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Composite Pheochromocytoma in Patients with Surgical Removal of Tumours in the Adrenal Region

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ABSTRACT

Pheochromocytoma remains an endocrine enigma to diagnose and treat in spite of striking advances in chemical assaying, radio-imaging and simultaneous better understanding of the pathophysiology and its varied clinical presentations, advances in antihypertensive drug therapy and anesthetic and surgical techniques. To study clinical presentation, methods of diagnosis and management of pheochromocytoma, with aim to determine whether; Clinical diagnosis was established prior to surgery. This observational study was conducted in the Department of Endocrinology and Oncology, at Tertiary care Hospital, Bangalore, Karnataka. In addition to hypertensive crisis (systolic blood pressure >220 mmHg and/or diastolic blood pressure >120mmHg) and/or hypotension (systolic blood pressure <90 mmHg and/or diastolic blood pressure <60 mmHg), PPGL crisis was defined as the acute and severe presentation of catecholamine-induced hemodynamic instability causing end-organ damage or dysfunction. Some patients (25%) had extra adrenal Pheochromocytoma (paragangliomas), rest all (75%) had adrenal with one bilateral. All four had histology consistent with pheochromocytoma. Along with that 25% patients having all clinical evaluations suggestive of nonfunctioning adrenal tumor had operative complications with histology proving pheochromocytoma. High index of suspicion in patients with clinical features suggestive is required for early diagnosis of this medically challenging problem. In spite of striking advances in diagnostic methods there still remains considerable difficulty and delay in establishing diagnosis, thus leading to adverse clinical implications. Nuclear Imaging with newer tracer materials are promising, although sensitivity and specificity has to be established with larger series.

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Key Words

Phenochromocytomas and paragangliomas, ganglioneuroblastoma, adrenal gland and hemodialysis

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INTRODUCTION

Unusual neuroendocrine tumors such as phenochromocytomas and paragangliomas (PPGLs) originate from the extra-adrenal neural crest progenitors and the chromaffin cells of the adrenal medulla, respectively. Both of these cells have the ability to release catecholamines[1,2]. Diagnosing PPGL can be quite difficult because of its nonspecific and highly varied clinical presentation. A few patients exhibit the traditional triad of tachycardia, diaphoresis, and episodic headache. Others, on the other hand, exhibit asymptomatic, local tumors symptoms such stomach pain, paroxysmal or continuous hypertension, or neither[3,4] However, patients do occasionally have a PPGL crisis, which is characterized as an immediate, severe manifestation of hemodynamic instability caused by catecholamines that results in end-organ damage or dysfunction[5,6]. A PPGL crisis's constellation of symptoms might be mistaken for other potentially fatal illnesses, such as septic shock, heart failure, thyroid storm and malignant hyperthermia[7,8]. It is crucial to identify the symptoms and signs of PPGL and make the right diagnosis because it is an endocrine emergency with a notable 15% death rate. In this study, effort to assess potential triggers and the clinical progression of the crisis.

MATERIALS AND METHODS

This observational study was conducted in the Department of Endocrinology and Oncology, at Tertiary care Hospital, Bangalore, Karnataka. In addition to hypertensive crisis (systolic blood pressure >220 mmHg and/or diastolic blood pressure >120 mmHg) and/or hypotension (systolic blood pressure <90 mmHg and/or diastolic blood pressure <60 mmHg), PPGL crisis was defined as the acute and severe presentation of catecholamine-induced hemodynamic instability causing end-organ damage or dysfunction. Clinical characteristics including sex, age, pre-existing PPGL symptoms, mutation status, family history, crisis-precipitating factors, laboratory findings, radiologic imaging, clinical course and treatment of the PPGL crisis were collected. All the study was conducted after taken approval from Institutional Ethics Committee (IEC) and the participants were recruited after obtained consent form.

RESULTS AND DISCUSSIONS

(Table 1) illustrates the age range was 16-62 years and the patients were worked up and referred, one (25%) incidental and one presented with hypertensive encephalopathy, work up confirmed diagnosis. Three (75%) had clinical features suggestive, leading to investigations. Three (75%) were hypertensive requiring treatment and were medically prepared for surgery with alpha blockers. All had urinary catecholamine analysed with three (75%) true positive and one false negative. PET Ga 68- Diatonic performed in two, with positive predictability of 50%. All were operated with no mortality. The 4th patient with false negative biochemistry, normal BP and false negative PET had an hypotension, bardycardia and pulmonary oedema during the surgery. One (25%) had extra adrenal Pheochromocytoma (paragangliomas), rest all (75%) had adrenal with one bilateral. All four had histology consistent with pheochromocytoma. The one (25%) patient having all clinical evaluations suggestive of nonfunctioning adrenal tumour had operative complications with histology proving pheochromocytoma. The three patients are regular to follow up with negative urinary biochemistry on at least two interval samples.

In this study A description of PPGL crisis patients is given. In one tertiary referral center for PPGL patients in the Netherlands, we find that the frequency of PPGL crisis was 3.02% among PPGL patients. The incidence that we report is less than the 7-18% th at previous studies have reported. According to a recent multi center retrospective assessment reported 11% of PPGL patients experienced a catecholamine crisis. However, two further retrospective investigations involving patients who had PPGL surgery revealed an incidence of 18% and 7%[9]. In contrast to other studies that found a prevalence of syndromic PPGL in their cohorts ranging from 14-21%, our study suggests a greater prevalence of syndromic PPGL[10,11]. The patients with syndromic PPGL are provided with yearly clinical evaluations, routine biochemical screening for excess metanephrine and radiological imaging examinations for PPGL[12]. This may lead to a comparatively high rate of early-stage and asymptomatic PPGL identification. Patients who were evaluated for PPGL due to a genetic susceptibility were found to have smaller tumours and lower urinary catecholamine excretion rates than those who presented with symptoms of PPGL[13,14]. The presumably leading to reduced preoperative problems, including crises and more easily accessible surgical resection of the smaller PPGLs. The PPGL crisis's typically sudden, nonspecific symptoms might make diagnosis difficult[15,16]. Often, the difference in the clinical picture raises the possibility of another diagnosis, most commonly sepsis. Given that PPGLs

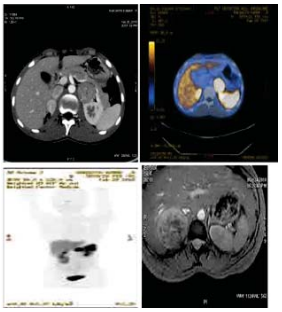

Fig. 1: Computed tomography images enhanced with contrast that display bilateral adrenal tumours

Table 1: Subject's characteristics

Contents	1	2	3	4
Age (years)	42	62	16	40
Sex	F	M	M	F
Presentation (suggestive)	Yes	Yes	Yes	No
Hypertension	Yes	Yes	Yes	No
Biochemistry	++	++	++	-- ve
Radiology	Extra Adrenal (L)	Adrenal (R)	Both Adrenals	Adrenal (R) tumor
Diagnosis	Pheo (extra adrenal)	Pheochromocytoma	Pheo (bilateral)	Nonfunctioning Adrenal Tumor (benign)
Histology	Pheo (extra Adrenal)	Pheochromocytoma	Pheohromocytoma	Pheochromocytoma

commonly resemble other illnesses, patients presenting with multiple organ failure, inexplicable lactic acidosis, unexplained shock or left ventricular failure, or hypertensive crisis should be evaluated for PPGL crisis, particularly if the patient is also feverish[17,18]. To increase survival, prompt diagnosis and confirmation must be followed by the best possible care. While there are certain general ways to care that are required, each patient must have their unique treatment decisions customized based on the severity of their crisis and the organ systems that are affected.

CONCLUSION

High index of suspicion in patients with clinical features suggestive is required for early diagnosis of this medically challenging problem. In spite of striking advances in diagnostic methods there still remains considerable difficulty and delay in establishing diagnosis, thus leading to adverse clinical implications. Nuclear Imaging with newer tracer materials are promising, although sensitivity and specificity has to be established with larger series.

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