

## Computed tomography abnormalities in hanging

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**Summary.** The CT pattern of bilateral and symmetrical round low density areas in the globi pallidi has been observed in a young man who attempted suicide by hanging. These CT abnormalities are similar to those described in other conditions such as carbon monoxide, hydrogen sulfide, cyanide and methanol poisoning, hypoglycaemia, drowning and acute global central nervous system hypoperfusion. The findings appear to be correlated with acute cerebral hypoxia.

**Key words:** Hanging - Cerebral hypoxia - CT scan - Globus pallidus hypodensities

The anoxia due to the obstruction of the respiratory tract and the ischemia secondary to the compression of the carotid arteries may lead to cerebral hypoxia in hanging. CT scan abnormalities consistent with the pathologic changes of cerebral hypoxia can be expected in this condition. We observed the CT pattern of bilateral low density areas in the globi pallidi in a young man who attempted suicide by hanging.

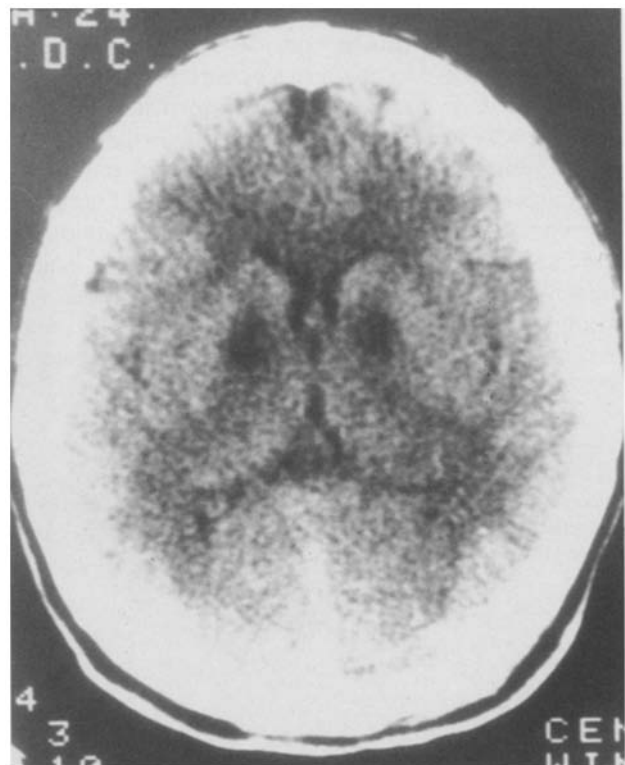
### Case report

A 24-years-old prisoner was found unconscious in his cell a few minutes after attempting suicide by hanging. First aid was immediately provided and he was admitted to the hospital two h later. He was comatose and presented irregular breathing. The pupils were dilated and unreactive to light and pain stimulation. The electroencephalogram showed diffuse slowing. An unenhanced CT scan performed 24 h after admission showed round bilateral low

density areas in the globi pallidi (Fig. 1). Although resuscitation care was sustained the patient had a poor outcome and died three days after admission.

### Discussion

The pathologic changes of hanging and strangling, including focal cavitation in the caudate, putamen and globus pallidus bilaterally [1-3], correspond



**Fig. 1.** CT scan shows bilateral and symmetrical low density areas in the globi pallidi.

well to the CT abnormalities observed in this case. Bilateral hypodensities of the basal ganglia are predominant CT findings of several conditions which are associated with cerebral hypoxia.

Carbon monoxide [4], hydrogen sulfide [5], cyanide [6] and methanol [7] poisoning, hypoglycaemia [8] and drowning [9] are known to present these CT abnormalities. Bilateral lucencies of the basal ganglia, possibly associated with low densities in the cerebral cortex and watershed regions, have been reported as the early CT findings of global central nervous system hypoperfusion [10] and postmortem examinations have confirmed these CT abnormalities.

Although the general mechanism of causation of these lesions is still undetermined, some possible explanations for the selective vulnerability of these structures have been postulated. A specific cytotoxicity cannot be excluded for some conditions [11, 12], but presumably the great metabolic demand of the basal ganglia and their relatively poor vascularization, because of their location at the boundary zones of perfusion, cause these structures to be especially at risk when conditions of acute cerebral hypoxia occur [10]. A similar mechanism can be invoked for hanging and presumably for other conditions which are known to produce acute cerebral hypoxia.

The CT pattern of bilateral low density areas in the basal ganglia can be considered convincing evidence that severe hypoxia has occurred in the brain.

Similar CT changes have also been described in Wilson's disease [13] and in Leigh's disease [14], a recessive inherited disease which presents pathologic changes in some way resembling those of cerebral hypoxia. It has been suggested that lactic acidosis, which is characteristic in Leigh's disease and is also present, as a consequence of venous stasis, in strangling and in other hypoxic conditions, may play a role in determining the pathologic changes [15].

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