



Long Term Follow-up for Thalamotomy and Pallidotomy for the Treatment of Medication-resistant Hemiballismus

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Learning Objectives

By the conclusion of the session, participants should be able to identify an treatment option for drug-resistant hemiballismus patients.

Introduction

Stereotactic neurosurgery remains as a final option in severe cases of medication-resistant hemiballismus, but is only necessary in a small proportion of patients.(1) Surgical options include thalamotomy and pallidotomy, both carried out alone. These procedures were reported in a few number of cases. Recently, good outcomes have been reported for deep brain stimulation but the technique remains controversial.(2)(3)(4)

Methods

Four patients underwent stereotactic ablative neurosurgery. The clinical data were reviewed using the objective **Hemiballismus/hemichorea Outcome Rating Score (HORS)**.(5) All patient with a history of severe disabling, involuntary movement HORS=4 to HORS=3. All of them had been treated clinically for years, without satisfactory results.

Results

Two of our four patients, who underwent combined pallidotomy (GPi)/thalamotomy (Vim-Vop), presented an excellent outcome, with a mild but definite difference from the two others patients who reported improvement but not total relief. See on video A 65-year-old woman, right handed, presented with left sided involuntary movement (HORS = 3). She had been treated with typical neuroleptic, atypical antipsychotic and antidopaminergic drugs for all this 17 years without major improvement. The patient was submitted to left pallidotomy (GPi) without any response immediately after the procedure. Left thalamotomy (Vim/Vop) was performed immediately thereafter and showed a mild initial response (HORS = 1) and optimal delayed response (HORS = 0), without language disturbances. This result continues after a two-year follow-up.

Discussion

Lesions of the subthalamic nucleus seem to play a critical role in the induction of this movement disorder.(6) However, other structural lesions in the basal ganglia, as well as in their afferent pathways from the GPe and efferent pathways to the GPi, have been shown to be related with hemiballismus. A decreased activity of the GPi results from reduced excitatory subthalamic outflow after subthalamic lesion.(7) Since the pallidothalamic pathway is inhibitory, hypoactivity of the GPi results in an increased drive of thalamic-cortical pathways projecting from the ventrolateral thalamus (VL = Vim/Vop/Voa) to the premotor cortex.

Targets For patients with ballistic movements, pallidal (GPi) lesions as well as Vim lesions may decrease the excitatory drive of thalamic-cortical pathway outflow, suggesting that both targets may improve the outcomes of surgical treatment of hemiballismus.(8) The ventral thalamus (VL) alone has been reported to be an excellent target for hemiballismus treatment, with complete resolution of ballistic movements.(9)

Discussion

Coral et al observed good improvement after treatment with haloperidol in six of eight patients, whereas two patients underwent thalamotomy, one of them with good results.(10) Already described as combined treatment, lesions of the zona incerta and of the base of the roventral thalamus (Voa/Vop) resulted in long-term clinical improvement of hemiballismus.(3)(6)

Lesions x DBS Deep brain stimulation DBS and chronic cortical stimulation are alternatives for the treatment of hemiballismus.(11) DBS has the advantages of preventing permanent lesion and permitting multiple parameters of current frequency and bandwidth among four electrodes. However, the cost effectiveness of chronic brain stimulation has not been compared to ablative surgery for the treatment of hemiballismus.

Conclusions

The combined thalamotomy and pallidotomy is a valid long term option for the treatment of medication-resistant hemiballismus.

References

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