

From our limited experience it seems that repeated courses of calcitonin may be needed after a 3-month interval. As many of the LSS patients are elderly and thus present a higher surgical risk, it seems reasonable to try medical treatment first.

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Accepted 8 November 1988

#### Subcutaneous apomorphine in Parkinson's disease

Sir: Recently, Stibe *et al*<sup>1</sup> reported the beneficial effect of subcutaneous apomorphine administration in Parkinsonian on-off oscillations. We have studied in a similar way the effect of apomorphine, a D1 and D2 dopaminergic agonist, administered by continuous infusion in four patients and by multiple injection in six patients. All patients had been suffering from disabling motor fluctuations unresponsive to other treatment strategies. Their mean age was 55.8 years and duration of disease was 9.4 years. Domperidone, a peripheral dopamine antagonist,<sup>2</sup> 20 mg three times daily, was given for at

least 3 days before adding apomorphine to the other dopaminergic drugs, that is, levodopa + decarboxylase inhibitor (mean dosage 635 mg/day) in all patients, and bromocriptine (mean dosage 31 mg/day) in eight patients.

Subcutaneous apomorphine administration induced a substantial motor benefit in all patients, for up to 6 months. In the four patients treated with an infusion pump, the mean duration of off periods per day was lowered from 6 to 1.1 hours (82% improvement), with a mean apomorphine infusion rate of 3.8 mg/h during diurnal hours plus a mean of four additional boluses of 1.5 mg each. Levodopa dosage fell by 61%. In the six patients treated by a penject, the mean duration of off periods per day was lowered from 4.7 to 1.7 hours (63% improvement) with a mean daily number of apomorphine injections of four, the mean dosage of each injection being 2.25 mg. Levodopa dosage was reduced by 15%. In two patients, tremor was abolished by apomorphine during on periods, whereas this was not the case with the previous dopaminergic drug intake. Domperidone could be suspended in all patients but one, within 3 weeks after apomorphine initiation. All patients using pumps, and one patient with multiple injections, developed transitory red nodules at the needle sites. In three patients complaining of pruritus at the injection site, peripheral blood eosinophilia occurred. One patient treated by pump complained of visual hallucinations for 2 days, but another patient reported the disappearance of evening and nocturnal hallucinations. No other side effects occurred.

These results confirmed the reports of Stibe *et al*<sup>1</sup> and Poewe *et al*<sup>3</sup> on the sustained improvement of all dopa-dependant symptoms in Parkinsonian patients with motor fluctuations. Moreover, we found that apomorphine could be useful in alleviating severe tremor, resistant to classical drugs.<sup>4</sup>

Since all other dopaminergic drugs could be stopped in one patient, apomorphine does not necessarily require intermittent administration of levodopa to achieve the best effect, as previously suggested.<sup>5</sup> It is noteworthy that oral high-dosage apomorphine-induced azotaemia<sup>6</sup> did not develop with subcutaneous, relatively low-dosage administration. As the beneficial motor effect can last many months, central dopaminergic receptors do not seem to become tolerant to chronic apomorphine administration unlike peripheral dopaminergic receptors which are implicated in apomorphine-induced emesis and vegetative effects.

These very encouraging results warrant

further long-term studies. Technical improvements in drug-delivery systems and in apomorphine physico-chemical properties are needed to obtain easier utilisation by Parkinsonian patients and better subcutaneous tolerance of this new therapeutic method.

Apomorphine hydrochloride was kindly supplied by Laboratoire Aguetant, Lyon.

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Accepted 8 November 1988

#### Lethal neurotoxicity associated to azidothymidine therapy

Sir: Among the toxic side-effects of azidothymidine (AZT), neurological manifestations such as headache and mild confusion have frequently been described. There is also a case report on lethal neurotoxicity in association with AZT therapy with focal seizures and respiratory arrest.<sup>1</sup>

We report a similar case of an AIDS patient who died probably of neurotoxicity during treatment with AZT. An intravenous drug abuser underwent a first clinical