

## Labile Hypertension Responding to Testosterone Withdrawal

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### Abstract

We report a single case of severe hypertension which presented many challenges in the management and even more in the resolution. Learning Points 1) That there can be unanticipated causes of hypertension 2) That difficult to control blood pressure should cause medical advisers to consider unusual causes of hypertension 3) That hypertension may respond to testosterone withdrawal.

### Background

The patient initially presented in 2003 at the age of 53 years with a long history of intermittent recorded high blood pressure readings at incidental measurements, attributed to the 'white coat' syndrome. In 2003 he presented for a gastroscopy, when his blood pressure was recorded at 270/190mmHg; echocardiography was normal, and there were no ophthalmological signs of hypertension.

### Case Presentation

A record of his 24-hour ambulant blood pressure showed a 24 hour average of 160/100mmHg with severe excursions ('spiking') to 210-270/160-190mmHg throughout the 24 hours as previously noted, with some 6 to 8 spikes in 24 hours whilst both awake and sleeping. Treatment was instituted with bendroflumethiazide 2.5mg once daily, losartan 100mg once daily plus aspirin 75mg once daily. This treatment resulted in a 24 hour average BP of 117/73mmHg with spikes to 176/116mmHg.

He underwent full investigation with normal renal artery and carotid artery ultrasound and a CT of the renal arteries was also normal. MRI brain was normal. Routine biochemistry was normal including urinary catecholamine. He was treated with variety of standard anti-hypertensive, but although they all reduced his overall blood pressure to some extent, none affected the spiking. On a single high renin-aldosterone ratio, serum aldosterone was 130pmol/L and renin 0.08pmol/L the possibility of Conn's syndrome was considered. He responded to spironolactone, up to 200mg daily, with blood pressures of 107/68mmHg with peaks of 140/90mmHg.

Eventually, his blood pressure failed to achieve adequate control. As he had partially response to spironolactone, repeated measures of testosterone were made, but it was always within the normal range. Blood pressure measurements were 116/74mmHg with peaks of 209/130mmHg.

Efforts were made to take him off all medication and then start rebuilding the medication. Amiloride proved to be most efficacious but he developed a systemic allergy (grade 3) to the agent and so again spironolactone was reinstated; however, after a period of one year his blood pressure was again uncontrolled. Serum testosterone levels were again within the normal range.

We noted that his hypertension was always exacerbated by withdrawal of the spironolactone, in the face of normal renin and aldosterone levels. The patient opined that the partial efficacy might be due to its anti-androgenic effects rather than its mineralocorticoid

blocking activity, but referral to several endocrinologists suggested that this was highly unlikely. However, the patient persuaded his medical advisers to prescribe Depot Provera and this very effectively controlled his blood pressure, but the agent was poorly tolerated. He was given a trial of several gonadotropin-releasing hormone agonists including Goserelin, Leuprorelin, and Triptorelin to suppress his pituitary-gonadal axis, but again the side effects of these drugs were intolerable, although each one controlled the blood pressure with complete abolition of all spikes. On these drugs, his blood pressure readings were around 112/72mmHg with spikes to 157/94mmHg

### Investigations

The patient was fully investigated with all the conventional tests for hypertension, excluding Conn's syndrome and a pheochromocytoma.

### Treatment

Though his hypertension and endocrine specialist had residual concerns he was seen by a urologist and bilateral orchidectomy was discussed in detail: the patient, a medical practitioner, considered that only removal of his major source of testosterone would normalise his blood pressure, and he accepted orchidectomy in the full knowledge of its possible complications.

Since that time his blood pressure has remained completely normal for the past 6 months with no further spiking and a mean 24 hour blood pressure of BP of 110/60mmHg on 24-hour assessment. Such 24 hour readings were taken at 8 week intervals in order to verify the results of the surgery. The patient has remained completely well.

### Outcome

We note this highly unusual case in which marked suppression of testosterone levels has been associated with stabilisation of a previously highly fluctuant blood pressure profile. We have no ready

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explanation for this phenomenon, but the experience from this one case does suggest that testosterone might be a factor in the spikes and hypertensive phenotype in this particular patient. The available literature on the role of androgens in hypertension is limited with some suggestions of a vasodilator effect of testosterone, with other reports of chronic exposure leading to raised blood pressure[1,2]. In the latest data from the 2011 Health Survey for England, men have higher prevalence of hypertension than women. We suggest that this case of difficult to control blood pressure prior to orchidectomy, alongside epidemiological data of gender difference in blood pressure, highlights the need for further systematic evaluation of the role of testosterone in systemic hypertension as in some men it may have a part to play in blood pressure elevation.

### **Declaration of Interest**

There is no conflict of interest that could be perceived as prejudicing the impartiality of the research.

### **Patient Consent**

Patient informed consent has been obtained.

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