

## Vascular Hemiballismus Due to Extralysian Lesions

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### Abstract

### Case Report

Hemiballismus represents a rare variety of hyperkinetic movement disorders that can complicate early-stage stroke. It is classically seen in contralateral Lysian lesions. We present the case of a 63-year-old hypertensive patient consulted for the sudden onset of involuntary movements. The neurological examination revealed right hemiballismus. Brain CT scan showed lacunar images of the internal capsule and left subthalamic muscles. The integrity of the subthalamic nucleus (STN) was confirmed by brain magnetic resonance image. The etiological assessment concluded that it was paroxysmal atrial fibrillation. The evolution was favorable after treatment with haloperidol. Hemiballismus represents less than 7% of movement disorders. It is usually linked to a vascular lesion of the contralateral STN. Extralysian involvement remains rare.

**Keywords:** Hemiballismus, ischemic stroke, lysis body.

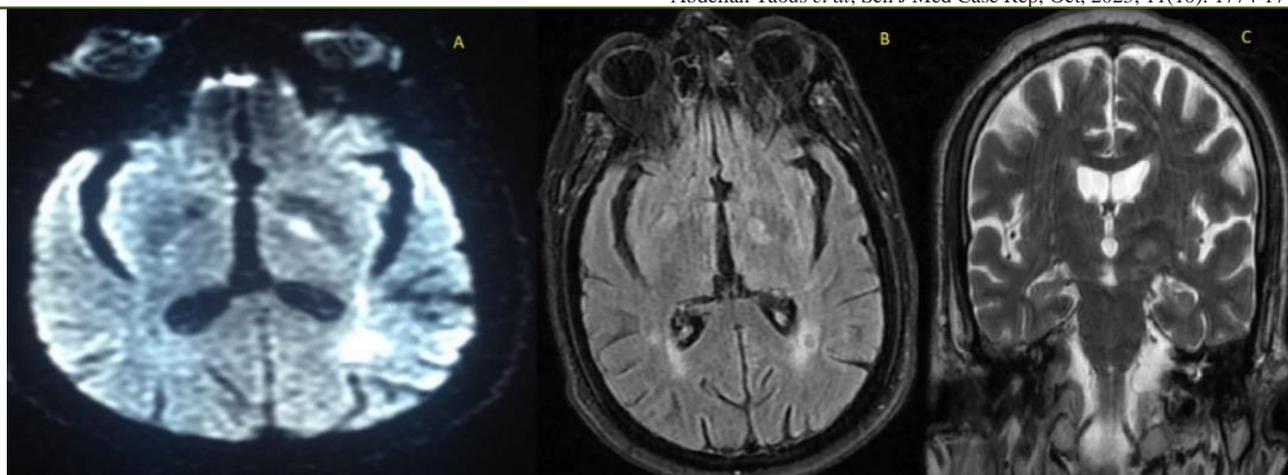
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## INTRODUCTION

Several types of Movement disorders (MD) can be induced by hemorrhagic or ischemic stroke. We distinguish between hyperkinetic movements and hypokinetic movements. MD are rare in the early phase of stroke, representing less than 1% of cases [1]. Hemiballismus represents a rare variety of hyperkinetic MD, whose most consistent neuropathological substrate is a vascular lesion of the contralateral subthalamic nucleus (STN) [1]. However, it can rarely survive outside of STN injury [2].

## CLINICAL CASE

A 63-year-old hypertensive patient consulted for the sudden onset a week previously of involuntary, abrupt, violent movements of large amplitude, relatively stereotyped, predominating at the roots of the limbs of the right hemibody. The neurological examination revealed right hemiballismus. The rest of the physical examination was normal. Neuro-radiological exploration by cerebral tomography supplemented by cerebral magnetic resonance imaging (Fig 1A, 1B, 1C) revealed a left capsulo-pallidal infarction, with integrity of the STN. The biological assessment did not reveal any particular anomalies. The cardiac assessment concluded that she had paroxysmal atrial fibrillation. The patient was treated with Haloperidol at a dose of 3 mg/day in 3 doses, with complete disappearance of hemiballistic movements after 3 months.



**Figure 1: Brain MRI in axial sections diffusion (A) and flair (B) sequences and coronal T2 sequence (C): left capsulo-pallidal hypersignal with integrity of the subthalamic nucleus**

## DISCUSSION

Hemiballismus is a sudden, uncontrollable abnormal movement of large amplitude affecting the limbs of a hemibody, often secondary to a structural or metabolic damage to the contralateral STN (Also called Luys body) or its afferent or efferent pathways [3]. It represents less than 7% of all MD. The vascular origin is the most common, especially in the elderly (most often infarct type, but also hematoma). In young subjects, it is necessary to look for an infectious, inflammatory or even neoplastic etiology [4]. Regarding the pathophysiology of hemiballismus, it is now well known that the suppression of the excitatory glutamatergic activity of the STN leads to a reduction of the inhibitory GABAergic activity of the internal pallidum (GPi), resulting in a disinhibition of the ventral nuclei of the thalamus, which, through thalamocortical connections, facilitates the activation of the motor cortex and thus leads to the abnormal execution of the movement [5, 6]. The role of the lenticular nucleus in the genesis of ballistic movement has been proven through animal experimentation [7]. A few cases of hemiballismus due to extralysian involvement have been reported in the literature [4, 8, 9, 10, 11], involving the neuronal alteration of motor circuits in several distinct locations (striatum, globus pallidus, thalamus, internal capsule, crown radiat). The treatment of hemiballismus must be both symptomatic and etiological [12]. Dopaminergic antagonists, very effective against choreic and ballistic movements, nevertheless represent the first-line treatment in the acute phase. Hemiballismus is characterized by a good response to treatment in the majority of cases, sometimes with spontaneous total remission [3]. The long-term prognosis of cases secondary to ischemic stroke remains similar to that of other ischemic strokes in general [13], especially with regard to survival rate and recurrence of a new stroke.

## CONCLUSION

Hemiballismus represents a rare variety of abnormal hyperkinetic movements that can complicate early-stage stroke. It is pathognomonic of a focal lesion of the STN. However, it can result from damage to its projections or even to the structures with which it shares connections.

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