likely to coexist. The outcome of division of the isthmus in these cases is unpredictable. Under these circumstances resection of the aneurysm may be possible if the graft is placed posteriorly, as in our patient. A second alternative is autotransplantation of the kidney, but there is no recorded instance in the literature of successful autotransplantation of a horseshoe kidney following resection of a ruptured AAA.

Division of the isthmus of the kidney is not without danger. Firstly, damage to the renal pelvis as a result of surgical manipulation may produce spillage of infected urine which exposes the patient to the serious sequelae of an infected vascular prosthesis. Secondly, division of the isthmus or an associated polar artery may result in infarction of renal tissue. Cayten et al. have suggested that the isthmus should only be divided when extended exposure is mandatory. Perhaps division of the isthmus should be strongly considered in ruptured aneurysms so as to facilitate control of bleeding from the aneurysm. They indicate that in elective cases it is frequently possible to mobilize the kidney and place the graft on the posterior aspect of the isthmus. They also point out that anomalous venous drainage is common in the presence of a horseshoe kidney, necessitating great care before unidentified vessels are ligated.

Carbon monoxide poisoning
Report of a case with 1-year computed tomographic follow-up

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Summary

A case of acute carbon monoxide poisoning with 1-year computed tomographic follow-up is presented. The typical initial bilateral symmetrical low-density areas in the basal ganglia were found to have decreased markedly in size in the latter scan. These appearances coincided with the initial early oedematous phase of infarction ending in the late permanent necrotic stage.


Hypoxia resulting from carbon monoxide (CO) poisoning is due to the displacement of oxygen (O₂) from haemoglobin. CO competes with O₂ by diffusing across alveolar membranes and binding to haemoglobin. Haemoglobin has approximately 250 times the affinity for CO that O₂ has, and exposure to small concentrations of CO may therefore be clinically significant. Although all organs are affected by CO poisoning, the brain is the most important of these. Pathologically there is marked venous and capillary dilatation. Petechial haemorrhages and frequently early necrosis of the basal ganglia, most often the globus pallidus as well as the reticular zone of the substantia nigra, have been observed. The Purkinje cells of the cerebellar cortex and dentate nucleus are commonly involved, as are cortical cells.

Case report

A 26-year-old man who attempted suicide by gassing himself in a motor vehicle was admitted to an outlying hospital in a confused stuporous state. He regained consciousness a day later and was transferred to our hospital. On examination he was disoriented for time and place with marked memory impairment and a mask-like facies. There were no extrapyramidal signs. Generalized brisk reflexes were present. The neurological examination was otherwise negative. Computed tomography (CT) showed bilateral symmetrical low-density areas in the globus pallidus. There was no change following intravenous contrast administration (Fig. 1). The patient was discharged shortly thereafter and followed up as an outpatient. One year later he again underwent scanning owing to persistent poor memory and inability to concentrate. CT showed a marked diminution in the

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Fig. 1. CT scan on admission. There are bilateral symmetrical low-density areas in the globus pallidus in keeping with the oedematous phase of infarction.

degree of low density in the globus pallidus compared with the original scan. No other abnormality was noted (Fig. 2).

Radiological features

The characteristic CT findings in cases of CO poisoning include bilateral symmetrical low-density areas in the basal ganglia, which may or may not enhance following contrast administration, depending on the stage of the scan. Contrast enhancement in infarcts is commonest in lesions 1 - 4 weeks old. Diffuse low-density areas in the white matter may also be found, affecting mainly the periventricular centrum semiovale and corpus callosum. Anatomically the periventricular centrum semiovale is a hypoperfused area. Ventricular dilation and prominent sulci due to atrophy may result.

Discussion

Bilateral necrosis of the basal ganglia is not pathognomonic of CO poisoning. A similar appearance may be observed in barbiturate intoxication, trauma, cyanide poisoning, hypoglycaemia and hydrogen sulphide poisoning. Predilection for the basal ganglia is due to their end-arterial supply with hypoperfusion secondary to systemic hypotension, not a primary O2 deficiency. Neuropsychiatric signs and symptoms may result in survivors of acute CO poisoning.

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