Case Report

Aortoarteritis: Could it be a form of catecholamine-induced vasculitis?

Vijaya Sarathi, Anurag R. Lila, Tushar R. Bandgar, Nalini S. Shah

Department of Endocrinology, Seth G S Medical College, Parel, Mumbai, Maharashtra, India

ABSTRACT

Catecholamine-induced vasculitis is a well known but rarely described entity. However, aortoarteritis as a manifestation of catecholamine-induced vasculitis is not described in the literature. We have reported two patients in whom pheochromocytoma coexisted with aortoarteritis. Both patients were young females with history of bilateral pheochromocytomas in more than one first-degree relative. Both patients also had bilateral adrenal pheochromocytomas (second patient also had paraganglioma at left renal hilum) with elevation of plasma free normetanephrine levels. We conclude that there may be an association between pheochromocytoma and aortoarteritis, and that catecholamine excess may have a role in the etiopathogenesis of aortoarteritis in these patients.

Key words: Aortoarteritis, catecholamine excess, pheochromocytoma

Introduction

Pheochromocytoma is a tumor that arises from chromaffin cells. It has correctly been called as "The Great Masquerader" due to its protean manifestations and its many faces. The 81 manifestations of this tumor may challenge a physician's acumen because it can present in so many disguises, suggesting a large variety of diagnostic possibilities.[1] Still, there may be many unraveled manifestations of this disorder.

Catecholamine-induced vasculitis is a well known but rarely described manifestation of pheochromocytoma. Cerebral (pseudo) vasculitis, renal artery stenosis, coronary vasospasm and intestinal ischemia due to mesenteric vasospasm are the frequently described vascular and/or vasculitic manifestations of pheochromocytoma. Although medium-sized vessels are the most commonly involved, small vessel vasculitis (cutaneous leucocytoclastic vasculitis, which was glucocorticoid resistant but reversed promptly with excision of pheochromocytoma) is also described.[2] However, aortoarteritis (large vessel vasculitis) as a manifestation of catecholamine-induced vasculitis is not described in the literature. We report two cases of pheochromocytoma with aortoarteritis, where we propose a role for catecholamine excess status in the etiopathogenesis of aortoarteritis.

Access this article online	
Quick Response Code:	Website: www.ijem.in
	DOI: 10.4103/2230-8210.107874

Case Reports

Case 1

A 21-year-old lady, mother of two children, presented with recurrent episodes of palpitations, excessive sweating and dyspnea for 3 months. She had a family history of pheochromocytoma [Figure 1a]. On examination, she had hypertension in the right upper limb (160/100 mmHg) but pulses were feeble in the left upper limb and both lower limbs. Further evaluation revealed elevated plasma free normetanephrine (1405 pg/ml) with normal plasma free metanephrine (23 pg/ml). Computerized tomography (CT) of the abdomen showed bilateral adrenal pheochromocytomas. Magnetic resonance angiogram [Figure 2] showed dilatation of aortic root and the

Corresponding Author: Dr. Vijaya Sarathi, Department of Endocrinology, Seth G S Medical College, Parel, Mumbai – 400 012, Maharashtra, India. E-mail: drvijayasarathi@gmail.com

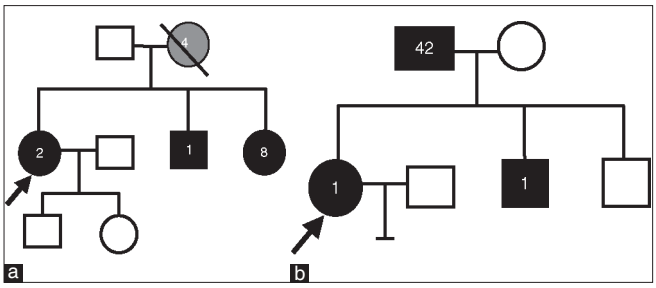

Figure 1: (a) Family pedigree of Case 1, (b) Family pedigree of Case 2 • Bilateral pheochromocytoma, • Left sided pheochromocytoma with pancreatic neuroendocrine carcinoma The numbers in squares and circles represent the age of diagnosis of pheochromocytoma in each affected member

proximal ascending aorta (largest diameter = 41 mm). Brachiocephalic trunk showed dilatation just before its bifurcation into the right common carotid artery and right subclavian artery, which were normal. The left subclavian artery was occluded from its origin. A short segment, high-grade stenosis of the celiac artery was seen at its origin. The right renal artery also showed a short segment stenosis in its middle part. Her erythrocyte sedimentation rate (56 mm/1st hour) was elevated while antinuclear antibody and rheumatoid factor were negative. After appropriate preoperative management (blood pressure was 130/86 mmHg on prazosin 20 mg/day and atenolol 50 mg/day), she underwent laparoscopic bilateral adrenalectomy. Postoperatively, she had hypocortisolism and was started on prednisolone (1 mg/kg/day) and fludrocortisone (50 μg/day). Currently, she is under regular follow-up by a cardiovascular surgeon and is normotensive on 10 mg/day of amlodipine.

Case 2

A 17-year-old girl presented with recurrent episodes of palpitation, headache and excessive sweating for 6 months, which were associated with abdominal pain, and dyspnea for the last 1 month. At the time of presentation to hospital, she complained of severe dyspnea, generalized body swelling and right-sided weakness for the last 3 days. Her blood pressure was 280/160 mmHg. Hypertension was initially managed with sodium nitroprusside infusion. Magnetic resonance imaging revealed hypertensive encephalopathy with infarct in the left middle cerebral artery territory. CT from head to pelvis showed bilateral adrenal pheochromocytomas and a paraganglioma at left renal hilum with calcification of abdominal aorta and coronary artery. CT angiogram showed thickening of the aortic wall with characteristic beading of aorta suggestive of aortoarteritis [Figure 3]. It also revealed calcification both common iliac arteries. Her erythrocyte sedimentation rate was normal while antinuclear antibody was negative. Her plasma free normetanephrine (1070 pg/ml) was elevated.

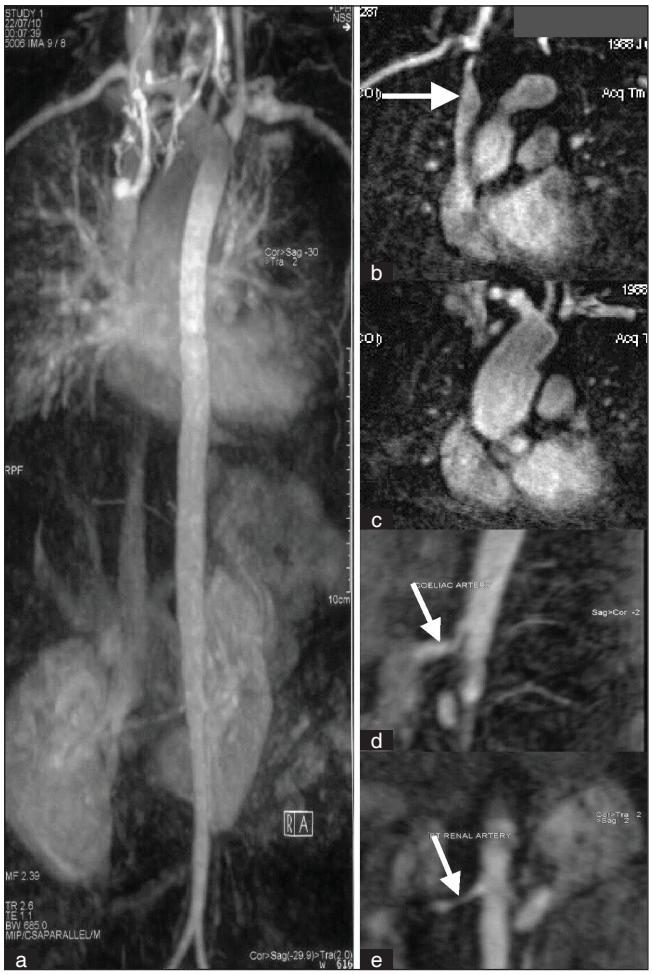

Figure 2: Magnetic resonance angiogram of Case 1 (a) showing dilatation of brachiocephalic trunk (b), dilatation of aortic root (c), stenosis of the celiac artery at its origin (d) and stenosis of right renal artery (e)

After appropriate preoperative preparation (blood pressure was 128/84 mmHg on prazosin 20 mg/day and atenolol 25 mg/day), she underwent right adrenalectomy, left cortical sparing adrenalectomy and excision of paraganglioma at left renal hilum. She had transient postoperative hypertension, which was managed on 5 mg of amlodipoine until 3 months after surgery. Postoperatively, she had normal serum cortisol (16 μg/dL) levels and did not require glucocorticoid or mineralocorticoid replacement. Three months after surgery, she was normotensive without antihypertensive medications. Family screening revealed bilateral pheochromocytomas in one sibling and her father [Figure 1b].

Discussion

We report two cases of aortoarteritis in patients with pheochromocytomas. Coexistence of these two conditions seems to be an association rather than a coincidence. Aortoarteritis in pheochromocytoma patients may be

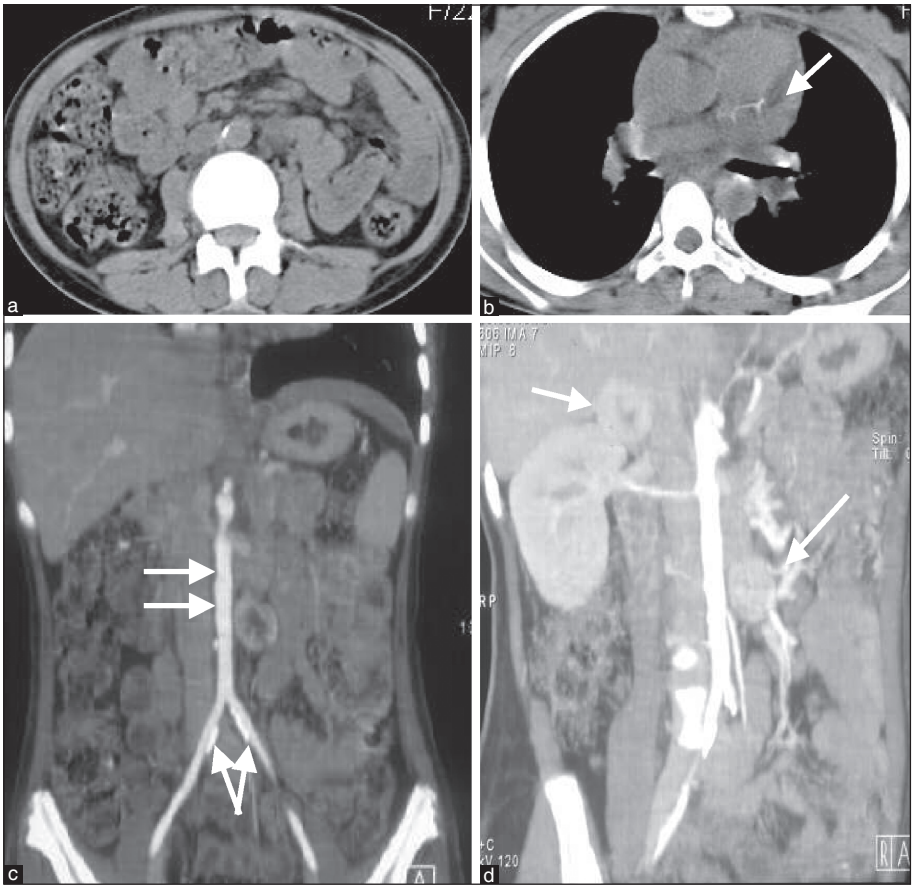

Figure 3: Computerized tomography of Case 2 showing calcification of aorta (a), calcification of coronary artery (b), beaded appearance of aorta on CT angiogram with calcification of both common iliac arteries (c) and right adrenal pheochromocytoma and paraganglioma at left renal hilum (d)

due to triggering of an autoimmune process by excess catecholamines. The first report of association between a catecholamine excess status and a vasculitis was published in 1989.[3] However, the coexistence of Bechet's disease and pheochromocytoma in this report was thought to be a chance phenomenon. This report was closely followed by another similar case where Behcet's disease symptoms were persistent even after high-dose steroids but rapidly resolved after excision of pheochromocytoma.[4] This observation suggested a definitive role for catecholamine excess in the pathogenesis of Bechet's disease. In addition, a few other reports have suggested a definitive role for catecholamine excess status in other autoimmune disorders such as systemic lupus erythematosus and rheumatoid arthritis.[5-7] Hence, we hypothesize that a similar mechanism might have operated in our patients, leading to aortoarteritis.

Pheochromocytoma has been described to be associated with cerebral vasculitis and renal artery stenosis (either permanent or transient) where catecholamine excess status has been implicated in their etiology.[8,9] In animal studies, adrenaline injections caused medial necrosis, destruction of the elastic lamellae and atrophic scarring of the walls of large vessels.[10] These changes may be associated with aneurismal dilatation and involvement of the medium-sized vessels. Catecholamine-induced vascular damage may be due to constriction of the vasa vasorum with resultant medial ischemia or the mechanical trauma to the vessel wall by the induced rise in blood pressure.[10] It appears that catecholamine excess status leads to direct damage to the vessel wall as well as triggering of autoimmune mechanism, both of which act in conjunction to produce aortoarteritis.

Both patients had elevated normetanephrine (suggesting excess production of norepinephrine) with normal metanephrine. Norepinephrine being a more powerful vasoconstrictor than epinephrine, it may also lead to more vascular damage. Hence, norepinephrine-secreting pheochromocytoma/paraganglioma patients may be at higher risk for all vessel-related complications including aortoarteritis.

In conclusion, we report two cases with coexisting pheochromocytoma and aortoarteritis where we have suggested a role for excess catecholamines in the etiopathogenesis of aortoarteritis.

References

1. Manger WM. The protean manifestations of pheochromocytoma. HormMetab Res 2009;41:658-63.
2. Kulp-Shorten CL, Rhodes RH, Peterson H, Callen JP. Cutaneous vasculitis associated with pheochromocytoma. Arthritis Rheum 1990;33:1852-6.
3. Oishi S, Koga B, Sasaki M, Umeda T, Sato T. Pheochromocytoma associated with Behçet's disease. Jpn J Clin Onco l1989;19:283-6.
4. Bethea L, Khan S. Behçet's disease and pheochromocytoma. J S C Med Assoc 1999;95:295-8.
5. Wu JJ, Luo SF, Ho HH. Systemic lupus erythematosus and pheochromocytoma. J Rheumatol 1992;19:982-4.
6. Lin AT, Min Y, Clements PJ, Morris R, Shayestehfar B, Mankin L, *et al*. New onsetsystemic lupus erythematosus with pheochromocytoma. J Rheumatol 2002;29:1334-7.
7. Townsend RR, McGinnis PA, Tuan WM, Thrasher K. Case report: Bilateral adrenal pheochromocytoma. Am J Med Sci 1994;308: 123-5.
8. Razavi M, Bendixen B, Maley JE, Shoaib M, Zargarian M, Razavi B, *et al*. CNS pseudovasculitis in a patient with pheochromocytoma. Neurology 1999;52:1088-90.
9. Gill IS, Meraney AM, Bravo EL, Novick AC. Pheochromocytoma coexisting with renal arterylesions. J Urol 2000;164:296-301.
10. Haft JI. Cardiovascularinjuryinduced by sympathetic catecholamines. Prog Cardiovasc Dis 1974;17:73-86.

Cite this article as: Sarathi V, Lila AR, Bandgar TR, Shah NS. Aortoarteritis: Could it be a form of catecholamine-induced vasculitis?. Indian J Endocr Metab 2013;17:163-6.

Source of Support: Nil, **Conflicting Interest:** None declared.