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Case Report

Retroperitoneal Extra-Adrenal Paraganglioma

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Abstract

Extra-adrenal paragangliomas (EAP) are rare endocrine tumors arising from embryonic neural crest cells. Paragangliomas are mainly composed of chromaffin cells located along the paravertebral and para-aortic axes, extending from the cervical region to the base of the pelvis. Extra-adrenal paragangliomas (EAP) account for only 10-15% of all paragangliomas of which 85%are located in the retroperitoneum, commonly arising from the organ of Zuckerkandl.

Functional paragangliomas secrete catecholamines which clinically may present with headache, sweating, palpitation and symptoms of hypertension. Non-functional may remain silent and present with vague symptoms like pain in abdomen.

Herein, we report a case of extra-adrenal paraganglioma (EAP) in a 26-year-old male who presented with headache and abdominal pain. On the basis of clinical suspicion, raised Vanyl Mandelic Acid (VMA) level and radiological findings diagnosis of extra-adrenal paraganglioma (EAP) was made. Preoperative blood pressure (BP) was well controlled and operated successfully for exploratory laparotomy and excision of tumor. Post-operative recovery was un-eventful. Finally histopathological findings confirmed the clinical and radiological diagnosis of extra-adrenal paraganglioma (EAP).

Herein, we emphasize the importance of an accurate and prompt diagnosis of extra-adrenal paragangliomas (EAP) in patients to reduce the morbidity and mortality.

Key words: Catecholamines, Extra-adrenal paragangliomas, Vanyl Mandelic Acid (VMA).

Introduction

Extra-adrenal paragangliomas (EAP) are relatively rare and account for 10-15% of all adult paraganglioma with an incidence rate of 2-8 cases per million people / year.[1]

They can be located in any portion of the paraganglion system, from the upper cervical region to the pelvis. 85% are located in the retroperitoneum and most commonly present in the organ of Zuckerkandl at the aortic bifurcation.[2]

They are usually seen in the second and third decades and both sexes are equally affected. They are often multicentric and more likely to be malignant.[3]Few of the paragangliomas which secrete catecholamines are termed as functional paragangliomas and so patients present with clinical manifestations like headache, sweating, palpitation and symptoms of hypertension. Non-functional paragangliomas do not secrete catecholamines and remain silent. Such patients present with vague symptoms like abdominal pain which makes the diagnosis difficult sometimes.[4]

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Extra-adrenal paragangliomas (EAP) can be one of the causes of secondary hypertension in younger patient and the presence of tumor can often lead to fatal outcome like cardiovascular or cerebrovascular complications. Therefore a thorough evaluation is mandatory in young patients who complain of headache and pain in abdomen.[5] Pre-operative investigation like ultra-sonography (USG), CT scan, MRI and 24 hours urinary VMA levels may help in achieving the correct diagnosis and to decrease the lethal consequences.

Herein, we present a case report of extra-adrenal paraganglioma (EAP) in a 26-year-old male patient who presented with headache and abdominal pain which was treated successfully by open surgical removal of tumor. The importance of the detection of this tumor is that over 90% of patients properly diagnosed and treated are curable.[6]

Case Presentation

A 26-year-old male presented with complaints of severe intermittent headache of 2-3 months duration. He had complaints of blurring of vision and pain in abdomen since 2 days. He gave no history of fever, vomiting and altered bowel habits. On clinical examination no abdominal mass was palpable. He had diagnosed hypertension 6 months back and was taking treatment. On examination his blood pressure was 146/98 mm of Hg. The rest of physical examination was unremarkable. Abdominal ultrasonography revealed well defined, oval, solid, hypoechoic, soft tissue lesion seen in left infrarenal para-aortic location measuring 4.5x3.4x3.0 cm. it shows mild vascularity. Abdominal CT scan revealed 34x32mm sized lesion showing peripheral solid very brightly enhancing tissue and central necrotic area in left paraaortic region inferior to left renal vessels. [Figure 1]

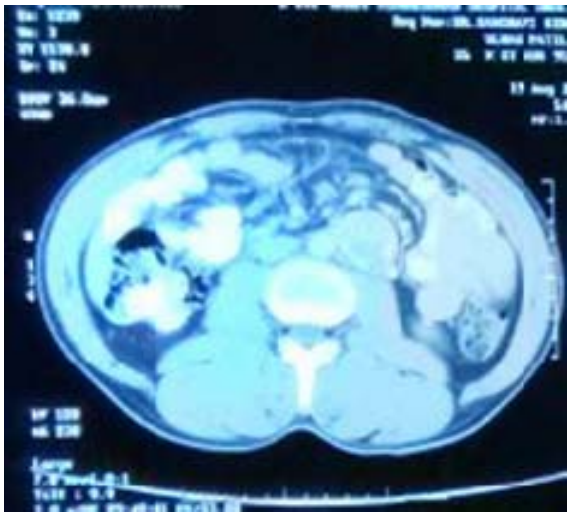

Figure 1-: CT scan of abdomen showing a hypervascular left para-aortic retroperitoneal mass.

Simultaneously, serum and urine catecholamine levels were performed and 24 hours urinary VMA level was raised (36.3mg/g). Clinically and biochemically diagnosed as paraganglioma. Pre-operatively patient was put on alpha blockers and his blood pressure was settled down. Exploratory laparotomy was done for excision of tumor under general anaesthesia. The resected tumor was sent for histopathological examination for confirmation. Intra-operative patient was stable and blood pressure was also maintained within normal limits.

Pathological findings: Gross: we received single, soft, irregular and well-encapsulated reddish mass measuring 7x4x3.5 cm. On cut section, mass was solid, homogenous and yellow-brown in color. (Figure-2)

Microscopy: Multiple serial sections showed a well encapsulated tumor arranged in cords, nests and trabecular pattern surrounded by a delicate capillary network (zellballen). Tumor cells were round to polygonal nuclei with fine stippled nuclear chromatin with abundant acidophilic cytoplasm. Few areas showed nuclear pleomorphism or bizarre nuclei and mitotic activity. Capsular and vascular invasion was not seen.(Figure 3a and 3b)

Figure 2-: Gross photograph showing externally solid and irregular reddish mass measuring 7x4x3.5 cm. On cut section, mass was solid, homogenous and yellow-brown in color.

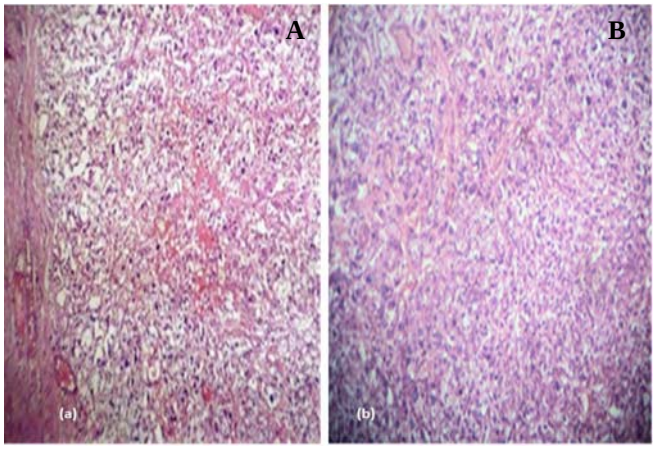

Figure3. (a) Multiple serial section revealed thickened capsule with tumor. Tumor arranged in nests, cords and trabecular pattern surrounded by a delicate capillary network (zell-ballen).(H & E , original magnification × 100). (b)Tumor cells are large to polygonal with granular eosinophilic cytoplasm. (H & E, original magnification, ×400)

Histopathological diagnosis was given as extra-adrenal paraganglioma. Post-operative period was uneventful over 8 months of follow-up.

Discussion

Confusion about the terminology of pheochromocytoma and paraganglioma existed. The paraganglioma of adrenal medulla is traditionally termed as pheochromocytoma while the term extra adrenal paraganglioma is applicable to paraganglioma situated outside adrenal medulla.[4]

Paragangliomas are rare endocrine tumors that arise from paraganglionic cells, dispersed over the entire body ranging from the skull to the pelvic floor.[3] Majority of the paragangliomas occur in specific locations like the carotid body, jugular foramen, middle ear, aortico-pulmonary region, posterior mediastinum and abdominal para aortic region.[7]

85% of all extra adrenal paragangliomas are situated in the retroperitoneum; most commonly in between the origin of inferior mesenteric artery and the aortic bifurcation known as organ of Zuckerkandl.[2] In the literature less common sites reported are in the bladder, thorax, neck and pelvis.[8]in our case mass was seen in left infrarenal para-aortic region.

Various nomenclature s are given to paraganglioma arising from various sites like those arising from jugulotympanic body, carotid body and second part of duodenum are known as chemodectomas, carotid body tumor and gangliocytic paraganglioma.[2]

They are usually seen in the second and third decades and both sexes are equally affected. They are often multicentric and more likely to be malignant.[3] Paragangliomas can be functional when they secrete catecholamines and their metabolites in the blood and urine and may present with headache, sweating, palpitation and symptoms of hypertension. Nonfunctional paragangliomas are mostly asymptomatic and found incidentally or present as a mass with symptoms of surrounding organ compression.

The most common presenting symptoms of paragangliomas are hypertension (90-100%), headache (70-90%), palpitations (50-70%) and diaphoresis (60-70%). Other common symptoms include anxiety, chest pain, dyspnoea, fatigue, heat intolerance and focal neurological deficits. Fever, pallor, hyperglycaemia and vomiting are less commonly seen.[9]Our patient presented with headache, blurring of vision and abdominal pain for short duration.

The cause of hypertension of our young patient was extra-adrenal paraganglioma (EAP) and fortunately it was diagnosed and treated very early so we

emphasize the necessity of a thorough evaluation in young patients who complain of headache and pain in abdomen.

Biochemical investigation as elevated blood and urine catecholamines and their metabolites help in achieving the diagnosis. Our patient had high 24 hours urinary VMA levels which was(36.3mg/g).Imaging studies such as USG, CT scan, MRI and I^{131}MIBG scan are necessary in evaluating the location, extent and multifocality of disease as well as for the presence of metastatic disease. We did USG and CT scan of abdomen of our patient which shows typical features of paraganglioma.

Grossly paragangliomas are solid tumors and are partially or completely encapsulated with a thin capsule. The cut surface of the tumor is homogeneous, tan to red –brown in colour and vascular. Microscopically they are composed of chief cells which are polygonal or slightly spindled with an amphophilic or eosinophilic cytoplasm. The cells are arranged in nests (zellballen) with adjacent smaller sustentacular cells surrounded by abundant intervening capillaries. A few retroperitoneal paragangliomas are highly pleomorphic lesions made up of spindled or angular cells with deeply eosinophilic cytoplasm and large hyperchromatic nuclei.[4]

Unfortunately, no reliable clinical, biochemical or histological features distinguish a malignant from benign paragangliomas. Only extensive local invasion and distant metastasis to lung, liver, bone and lymph nodes have been used as indicators for malignancy. According to literature 20% of paragangliomas are reported to metastasize.[1]

20-50% of EAP are malignant in contrast to pheochromocytoma which are 10% malignant.[10] Though in our case tumor cells show diffuse growth, high nuclear pleomorphism, nuclear hyperchromasia and increased mitotic activity but it was interpreted as a benign tumor because there was no local invasion and distant metastasis. We did CT brain and which was normal or no abnormality. Definitive treatment is surgical removal of the tumor; however, pre and intra-operative medical management are extremely important leads to successful outcome and cure of the disease. Our patient was treated successfully by open surgical removal of tumor. An experienced anaesthetist and surgeon are crucial to the success of the operation. Histopathological examination remains the gold standard method for diagnosis of paraganglioma. Estimation of 24 hour urinary catecholamine 2-3 weeks after surgery gives idea about biochemical cure and also recurrence or metastasis in later post-operative period.

Conclusion

Retroperitoneal extra-adrenal paraganglioma (EAP) are relatively rare neuroendocrine tumors. It is fascinating and challenging to medical fields because it carries a high risk of morbidity and mortality if it is undiagnosed or untreated. Thus pre-operative assessment, intra-operative monitoring, surgical skill and finally pathological diagnosis achieve the successful outcome. Long term follow-up is mandatory, as the tumor is prone to recur and to metastasize.

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