting in kidney failure. An understanding of alterations in the renal physiology due to hemodynamic changes is important for successful perioperative management. We report a successful perioperative management of a vaginal hysterectomy in a female patient with adult polycystic kidney disease.

CASE REPORT

A 62-year-old female with III degree uterovaginal prolapse was scheduled for elective vaginal hysterectomy. She was diagnosed to have hypertension since 14-years and was on treatment with Amlodipine 5 mg OD, Perindopril 4 mg OD and Aspirin 150 mg OD. She has two brothers and both of them were hypertensive on treatment since 10-years.

On examination, heart rate was 82/min regular, systemic blood pressure of 138/80mmhg in supine position. Systemic examination was unremarkable. Airway was graded as mallampatti classification class two with normal neck movements and without any spinal abnormality.

Preoperative investigation showed haemoglobin (Hb) of 11.9 gm% and normal blood cell counts. Biochemical profile showed blood urea of 41mg/dl, Serum creatinine 1.2mg/dl, Na⁺ 130meq/l, K⁺—4.1 meq/ l, Ca⁺⁺—7.9 meq/ l, acid phosphatase 1.2 U and 24 hrs urine protein -76 mg/dl. Liver function tests and coagulation profile were within normal limits. ECG showed sinus rhythm with left axis deviation and echo showed left ventricular hypertrophy (LVH) with ejection fraction of 58%. Chest X-ray showed normal lung fields and abdominal sonography revealed bilateral polycystic kidney. Magnetic resonance imaging of brain was found to be normal. A nephrology and cardiology opinion was taken and was advised to avoid nephrotoxic drugs, and intraoperative hypotension.

On the night prior to surgery, patient was counselled and informed consent was obtained. She was given tablet diazepam 10 mg, advised nil perorally and to continue antihypertensives on the morning of the surgery. On the day of surgery, she was wheeled into operation theatre. Monitoring included pulse oximeter, noninvasive blood pressure (NIBP), five lead electrocardiography (ECG), central venous pressure (CVP) and urine output measurement. Combined spinal epidural (CSE) technique in different interspaces was planned. She was preloaded with 500 ml of ringer lactate solution through central venous line. Under aseptic precautions, 18 gauge epidural catheter was inserted at L1-L2 space and spinal anaesthesia was given at L3-4 space through 25 gauge spinal needle, using 3 ml of 0.5% heavy bupivacaine with buprenorphine 2 mcg/kg. Anaesthesia and level of blockade were adequate. Throughout the surgery blood pressure was maintained in the range of 110-120 mmhg of systolic and 68-80 mmhg of diastolic and there was no episode of bradycardia during the surgery. Postoperative analgesia was achieved by 8 ml of 0.125% bupivacaine with buprenorphine

Keywords: Hypertension, Polycystic kidney disease, Renal failure

two mcg/kg epidurally every 8th hourly. Her vitals were stable and she was shifted to the postanesthesia care unit. Patient had an uneventful postoperative period and she was discharged from hospital on 8th postoperative day.

DISCUSSION

The polycystic kidney diseases are among the most common life threatening inherited diseases worldwide [1]. Hypertension is an early symptom, occurring in approximately 60% of patients secondary to stretching of arterioles across expanding cysts leading to increased secretion of rennin and angiotensin [2]. Decreased urine concentrating ability develops early in the course of the disease. Haemodialysis or renal transplantation is eventually necessary in most of these patients [3,4].

Presenting symptoms and signs include abdominal discomfort, hematuria, urinary tract infection, incidental discovery of hypertension, abdominal mass, elevated serum creatinine, or cystic kidneys on imaging studies. Hypertension is common and often precedes renal dysfunction, perhaps mediated by increased activity of the renin-angiotensin system. Risk factors for progressive kidney disease include younger age at diagnosis, black race, male gender, presence of polycystin-1 mutation, and hypertension [1,5].

Our patient had hypertension since 14 years which was kept under control with medications. Echo findings revealed LVH with ejection fraction of 58%. Hypertension in Autosomal Dominant Polycystic Kidney Disease (ADPKD) leads to early development of left ventricle hypertrophy and definitely contributes to the progression of chronic renal insufficiency. LVH occurs due to a combination of pressure and volume overload. Volume overload may be due to sodium and water retention, the presence of an atrioventricular (AV) fistula, or chronic anaemia with increased stroke volume and heart rate. Pressure overload is related to hypertension and arteriosclerosis. Reduced LV compliance may result in increased sensitivity to volume changes with a small increase in LV volume precipitating pulmonary oedema [6]. In ADPKD optimal control of blood pressure dramatically decreases the risk of left ventricle hypertrophy and contributes to its regression. Angiotensin converting enzyme inhibitors and/or angiotensin receptor blockers is the drugs of choice in the treatment of hypertension in ADPKD [7].

The incidence of hepatic cysts is 40% in patients over the age of 60 years and more frequently in females. Tanmoy ghatak et al., reported

a case of ADPKD for which nephrectomy was done and two weeks later, patient presented with shock as hepatic cyst had compressed cardiac chambers leading to reduction in ejection fraction to 30% [8].

Regional anaesthesia was planned to avoid the administration of cardio depressant and nephrotoxic drugs as well as the stress response during laryngoscopy and intubation of general anaesthesia.

Fernandez and Suvarna, described successful spinal anaesthesia for caesarean section in a primigravida with ADPKD in renal insufficiency requiring hemodialysis [2]. We employed CSE anaesthesia as it allows a rapid onset of neuraxial blockade, which can subsequently be prolonged or modified. Ideally it combines the best features of spinal blockade (rapid onset, profound blockade, low drug dosage) and epidural blockade (titratable levels, ability to prolong indefinitely) and avoids their respective disadvantages (spinal: single-shot nature, unpredictable level of blockade; epidural: missed segments, incomplete motor block, poor sacral spread, local anaesthetic toxicity) [9,10].

Preservation of renal function intraoperatively depends on maintaining an adequate intravascular fluid volume and minimizing drug-induced cardiovascular depression. The presence of risk factors like, hypotension due to anaesthetic drugs or techniques and hypovolemia due to bleeding may cause hypoxic injury to the kidneys resulting in acute tubular necrosis and later acute renal failure [7,11]. Intravenous fluids were titrated to maintain a CVP of 8-10 cm of water and adequate urine output as our patient had LVH, thus reduced left ventricular compliance, which might result in pulmonary oedema even with small increase in left ventricular volume.

A prospective study on 526 patients demonstrated that chronic renal disease confers substantially increased risk of postoperative morbidity in homogeneous, elective, moderate risk orthopedic surgery [12]. A recent meta-analysis of 31 cohort studies demonstrated that CKD (chronic kidney disease) conferred increased risk of postoperative

death and cardiovascular events in noncardiac surgical patients compared with those with preserved renal function [13].

CONCLUSION

The presence of renal disease has important implications for patients undergoing surgery and anaesthesia. Asymptomatic patients scheduled for surgery need a thorough evaluation in view to screen for associated conditions and to prepare to combat the events which may lead to unwanted complications.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Jan 03, 2014**

Date of Peer Review: **Feb 17, 2014**

Date of Acceptance: **Apr 16, 2014**

Date of Publishing: **Jul 20, 2014**