

OPISTHOTONUS IN DRUG-INDUCED
DYSTONIC SYNDROME

DEAR SIR,

The occurrence of opisthotonus that responded dramatically to the I.V. administration of an anti-parkinsonian drug has recently been described in a case of tranquillizer poisoning (Lichtigfeld, *Brit. J. Psychiat.*, March, 1964, pp. 226-227). Lesser grades of postural deviation such as tonic spasms may be followed by tonic convulsive seizures and opisthotonus. The latter posture is characteristic of a transverse mid-brain lesion causing decerebrate rigidity (Walton, 1961). The brain stem has also been implicated in the regulation of posture, and anomalies of the posture of the trunk (dystonia) may result from pathology in this region (Monnier and Levy, 1960). Disturbances of the basal ganglia are also involved in the causation of involuntary movements, muscular rigidity and abnormal postural fixations (Purdon Martin, 1960). Experimentally, medial thalamic stimulation can produce opisthotonus (Monnier and Tissot, 1958). Thus different mechanisms are probably responsible for producing opisthotonus in various clinical states. Although it is probably worth while to treat opisthotonus occurring in conditions such as rabies, strychnine poisoning and tetanus by anti-parkinsonian drugs, it remains to be seen whether this treatment will have a beneficial effect in these conditions.

Opisthotonus has been produced experimentally by inducing thiamine deficiency in pigeons (Peters, 1959), and by intra-cisternal injection of isotonic citrate in dogs, presumably leading to a deficiency of ionized calcium (Huggins and Hastings, 1933). Another condition that can produce a clinical picture of opisthotonus is tetany (Barker, 1922). All the signs of autonomic stimulation observed in the drug-induced dystonic syndrome are also seen in tetany (Zondek, 1944), while tonic spasms of the laryngeal muscles can occur in both conditions. Tonic convulsive seizures without loss of consciousness are also suggestive of hypo-calcaemic tetany, while patients suffering from disease of the basal ganglia may have athetoid spasms of the hands and feet nearly identical with carpo-pedal spasms of hypo-calcaemia (Talbot *et al.*, 1952). Extra-pyramidal symptoms have also been described in association with hypo-parathyroidism (Simpson, 1952; Sugar, 1953; Doherty *et al.*, 1962), and calcium deficiency states (Nesbit, 1935). The extra-pyramidal symptoms occasionally reported in hypo-parathyroidism may be associated with calcification of the basal ganglia, although most cases showing this calcification do not exhibit any such symptoms (Denny Brown, 1962). The cerebral

calcification in hypo-parathyroidism was not considered to be the cause of tonic convulsive seizures in tetany as the calcification persisted after the condition had been treated and it was concluded that it could not have been responsible for the tetany in the first place (Eaton and Haines, 1939; Siglin *et al.*, 1957).

Since it is doubtful whether the calcification in the basal ganglia is a cause of the extra-pyramidal symptoms in some cases of hypo-parathyroidism, the possibility exists that hypo-calcaemia can disrupt nerve cell function in the basal ganglia. It has also been suggested that cases of tetany resulting after encephalitis lethargica (Zondek, 1944), and brain injury (Winer, 1945) were due to lesions in the diencephalon interfering with the central regulation of calcium metabolism.

The tranquillizers causing extra-pyramidal syndromes may produce their effects by their action on calcium metabolism, and, conversely, calcium administration may have an ameliorating effect on drug-induced parkinsonism. It has been found that the acetylcholine content of the extra-pyramidal system is increased when reserpine is given in doses large enough to cause drug-induced parkinsonism, while the anti-parkinsonism drugs may be said, in general, to have some sort of anti-acetylcholine action (Bylsma, 1963). Calcium is necessary for the action of cholinesterase to take place and in this way is a factor in regulating acetyl choline metabolism, while it also has an anti-allergic and sedative action (Sandoz, 1952); actions which resemble some of the properties of the drugs used to combat parkinsonism.

As a large number of drugs are capable of controlling drug-induced dystonias resulting from tranquillizers, it is likely that their actions may be mediated at the synapse. The basis for this may lie in the altered ionic equilibrium produced there. Alternatively, these drugs may act on the nerve cells that regulate calcium metabolism. It is suggested that calcium may control some of the extra-pyramidal symptoms caused by tranquillizers.

F. J. LICHTIGFELD, B.Sc., M.B. B.Ch.

22 Oxford Road, Parktown,
Johannesburg, South Africa.

REFERENCES

- BARKER, L. F. (1922). *Endocrinology and Metabolism*. Vol. 1. London: Appleton.
 BYLSMA, U. G. (1963). *Leech*, 33, 95.
 DENNY BROWN, D. (1962). *The Basal Ganglia*. Oxford University Press.
 DOHERTY, O., CANARY, J. J., and KYLE, L. H. (1962). "Neurological Aspects of Endocrine Disorders", in *Clinical Neurology*. 2nd edition (ed. Barker, A. B.). Hoeber and Harper.

- EATON, L. M., and HAINES, S. F. (1939). *J. Amer. Med. Ass.*, **113**, 749.
- HUGGINS, C. B., and HASTINGS, A. B. (1933). In Sandoz monograph on Calcium (1952).
- LICHTIGFELD, F. J. (1964). *Brit. J. Psychiat.*, **110**, 226.
- MONNIER, M., and LEVY, A. (1960). *Schweiz. Arch. Neurol. Psychiat.*, **85**, 100.
- and TISSOT, R. (1958). In *Neurological Basis of Behaviour*. London: Churchill.
- NESBIT, H. T. (1935). *Amer. J. Dis. Child.*, **49**, 1449.
- PETERS, R. A. (1959). *Biochemical Aspects of Neurological Disorders* (ed. Cumings, J. N., and Kremer, M.). Oxford.
- PURDON MARTIN, J. (1960). *Papers on Hemiballismus*, Queen Square, London.
- Sandoz Monograph on Calcium (1952).
- SIGLIN, I. S., EATON, L. M., CAMP, J. D., and HAINES, S. F. (1957). *J. clin. Endocrin.*, **7**, 433.
- SIMPSON, J. (1952). *Brain*, **75**, 76.
- SUGAR, O. (1953). *Arch. Neurol. Psychiat.*, **70**, 86.
- TALBOT, N. B., SOBEL, E. H., McARTHUR, J. W., and CRAWFORD, J. D. (1952). *Functional Endocrinology*, Ch. 2. Harvard University Press.
- WALTON, J. N. (1961). *Essentials of Neurology*. Ch. 9. London: Pitman.
- WINER, N. J. (1945). *J. clin. Endocrin.*, **5**, 86.
- ZONDEK, H. (1944). *The Diseases of the Endocrine Glands*. 2nd edition. London: Arnold.