CASE REPORT

First reported case of posterior reversible encephalopathy syndrome occurring in a weightlifter

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SUMMARY

Posterior reversible encephalopathy syndrome (PRES) is an increasingly well recognised clinical and radiological condition. Here we report on the first known published case of PRES in a weightlifter. We present a 34-year-old man with acute onset visual disturbance and expressive dysphasia which occurred after an intensive gym session.

BACKGROUND

This case serves as a reminder that posterior reversible encephalopathy syndrome (PRES) is not limited to patients on immunosuppressant therapy or during the puerperal phase, but can otherwise occur in normally well people who experience an abrupt increase in their blood pressure.

CASE PRESENTATION

A 34-year-old man presented to the emergency department complaining of impaired vision and difficulty in speaking. He found communication very difficult using inappropriate words, for example, 'tree' instead of 'pen.' Comprehension, however, was not affected. He remained unsettled and agitated on the day of admission. Symptoms developed approximately 1 h after an intensive gym session as an avid weightlifter. He recently increased his lifting capacity at the gym. He smoked a single marijuana joint per day but denied the use of anabolic steroids. Examination confirmed a dense expressive dysphasia. Visual acuity was impaired, right 6/15 and left 6/

21 but visual fields and colour vision were not affected. There was no papilloedema. Remainder of general and neurological examination was normal without signs of upper motor neurone pathology.

INVESTIGATIONS

Haematological, biochemical and inflammatory blood investigations were all normal.

Toxicology screen was negative for amphetamines, cannabinoids and opioids. CT scan of the head and lumbar puncture showed no abnormality. Contrast-enhanced MRI scanning demonstrated diffuse high signal affecting both the grey and white matter, arising from the temporal lobe on the left and the parieto-occipital lobes bilaterally. There was also a separate white matter lesion in the right cerebral hemisphere. There was no gadolinium enhancement. There was high signal on diffusion weighted imaging (DWI) and apparent diffusion coefficient (ADC) maps. There was no evidence of haemorrhage on gradient echo imaging. No abnormality was seen on MR angiography (MRA) or T1 fat saturation (see figure 1). Blood pressure as an inpatient was normal and he improved spontaneously. Clinical examination including speech and visual acuity returned to normal within 1 month. Repeat MRI done a month later demonstrated almost complete reversal of all white matter changes.

Figure 1 Axial T2 MRI head scan of the patient. (A) On admission demonstrating extensive grey and white matter high signal changes affecting mainly the parieto-occipital lobes (white arrows). (B) One month later there was complete resolution of MRI changes (yellow arrows).

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TREATMENT

His blood pressure was closely monitored. As it remained normal, no treatment was necessary and there was spontaneous resolution.

OUTCOME AND FOLLOW-UP

The patient was reviewed 2 months later and had returned to normal state.

DISCUSSION

In 1996, Hinchley *et al*¹ reported on a series of 15 patients with posterior leukoencephalopathy. Of the 15 patients, 7 were on immunosuppressant treatment, 4 had acute hypertensive encephalopathy, 3 had eclampsia and 1 was receiving interferon. Twelve had an abrupt increase in blood pressure while 8 had some degree of renal impairment. Headache, altered alertness, seizures, vomiting and abnormalities of visual perception were the most common presenting symptoms. CT or MRI studies showed extensive bilateral white matter abnormalities suggestive of oedema in the posterior regions of the cerebral hemispheres. All neurological deficits resolved within 2 weeks of onset.

The pathophysiology of posterior reversible encephalopathy syndrome (PRES) is thought to be most commonly linked to abrupt increase in blood pressure before the onset of symptoms. The result is an overwhelming of the autoregulation system of cerebral vasculature with areas of vasodilatation and vasoconstriction developing especially at arterial boundary zones.^{2–3} The predilection of the posterior circulation territories is thought to result from the relatively sparse sympathetic innervation of vertebrobasilar circulation. Another possibility is one of the endothelial dysfunction secondary to circulating toxins originating from immunosuppressant therapy, sepsis, autoimmune disease and pre-eclampsia/eclampsia.⁴ Prognosis is good. The majority of symptoms resolve within 3–8 days with any persistent neurological deficit generally linked to pre-existing complications. Clinical imaging findings generally take longer to resolve, generally weeks in the case of MRI.^{2–5}

Here, we present the case of a weightlifter with both clinical and radiological findings of PRES. During weight lifting there is as much as a fourfold increase in both systolic (SBP) and diastolic blood pressure (DBP).⁶ One study recorded values as high as 480/350 mm Hg in a subject performing double leg presses. The origin of this increase is multifactorial. Initially, at the start of contraction, there is a dramatic mechanical compression of the muscle vasculature measured as high as 570 Torr in human quadriceps. SBP increases to overcome this effect with an accompanying pressor effect further driving SBP and heart rate.

These blood pressure changes are transmitted to the cerebral artery with an interruption of normal tight control of cerebral blood pressure. We must also consider the effect of the Valsalva manoeuvre executed during contractile phase of lifting. The resultant increase in intrathoracic pressure is thought to help the contractile ability of the heart in augmenting SBP.^{6–7} The overall effect is thought to be protective. In this individual however, we hypothesise that autoregulatory mechanisms were overcome resulting in PRES.

His blood pressure was normal as an inpatient and symptoms improved spontaneously as expected in cases of PRES. In terms of recurrence, a retrospective review of PRES cases between 1998 and 2005 gave a relapse rate of 4%.¹ This would suggest that further symptoms should not occur but it would be advisable that his blood pressure be carefully monitored especially during his exercise routine.

Learning points

- ▶ Posterior reversible encephalopathy syndrome (PRES) as an important differential for acute onset visual and cognitive disturbance.
- ▶ There is a potential for this condition to occur in any patient who has an abrupt increase in blood pressure.
- ▶ Need for repeat imaging to assess disease resolution.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned, externally peer reviewed.

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