
Laparoscopic Adrenalectomy In A Patient With Nephrotic Syndrome

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Abstract

During the last two decades laparoscopic surgery has become a widely practiced procedure. Laparoscopic adrenalectomy for adrenal tumor excision is one of these new applications, The Anaesthesia related implications are critical and note-worthy in the presence of long standing essential hypertension and nephrotic syndrome with poly-pharmacy.

OBJECTIVES: To report the first anesthesia for laparoscopic adrenalectomy in Security Forces Hospital in Riyadh.

SETTING: Tertiary Care Security Forces Hospital in Riyadh.

PATIENT: A 58 years old Saudi woman diagnosed with essential hypertension, nephrotic syndrome, non insulin dependent diabetes mellitus (NIDDM), and right adrenal tumor, with the provisional diagnosis of pheochromocytoma.

INTERVENTIONS: General anesthesia, thoracic epidural, control of hypertension with both alpha and beta blockers, and selective Surgical ICU admission for monitoring and pain relief.

MEASUREMENT AND THE MAIN RESULTS: Preoperative ultrasound and MRI, MIBG scan of the adrenals, catecholamines serum level, intraoperative direct cardiovascular pressure measurements using Swan-Ganz catheter and arterial line. Pain control was achieved by using epidural narcotics, measurement of blood glucose, blood gases, urea, creatinine and electrolytes. Adequacy of ventilation was monitored by capnography and pulse oximetry. The surgical procedures included right adrenalectomy and cholecystectomy.

CONCLUSION: Anaesthesia for laparoscopic adrenalectomy has special problems to be solved specially in relation to pneumoperitonium effect, poly-pharmacy and the current disease state. The use of modern anesthetic agents, cardiovascular monitoring, ventilation and proper analgesia make the hospital stay short, thus ensuring low morbidity and minimal mortality.

INTRODUCTION

The wealth of experience in laparoscopy from clinicians across the world has proved that this new technique is safe with reduced incidence of severe pain. The procedure is less expensive and the patient resumes his normal life within a short time thereafter. However it also presents special problems like complications of insufflation of carbon dioxide and its reabsorption to the blood, embolization, and the cardiovascular effects which occur due to the increased intra-abdominal pressure. To the best of our knowledge there is only one report in medical literature mentioning removal of pheochromocytoma in a patient on long term hemodialysis.

We describe the anaesthetic management in a case of nephrotic syndrome with diabetes and hypertension that warranted laparoscopic adrenalectomy, probably the first in the kingdom of Saudi Arabia.

CASE REPORT

A 58 year old Saudi obese woman was seen in the nephrology clinic at SFH, and diagnosed and on continuous treatment since 20 years for essential hypertension, non insulin dependent diabetes mellitus (NIDDM) since fourteen years, nephrotic syndrome since 4 years, and cholelithiasis. Investigations were directed towards secondary causes of hypertension like renal artery stenosis and adrenal tumors

including pheochromocytoma. Clinically she had general oedema, ascites, anaemia, hypoalbuminemia, hyponatremia, uremia, high serum creatinine and proteinuria. Catecholamine blood level; measured on two occasions (Reference laboratory: JSPS London) indicated noradrenaline 6.4 nmol/l (normal range 2-6 nmol/l) and adrenaline 0.39 nmol/l (normal range 0.1-5 nmol/l). Urinary catecholamines /24h, revealed Noreadrenaline 212 umol /24h, Adrenaline 18 umol/24h, and Dopamine 1335 Umol/24h. A kidney biopsy demonstrated immune complex mediated glomerulopathy complicating diabetic nephropathy. The ultrasound scan of the kidneys, adrenals, Magnetic Resonance Imaging (MRI) and Metaiodobenzylguanidine (MIBG) nuclear scanning demonstrated a solid mass lesion in the right suprarenal area probably tumor within the right adrenal which measured 38 mm. Otherwise the other organs of the abdomen looked normal [fig 1;a,b,c,&d]. EKG showed evidence of ST segment depression, with left ventricular hypertrophy. Echocardiogram was normal. Examining the back showed marked lordosis.

PRE-ANESTHESIA PREPARATION

The preoperative preparation included Alpha-adrenergic blockers prazosin (15 mg), Beta-blockers atenolol 100mg, adalat 60 mg, Lasix 80 mg, clonidine 150 mg and prednisolone 30 mg daily. This regime had optimized the blood pressure which was at the morning of the operation 160/80 Torr. and no changes in these parameters were noted during the period 72 hours before the day of surgery. However, hyponatremia was present.

ANESTHETIC MANAGEMENT

INTRAOPERATIVE MANAGEMENT

The anesthetic management included preoperative diazepam 10 mg orally 3 h before surgery, 5 mg iv midazolam in induction room. attaching the EKG leads, oximetry, insertion of radial artery catheter. Swan-Ganz catheter for CVP, PAP. and PAWP. A thoracic epidural catheter was inserted at T9-T10. Other monitored parameters included FiO₂, capnography, and body temperature. The induction was gradual and fentanyl 100 ug, Thiopentone 210 mg, and intubation was facilitated by atracurium 40 mg. Xylocaine 1% intravenously was given to suppress the laryngoscopy and intubation response. Also, topical lignocaine 10% was administered over the larynx, vocal cords and in the trachea. Maintenance of the anaesthesia was achieved by adding

isoflurane to 50:50 oxygen nitrous oxide mixture, 200 ug of fentanyl intravenously during the length of the surgery in intermittent doses and 100 ug of fentanyl epidurally. Muscle relaxation was maintained by infusion of atracurium 10 ug/kg/min. The course of the anaesthesia was uneventful. Fluctuation in blood pressure was minimal and adjusted by deepening of the anaesthesia, and guided by CVP, and PCWP reading a pressure of 10-12 mmHg and 15-20 mmHg respectively was maintained and infusion of plasma protein 5% 500 ml, albumin 20% 100 ml, and whole blood 300 ml were administered.

OPERATIVE TECHNIQUE

The patient was placed in the right nephrectomy position with table bridge at the level of the left flank. Then he was strapped to the table and placed in a 45° anti-Trendelenburg position with 30° tilt to the left. Pneumoperitonium was established through a Veress needle introduced at the mid-clavicular line below the costal margin. Then, a 10 mm port was introduced in the mid line above the umbilicus at a 30° angle. Subsequent 4 ports were introduced under direct vision. The liver and gall bladder were retracted cephalad while the other viscera retracted downward, medially exposing the retroperitoneal area at the superior pole of the right kidney. The right adrenal gland was exposed through the perinephric fat after dissecting the retroperitoneal covering. Dissection of the adrenal gland started laterally and proceeded toward the inferior vena cava in order to expose the central draining veins. Small vessel bleeding was controlled by diathermy while the medium size vessels were divided between metal clips. The whole gland was mobilized and dissected free and placed into an endo-bag. The gall bladder which contained several stones was also removed laparoscopically and placed in an endo-bag [fig. 2,3,&4]. Haemostasis was secured and the endo-bags were removed through one of the 10 mm ports opening and the port openings were closed with skin clips.

INTENSIVE CARE MANAGEMENT

POSTOPERATIVE MANAGEMENT

At the end of the procedure, the patient was awake and extubated and transferred to the SICU for further management and monitoring. During the next five hours in the post operative period, the blood pressure tended to rise which necessitated the infusion of Na nitroprusside 4 ug/Kg/min. CVP and PCWP readings were reflecting good filling and at no time hypotension occurred. The urine output showed diuresis at rate of 200 ml/h and that continued for 18

hours post operatively. Hyponatremia improved, urea and creatinine decreased. Early mobilization, incentive spirometry and chest physiotherapy were repeated at 2-hour intervals. The patient needed minimal epidural narcotics consisting of 3 mg of morphine in 10 ml saline /12 h. On the morning of the second postoperative day the patient was mobile, pain free, and started a soft diet.

Discussion A case of long standing hypertension, with finding of a suprarenal mass should alert the clinician to the possibility of pheochromocytoma, which constitutes a serious risk for the patient posted for surgery (1). The control of the blood pressure peri-operatively was a major concern to the managing team. Two approaches are described in literature, the use of alpha (2,3) and beta sympathetic blockade(4,5), or Magnesium sulfate infusion.(6). If blood pressure is fluctuating Na nitroprusside is used for hypertension, and norepinephrine infusion if hypotension occurred after removal of the tumor. In this case blood pressure intra-operatively was controlled simply by the balanced anaesthesia technique adjusting isoflurane inhaled concentration and using thoracic epidural for pain relief. The manipulation of the mass by the surgeon did not affect the blood pressure, after recovery from anaesthesia the blood pressure raised to 190/110 Torr in the post operative period, which indicated the use of Na nitroprusside.

Pheochromocytoma was a working diagnosis since all the clinical and scan information made it a distinct possibility and the anaesthesiologist was preparing himself for this possibility. Nephrotic syndrome added a new dimension with regard to the fluid therapy and the amount of the fluid in the body (ascites and edema fluid). The use of direct cardiovascular pressure measurements helped in controlling the fluid balance. Laparoscopy in this obese patient with ascites calls for more attention and steps to guard against the complications (7). It is known that pneumoperitonium affects the lung function tests and cardiac functions adversely, since it affects the diaphragmatic functions. The resorption of carbon dioxide from the peritoneum may demand greater rate of elimination, capnography alone does not reflect the extent of blood carbon dioxide level. Our technique involved close monitoring of the blood gases, saturation and capnography. The controlled ventilation was adjusted to prevent hypercarbia and acidosis, or hypoxemia. The choice of anesthetic agent was in accordance with the drugs suitable for quick recovery from anaesthesia e.g. isoflurane, and drugs non-dependent on urinary excretion such as atracurium which does not interact with the drugs used to control the blood pressure which helped in cardiovascular

stability (8,9,10,11,12,13). In renal compromised patient the reduction of preload, Alph adrenergic blockade and adequate analgesia would assure the haemodynamic stability (14).

CONCLUSION

Laparoscopic adrenalectomy was well tolerated in this compromised patient although many co-existent diseases complicated the picture. The precautions taken against the effects of pneumoperitonium and careful monitoring of the cardiovascular and respiratory parameters as well as the use of post operative SICU admission helped to shorten the patient's post operative recovery and ultimately ensure a good outcome.

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References

1. Sutton M.G., Sheps S.G., Lie J.T. Prevalence of clinically unsuspected pheochromocytoma. Review of a 50-year autopsy series. *Myo Clin Proc* 1981;56(6):234-60.
2. Roizen M.F., Hunt T.K., Beaupre P.N., Kremer P., Firmin R., Chang C.N., Alpert R.A., Thomas C.J., Tyrell J.B., Calahan M.K. The effect of alpha-adrenergic blockade on cardiac performance and tissue oxygen delivery during excision of pheochromocytoma. *Surgery* 1983;94(6):941-5.
3. Crosse H., Schroder D., Schober O., Hausen B., Drakke H. The importance of high-dose alpha receptor blockade for blood volume and haemodynamics in pheochromocytoma (German text). *Anaesthesist* 1990;39(6):313-8.
4. Zakowski M., Kaufman B., Berguson P., Tissot M., Yarmush I., Turndorf H. Esmolol use during resection of pheochromocytoma: report of three cases. *Anesthesiology* 1989;70(5):875-7.
5. Mihm F.G., Sandhu J.S., Brown M.D., Rosenthal M.H. Short-acting beta-adrenergic blockade as initial drug therapy in pheochromocytoma. *Crit. Care Med.* 1990;18(6):673-4.
6. Drolet P., Girard M. The use of magnesium sulfate during surgery of pheochromocytoma: apropos of 2 cases (French text) *Can J Anaesth* 1993;40(6):521-5.
7. Cali R.W. Laparoscopy. Symposium on modern technique in surgery *Surg Clin North Am* 1980;60(20):407-24.
8. de Grood P.M., Harberts J.B., van Egmond J., Crul J.F. Anaesthesia for laparoscopy. A comparison of five techniques including propofol, etomidate, thiopentone and isoflurane. *Anaesthesia* 1987 42(8):815-23.
9. Van Hemelrijck J., Smith I., White P.F. Use of desflurane for outpatient anesthesia. a comparison with propofol and nitrous oxide. *Anesthesiology* 1991;75(2):197-203.
10. Ding Y., Fredman B., White. Use of mivacurium during laparoscopic surgery: effect of reversal drugs on post operative recovery. *Anesth Analg* 1994;78(3):450-4.
11. Waldvogel H.H., Schneck H.J., Felber A., Von Hundelshausen B. Anesthesia relevant features of laparoscopy- the value of capnography (German text) *Anesthesiol Reanim* 1994;1914-10.

12. Bailie R., Craig G., Restall J. Total intravenous anaesthesia for laparoscopy. *anaesthesia* 1987;44(1):60-3.
13. Ciofolo M.J., Clergue F., Seebacher J., Lefebvre G., Viales P. Ventilatory effects of laparotomy under epidural anesthesia. *Anesth Analg* 1990;70(4):357-61.

14. Sollazzi L., Perilli V., Crea M.A., Bellantone R., Meo F., Sciarra M., Pariante R., Ranieri R. Anaesthetic management of pheochromocytoma in long term hemodialysed patient. *Acta Anaesthesiol Belg* 1994;45(1):13-7

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