Hypertension found at a free health check

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Secondary causes of hypertension need to be considered in patients with very high blood pressure of quick onset, especially if it does not respond to antihypertensive medications.

As a GP working a regular shift in the local emergency department, your next patient is a middle-aged man with hypertension and a mild headache of a few days' duration. The case seems routine, being very similar to those you see in your general practice.

Case scenario

A 56-year-old businessman had his blood pressure (BP) checked at work as part of a health promotion by a health fund. His BP was found to be very high, even after repeating the measurement, and he was recommended to attend the local emergency department.

The patient's short referral letter provided by the nurse at the health check listed the BP as 216/118 mmHg. The triage nurse noted that the patient had a mild occipital headache that had started a few days ago and classified him as triage category 3 (to be seen within 30 minutes).

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The patient's repeat vital signs were as follows:

- pulse, 78 beats per minute
- BP, 197/106 mmHg
- oxygen saturation, 97% on room air
- respiratory rate, 16 breaths per minute
- temperature, 36.8°C.

His urine analysis was unremarkable.

On seeing these results and especially as the patient's headache was now 6/10, you were concerned. You asked the patient to lie down and then took a history while the nurse checked his BP in both arms (they were similar), attached an ECG and inserted an IV cannula for blood sample collection and any potential drug therapy. Initial blood and urine tests were organised.

The history

The patient, a pleasant and co-operative man, said the BP taken by his GP four months ago was normal but at that time his cholesterol level had increased. He said that his current headache had started two days ago, and only improved slightly with paracetamol. It was worse when sitting up and at the end of the day. He had no nausea or vomiting, no neck discomfort and no other symptoms.

He is a nonsmoker and a vegetarian, drinks at the most two to three drinks a week (at the weekends) and has an active weekend sporting lifestyle and a normal BMI (sleep apnoea would need to be considered with a raised BMI, as a secondary cause of hypertension). His father died at age 60 years following a heart attack and his mother at age 82 years from lung cancer. He has no history of kidney or other problems, is not under any particular stress and had never been admitted to hospital. He said he was not using any prescribed or over-the-counter medications (including decongestants), nor any illicit drugs such as amphetamines, and that he had not been eating liquorice.

Physical examination

Physical examination of the patient, including fundoscopy, was unremarkable.

CAUSES OF SECONDARY HYPERTENSION

Common

- Drug-induced
  - alcohol, excessive intake (most common drug-induced cause)
  - NSAIDs (most important drug-induced cause)
  - others include corticosteroids, anabolic steroids, contraceptives containing ethinyl oestradiol, cocaine and monoamine oxidase inhibitors when taken with tyramine-containing foods
- Drug withdrawal-induced
  - ACE inhibitors
  - beta blockers
  - clonidine
- IgA nephropathy
- Obstructive sleep apnoea
- Primary hyperaldosteronism
- Renal parenchymal disease (most common cause)
- Renal artery stenosis

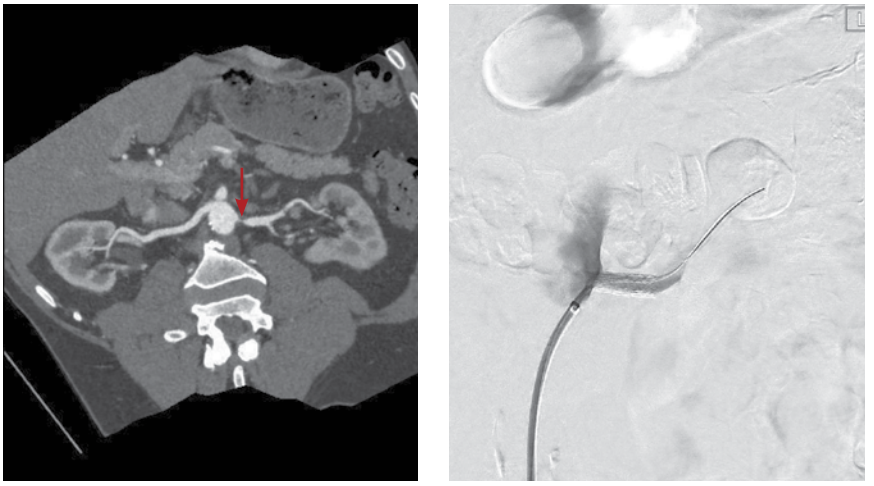
Uncommon

- Acromegaly
- Aortic coarctation
- Congenital adrenal hyperplasia
- Cushing's syndrome
- Hyperparathyroidism
- Hypothyroidism
- Phaeochromocytoma
- Thyrotoxicosis

Test results and provisional diagnosis

The blood test results, including renal and thyroid function, were all normal. Urine analysis was clear, with no protein present. The ECG showed sinus rhythm, no ischaemic changes but possible early left ventricular hypertrophy. A provisional diagnosis of essential hypertension was made.

The nephrology team reviewed the test results and performed a more detailed examination. No pathology was revealed and the provisional diagnosis was supported.



Figures 1a and b. Renal artery stenosis. a (left). CT angiogram showing an almost complete obstruction of the right renal artery in the proximal (ostial) portion (arrow). b (right). CT angiogram after treatment, showing catheter with the stent in situ and good renal parenchymal blood flow.

Hospital admission and work up

The patient was admitted to hospital and a detailed work up initiated to exclude secondary causes of hypertension such as renal artery stenosis, phaeochromocytoma or Cushing's syndrome (Box). The following tests were ordered:

- blood tests:
  - aldosterone and renin levels (for aldosterone to renin ratio; ARR)
  - metanephrines (to test for phaeochromocytoma)
- urine test:
  - free cortisol, 24-hour
- echocardiogram
- carotid doppler
- renal artery doppler.

Treatment

Even in the presence of malignant hypertension, guidelines for hypertension management now suggest that the drop in BP be limited to only 20% in the first 24 hours.[1] Only patients with aortic dissection or stroke with severe hypertension for which thrombolysis is to be given require more urgent BP reduction.

Vasodilator treatment was commenced in the patient:

- hydralazine 5 mg intravenously immediately
- oral hydralazine 2.5 mg as needed until BP below 180/110 mmHg.

As the patient's blood pressure did not drop overnight with this treatment, amlodipine orally 5 mg was started.

Over the next two days the patient's BP was difficult to bring down and keep down, despite him being given several doses of 2.5 mg hydralazine and then his amlodipine dose being increased to 10 mg. A 16 mg dose of candesartan was then commenced, after which the patient had a 30-second episode of syncope and vomiting, possibly related to the candesartan. However, he remained hypertensive.

As the patient was still an inpatient because of the poorly controlled BP, the renal artery ultrasound that had been booked for him as an outpatient appointment was performed. The tight right proximal (ostial) renal artery stenosis shown on the imaging was critical and therefore an indication for intervention (Figure 1a). Both kidneys were unremarkable otherwise.

His BP still high but acceptable and his headache resolved, the patient was discharged with a booking to return for surgery the following week. The

subsequent formal angiography and renal artery dilation and stenting was successful, his BP returning to normal (Figure 1b).

Discussion

Hypertension is the most common management problem seen in general practice in Australia, accounting for 5.5% of all conditions managed.[2] In the USA, it is the most common reason both for nonpregnant adults to attend clinicians and for the use of prescription drugs.[1,3]

Hypertension is an important risk factor for heart attacks and stroke,[4] and you feel rewarded in helping to find a treatable cause for it in this patient who presented as a potential hypertensive emergency (i.e. a diastolic BP greater than 120 mmHg, headache and possible end organ [cardiac, brain/fundi] damage).

Renal artery stenosis is rare in any patient but is one of the more common causes of secondary hypertension, renal parenchymal disease being the most common cause overall, and excessive alcohol intake the most common drug-induced cause (Box).

Renal artery stenosis is secondary to atherosclerotic disease in older adults (over 50 years of age), whereas in younger adults it is caused by fibromuscular dysplasia. MT

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