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The Unusual Culprit: Vitamin D Deficiency as a Rare Cause of Resistant Hypertension

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Abstract: ***Resistant hypertension is defined as blood pressure that remains above target despite the use of three antihypertensive agents of different classes, including a diuretic. While essential hypertension is the most common diagnosis, secondary causes must be rigorously investigated. This case report highlights a 26year old female presenting with hypertensive emergency and subsequent resistant hypertension. Extensive workup ruled out common secondary causes but revealed severe Vitamin D deficiency and associated secondary hyperparathyroidism. Following Vitamin D supplementation and normalization of levels, the patient's blood pressure was successfully controlled with a reduced drug regimen. This case suggests that Vitamin D deficiency, via its role in the Renin-Angiotensin-Aldosterone System (RAAS) and parathyroid hormone regulation, can be a treatable contributor to resistant hypertension*** [1-5].

Keywords: Resistant Hypertension, Vitamin D Deficiency, Secondary Hyperparathyroidism, RAAS, Hypertensive Emergency

1. Introduction

Resistant Hypertension (RH) is a clinical challenge defined as blood pressure exceeding 140/90 mmHg despite concurrent use of three antihypertensive classes at maximally tolerated doses. Although most cases are essential hypertension, clinicians must remain vigilant for secondary causes. Vitamin D plays an important endocrine role in blood pressure regulation. Reduced Vitamin D levels lead to increased parathyroid hormone secretion and loss of renin suppression, contributing to vascular resistance and refractory hypertension [1-4].

Case Report

A 26-year-old female presented with blurring of vision and generalized weakness for three days. She had no known prior history of hypertension, diabetes mellitus, or thyroid disorders.

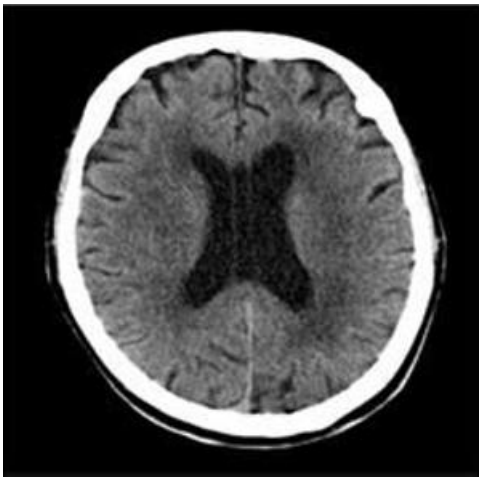
Clinical Examination

- Vitals: BP 240/108 mmHg consistent with hypertensive emergency; pulse 106 bpm; SpO_2 98% on room air.
- Fundoscopy: Bilateral optic atrophy with papilledema and retinal pigmentary changes.
- ECG: Sinus rhythm with left ventricular hypertrophy.

2. Observations and Investigations

Comprehensive evaluation was undertaken to identify secondary causes of hypertension.

Investigation	Result	Reference Range
Hemoglobin	13.3 g/dl	12–15 g/dl
Serum Creatinine	0.9 mg/dl	0.6–1.2 mg/dl
Serum Calcium	9.20 mg/dl	8.5–10.2 mg/dl
Serum Phosphorus	2.0 mg/dl	2.5–4.5 mg/dl
iPTH	98.9pg/ml	15–65 pg/ml
Vitamin D3	15.8 ng/ml	30–100 ng/ml
24-hr Urine Metanephrines	16.06 µ	Normal
Renal Artery Doppler	Normal	No stenosis
CT Brain	Small vessel ischemic changes	—
2D Echo	LVH, EF 60%	Normal EF



3. Course in Hospital

The patient initially required intravenous antihypertensive therapy. Despite triple oral therapy, blood pressure remained elevated, meeting criteria for resistant hypertension. Severe Vitamin D deficiency with elevated iPTH prompted supplementation. Following correction, blood pressure control improved, allowing step-down to a two-drug regimen.

4. Discussion

Vitamin D deficiency contributes to hypertension through RAAS activation and secondary hyperparathyroidism. Increased renin activity and vascular smooth muscle calcium influx promote vasoconstriction. Correction of deficiency reduces hormonal dysregulation and vascular resistance. This case illustrates the importance of endocrine evaluation in resistant hypertension [3-8].

5. Conclusion

Vitamin D deficiency is an underrecognized yet reversible contributor to resistant hypertension. Screening should be considered in patients with unexplained or refractory hypertension.

References

[1] Snijder MB, et al. Vitamin D status and PTH in relation to blood pressure. J Intern Med. 2007; 261: 558–565.
[2] Forman JP, et al. Vitamin D intake and hypertension risk. Hypertension. 2005; 46: 676–682.
[3] Holick MF. Vitamin D deficiency. N Engl J Med. 2007; 357: 266–281.
[4] Vaidya A, Williams JS. Vitamin D and RAAS. Endocrinology. 2012; 153:5–13.
[5] Li YC, et al. Vitamin D inhibition of renin expression. J Clin Invest. 2002; 110: 229–238.
[6] Chakhtoura M, Alam S. Vitamin D and hypertension. Am Heart J Plus. 2025; 56: 100570.
[7] Kumar V, Kumar R. Vitamin D and hypertension stages. J Pharm Bioallied Sci. 2025; 17: 112–118.
[8] Judd SE, Tangpricha V. Vitamin D and cardiovascular disease. Am J Med Sci. 2009; 338: 40–44.