EFFECTS OF AN ADRENERGIC BLOCKER AND LESIONS ON APOMORPHINE-INDUCED
ROTATION IN UNILATERAL SUBSTANTIA NIGRA LESIONED RATS

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Rats with unilateral electrolytic lesions of the substantia nigra (SN) rotate ipsiversively following systemic administration of either apomorphine or amphetamine. In this animal model apomorphine induces ipsiversive rotation by acting on normal dopamine receptor in the caudate nucleus on the intact side. The present work aimed to investigate the effects on apomorphine-induced rotation of electrolytic lesions of the globus pallidus (GP), a major output of the basal ganglia; parafascicular nuclei (PF), the nuclei receive projection from SN; and a beta-adrenergic blocker, dl-propranolol.

The investigation of the role of the GP or PF on apomorphine-induced ipsiversive rotation in the SN lesioned rats were done by making electrolytic lesions (2 mA DC, 15 sec) at the GP or PF on the intact side. Rats with double lesions were tested for apomorphine-induced
rotation on days 4 and 7 after the second lesions. In contrast to control apomorphine-induced rotation (420 ± 123 turns to the left, X ± SEM), the rats with second lesions at the right GP demonstrated reversal of rotation following the same dose of apomorphine (1 mg/kg) (129 ± 43, and 91 ± 61 turns to the right at 4 and 7 days after GP lesions respectively, X ± SEM). While rats with sham at the right GP still rotated to the left with the same magnitude as control rotation. In addition, rats with only unilateral GP electrolytic lesions also rotated ipsiversively following apomorphine i.p. The results indicate that unilateral lesions of the GP as well as the SN induced imbalance of the nigrostriatal-striatonigral circuit. The expression of apomorphine-induced rotation in the unilateral SN electrolytic lesioned requires the GP.

Contralateral as well as ipsilateral lesions (2 mA DC, 15 sec) of the PF significantly reduced apomorphine-induced rotation in SN-lesioned rats. While rats with sham operation at that nucleus did not show any significant change in ipsiversive rotation. However, apomorphine 0.5-3 mg/kg i.p. failed to produce any rotation in unilateral PF lesioned rats. The results indicate that apomorphine-induced rotational expression of nigrostriatal output is markedly modified by the concomittant activity at PF nuclei.

There has been increasing evidence that noradrenergic system is involved in rotation. A beta-adrenergic blocker, dl-propranolol, at 3 different doses was given to 3 groups of 6 unilateral SN electro-
lytic lesioned rats 30 minutes before testing for apomorphine (0.75 mg/kg) induced rotation. The pretreatment were alternated with saline i.p. Propranolol reduced apomorphine-induced rotation in a dose-related manner (20%, 44% and 76% reduction with 1.0, 2.5 and 5.0 mg/kg respectively) Compared with control rotation which was rotation induced by apomorphine 0.75 mg/kg tested 3 days before pretreatments in each group. The reduction of apomorphine-induced rotation by propranolol supports the role of adrenergic system in rotation.