Stereotactic pallidotomy in Parkinson's disease

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Chapter 7b

Transient hiccups after posteroventral pallidotomy for Parkinson's disease

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Hiccup is defined as an abrupt intermittent, involuntary, contraction of the diaphragmatic and external (inspiratory) intercostal muscles, with inhibition of expiratory intercostal activity. This results in a sudden inspiration, abruptly opposed by closure of the glottis.[1] Hiccup may result from various structural or functional disorders of the medulla, the afferent or efferent nerves to the respiratory muscles, and the gastrointestinal tract.[2,3] Newson Davis performed a study of hiccup with electrophysiological techniques and concluded that hiccup is served by a supraspinal mechanism distinct from that generating rhythmic breathing.[3] The principal site of interaction of the hiccup discharge with other descending drives to the respiratory motorneuron is at the spinal level. Neurogenic hiccup is particularly associated with structural lesions of the medulla oblongata.

Since 1994 we have performed 66 pallidotomies for Parkinson's disease in 60 patients. So far, we have seen transient hiccups in seven patients after the operation (table). Our target coordinates for the posteroventral globus pallidus at the border of the medial and lateral segments are 2-3 mm anterior to the midcommissural point, 5 mm below the intercommisural line, and 22 mm lateral to the midline of the third ventricle. Ventriculography was performed for target localisation. Patients started with a short schedule of corticosteroids (5 days) the night before surgery.

Table Patient characteristics

	Age at surgery	Sex	Yr with PD	H and Y* on/off	UPDRS off† prepallidotomy/ postpallidotomy	Side	Transient side effects	Medication additional to levodopa
1	66	M	8	2 / 5	57 / NP‡	R	Slight facial paresis, swallowing problems, drooling	Tryptizol, temazepam, alprazolam, apomorphine supp.
2	43	F	7	2 / 2.5	22 / 7	L	Slight dysarthria	Trihexifenidyl
3	49	M	15	2 / 2	55 / 15	L	Facial paresis	Pergolide, amantadine
4	50	M	12	2 / 2	45 / 22	L	Slight dysarthria	Selegeline, biperideen
5	53	M	14	2.5 / 4	69 / 36	R	Facial paresis, hypophonia	Pergolide, selegeline
6	55	M	13	2.5 / 3	48 / 27	L	Facial paresis, aphasia	Selegeline, biperideen
7	61	F	15	2.5 / 4	55 / NP	R		Clozapine, temazepam, cisapride

* H and Y=Hoehn and Yahr stage; † UPDRS off=unified Parkinson´s disease rating scale motor examination section in standardised off state, 12 h without antiparkinson medication; ‡ NP=not performed.

The hiccups started immediately after the operation or the next day, were intermittent and the bouts of hiccup of six patients, with a duration of hours, resolved within 3 days after the procedure. One patient complained of yawning more often and frequent bouts of hiccup for 6 months.

Five patients were men. All patients were right handed. The mean age at surgery was 54 years and the mean duration of Parkinson's disease was 12 years. All

patients were taking levodopa. In four patients the hiccups appeared after a left sided pallidotomy. Patient 2 had a right sided thalamotomy 4 years before the pallidotomy. Patient 5 underwent a left sided pallidotomy 10 months before the right sided pallidotomy which caused the hiccups. The pallidotomies improved parkinsonism in the 'off' state (table), contralateral dyskinesias, and pain accompanying Parkinson's disease. Six patients had transient adverse events: four patients had a transient facial paresis postoperatively and two a slight transient dysarthria (table). Two patients had choreatic movements after the pallidotomy at the contralateral side which resolved spontaneously within 2 h and is associated with a favourable surgical outcome.[4]

Postoperative magnetic resonance imaging scans were obtained in the first six patients, and showed that in five patients the lesions were located in the posterior part of the globus pallidus pars externa (GPe) and interna. In patient 5 the lesion was situated slightly more anterior in the GPe and putamen. In patient 3 there was a small separate lesion more dorsal, probably an infarct.

We never encountered hiccups in 150 other stereotactic procedures for Parkinson's disease, such as thalamotomies or deep brain stimulation electrode implantation in the thalamus and therefore it is unlikely that medication or positive contrast medium ventriculography with iohexol evoked the hiccups.

A possible cause for the transient hiccups could be the lesion in the ventral medial segment of the globus pallidus or pressure, due to oedema, on an adjacent structure like internal capsule or putamen. We could not find other reports of hiccups as an adverse event after functional stereotactic surgical interventions, nor after lesions of other aetiology involving the striatium.[5] Based on our experience we hypothesise that the globus pallidus or a neighbouring structure may be involved in a supramedullary system involved in triggering hiccups.

References

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