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Laparoscopic Adrenalectomy for Giant Aldosterone-Producing Adenoma (Conn Syndrome): Case Report with Video Presentation

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1. Abstract

1.1. Aims: Primary Hyperaldosteronism (PH) (Conn syndrome) is a condition of Hypertension (HT) episodes due to an adrenal cortex tumor secreting excessive aldosterone. Primary Hyperaldosteronism (PH) should be suspected when hypokalemia is detected in a patient with HT. The common treatment approach in unilateral adenomas is adrenalectomy.

In this article, we aimed to present a case of laparoscopic adrenalectomy for symptomatic PH due to giant adenoma (resistant to medical therapy), together with its video.

1.2. Results: A 51-year-old female presented to our outpatient clinic with the complaints of weakness, myalgia, headache and intermittent HT episodes. For resistant HT, she had been receiving three different antihypertensive medications including a diuretic agent. Physical examination was unremarkable. Further laboratory tests revealed hypokalemia (2.8 mEq/L) and elevated serum aldosterone level (22.7 ng/dL). A mass with the diameter of 42x30x55 mm in right adrenal gland was detected with abdominal computed tomography (CT). According to these findings, unilateral adrenalectomy was planned with the diagnosis of aldosterone-producing adenoma. After starting mineralocorticoid antagonist (spironolactone) and treating hypokalemia during the preoperative preparation, laparoscopic right adrenalectomy was performed.

1.3. Conclusion: Effective treatment of HT due to PH is adrenalectomy. Laparoscopic adrenalectomy is a safe approach in adenomas larger than 2 cm, with successful outcomes.

2. Introduction

Primary Hyperaldosteronism (PH) (Conn syndrome) is a condition of Hypertension (HT) episodes due to an adrenal cortex tumor secreting excessive aldosterone [1]. Although the patients are usually asymptomatic; fatigue, muscle weakness, cramping (secondary to potassium wasting), headaches and palpitations also occur [1]. Primary hyperaldosteronism should be suspected when hypokalemia is detected in a patient with HT. Normal serum potassium levels may be found in about 38% of the PH cases [2]. The common treatment approach in unilateral adenomas is adrenalectomy. The success rate of achieving the normal blood pressure with unilateral adrenalectomy in patients with a single adenoma has been reported between 30% and 60%, however, this cure rate is quite lower (19%) after unilateral or bilateral adrenalectomy in patients with idiopathic hyperaldosteronism [2].

In this article, we aimed to present a case of Laparoscopic Adrenalectomy (LA) for symptomatic PH due to giant adenoma (resistant to medical therapy), together with its video.

3. Case Presentation

A 51-year-old female presented to our outpatient clinic with the complaints of weakness, myalgia, headache and intermittent HT episodes. For resistant HT, she had been receiving three different antihypertensive medications including a diuretic agent. She had a history of pulmonary tuberculosis and no past surgical history. Physical examination was unremarkable. Further laboratory tests revealed hypokalemia (2.8 mEq/L) and elevated serum aldoste-

rone level (22.7 ng/dL). Hypokalemia was highly resistant to the treatment, and Aldosterone to Renin Ratio (ARR) was 227 (normal level<25). The 24 hours urine aldosterone level was checked to confirm hyperaldosteronism, which resulted in level of 91 mcg/day (normal range: 1.2-28.1). A mass with the diameter of 42x30x55 mm in right adrenal gland was detected with abdominal Computed Tomography (CT). According to these findings, unilateral adrenalectomy was planned with the diagnosis of aldosterone-producing adenoma. After starting mineralocorticoid antagonist (spironolactone) and treating hypokalemia during the preoperative preparation, laparoscopic right adrenalectomy was performed (Video).

The patient was discharged uneventfully on the second postoperative day. Her blood pressure improved during the early postoperative period. She has been followed up for 26 months and has not developed any additional problems.

Written informed consent was obtained from the patient for the publication of this case report and any accompanying images.

4. Discussion

This case is unique since it is the second largest adrenal adenoma with PH presented in the English language literature.

Aldosterone producing adenoma, bilateral idiopathic adrenal hyperplasia, aldosterone-producing adrenal carcinoma and familial aldosteronism are the causes of PH [2]. Their size is usually 1-3 cm, and they rarely reach large diameters [3]. The largest aldosterone-producing adenoma was 7.5 cm and reported by Horii et al [4]. The incidence of carcinoma increases with age and the most important clinical symptom is resistant HT [5]. What is meant by resistant HT is that systolic blood pressure higher than 140 mmHg and/or diastolic blood pressure higher than 90 mmHg despite receiving at least three antihypertensive medications from different drug classes [6].

The most sensitive test for the diagnosis of PH is ARR. Then, one of the tests of oral sodium loading, saline infusion, fludrocortisone suppression, or captopril challenge tests should be performed for the confirmation [7]. All patients with PH should undergo CT or MRI to rule out adrenocortical carcinoma and to differentiate between adenoma-hyperplasia [7, 8]. In addition, routine evaluation of micro albuminuria and left ventricular hypertrophy is recommended in all patients with HT [9]. Furthermore, target organ – especially kidney and heart- damage should be assessed in these patients before the operation since they are more likely to develop in PH than in primary HT [10].

In addition to these tests, AVS may be required when the adenoma is too small (< 1cm) or the diagnosis is suspected [11]. However, AVS was not recommended in the 2016 Endocrine Society Clinical Practice Guideline for the young (< 35 years) patients with typical biochemical changes in blood tests (hypokalemia and significant aldosterone elevation) and unilateral adrenal lesion suggestive for a cortical adenoma on imaging methods [12].

In here presented case, the tumor size was 55 mm and the patient had been receiving triple antihypertensive therapy for 4 years. Hypokalemia and elevated serum aldosterone level was resistant to the treatment. The tumor was localized accurately with CT and the imaging findings were consistent with a cortical adenoma.

Main purpose of the treatment is to abolish hyperaldosteronism, since prolonged exposure to the elevated aldosterone results in vital cardiovascular complications (e.g., left ventricular hypertrophy, arterial wall stiffening, metabolic syndrome, renal damage, myocardial infarction and atrial fibrillation).The treatment approach is determined according to the patient's clinic manifestation and the etiology of the tumor. The common approach is adrenalectomy in aldosterone-producing adenoma and unilateral PH variants, whereas mineralocorticoid receptor antagonist (spironolactone and Eplerenone) is indicated for the patients who do not accept surgery, have a bilateral disease or cannot be cured with surgery [3]. Improvement after medical treatments is slower and minor than it is after surgery. Open, laparoscopic or robotic adrenalectomy with an anterior, lateral or posterior approach can be performed in patients who are scheduled for surgery, after the tumor is localized and the serum potassium and renin levels are corrected with the mineralocorticoid antagonist [8]. Today, laparoscopy is the most frequently used technique due to its lower morbidity, shorter length of hospital stay, lower rates of postoperative ileus, less postoperative pain and lower costs [12].

Treatment success is influenced by the factors such as age, sex, anti-hypertensive drug dose, duration of HT, comorbidity and renal insufficiency [12]. Hypokalaemia (if present before surgery) improves in almost all patients after an adrenalectomy with the correct indication [13]. In addition, complete improvement in HT has been reported to be achieved in 55% of the patients and partially in 36% [13]. In 2017, Primary Aldosteronism Surgical Outcome (PASO) study showed that most patients (94%) achieved complete biochemical success; however, clinical success (defined as normotensive after ceasing all antihypertensive drugs) was obtained in less than half (37%) of the patients [14]. Sellgren et al. (in 2020) reported the rates of complete biochemical and clinical success after surgery as 92% and 34%, respectively [15].

After the appropriate preoperative preparation, LA was performed in our case without any complications. Hypokalemia and HT improved in the early postoperative period. During the 26 months of follow-up, no late complications were encountered.

5. Conclusion

Effective treatment of HT due to PH is adrenalectomy even in patients dependent on multiple antihypertensive drugs. Although, laparoscopy has been accepted as a feasible approach since most adenomas are small in size, LA can also be performed safely and successfully in unusual cases with larger adenoma size.

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