Asterixis and dysarthria-clumsy hand originated of lacunar infarction: A series of six cases

Asterixis y disartria-mano torpe originado a partir de los infartos lacunares: Una serie de seis casos

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Abstract

Asterixis and dysarthria-clumsy hand are uncommon neurological signs following to movement disorders after a stroke, clinically are classified as a part of lacunar infarction and most of the cases resolved spontaneously within ten days to one month. The aim of this study was to describe the clinical characteristics of six patients with lacunar infarction and mild motor symptoms of dysarthria and asterixis with no signs of dementia. All patients had as comorbidities hypertension and/or type 2 diabetes. In conclusion, it is important due to the transience of the abnormal neurological movements, the promptly recognition of the characteristic clinical presentation and confirmation of the diagnosis with noninvasive studies. The patients should be treated to prevent recurrent stroke with more severe consequences.

Keywords: Asterixis, dysarthria-clumsy hand, lacunar infarction, stroke

Resumen

La asterixis y la disartria-mano torpe son signos neurológicos poco frecuentes que pertenecen a los trastornos del movimiento después de un accidente cerebrovascular. Clínicamente ellos son clasificados como parte del infarto lacunar y la mayoría de los casos se resuelven espontáneamente en un periodo entre 10 semanas y un mes. El objetivo de este estudio fue reportar seis casos de pacientes masculinos con infarto lacunar y describir los síntomas, localización y tamaño de las lesiones. Se describen casos de infarto lacunar y síntomas motores leves (disartria y asterixis) sin ningún indicio de demencia. En conclusión, nuestros casos presentan movimientos neurológicos anormales como asterixis y disartria-mano torpe en pacientes con hipertensión y / o diabetes mellitus tipo 2. Debido a la transitoriedad de esos movimientos, el diagnóstico en el tiempo adecuado es importante, a partir de eso los médicos pueden solicitar los exámenes de imagen, tratar al paciente y luego acompañarlo previniendo futuros ictus con consecuencias aún más graves. Así, estudios como el nuestro pueden contribuir al correcto diagnóstico de los infartos lacunares.

Palabras clave: Asterixis, disartria-mano torpe, infarto lacunar, accidente cerebrovascular

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Introduction

Cerebrovascular accidents (stroke) are the second leading cause of death in the word.[1] Lacunar infarction accounts for about 20% of all strokes and are caused mainly by small-vessel disease occluding a small perforating artery.[2,3] A lacune usually describes as small perforating arteries feeding deep subcortical structures. Lacunes of presumed vascular origin are shaped as a round or ovoid, subcortical, fluid-filled cavities, with 3 mm and about 15 mm in diameter.[4] Risk factors for lacunar infarction includes age, gender, hypertension, diabetes, previous transient ischaemic attack, and possibly ischaemic heart disease,[5,6] others risk factors such as cardiac or carotid emboli have been suggested as possible cause of lacunar infarction.[7] Clinically, lacunar infarction can manifest with several syndromes depending on the lesion location, usually are small infarcts in the deep cerebral white matter, basal ganglia or pons.[8] Five symptomatic signals are well recognized such as: pure motor hemiparesis, sensorimotor stroke, pure sensory stroke, dysarthria-clumsy hand and ataxic hemiparesis.[6,9-11]

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Neurological progression is one of the major problems in managing the patients with acute lacunar infarction usually developed within hours or a few days following the acute lacunar infarction event and typically involved primarily motor function.[12,13] Curiously, until 20% of asymptomatic elderly persons have evidence of incidental lacunes in image studies.[14] Investigations have focused on the dysfunction of the autonomic nervous system as a cause of neurological progression.[15] However, just few studies were performed describing abnormal involuntary and transient movements as asterixis and dysarthria-clumsy hand, as a consequence of lacunar infarction.[9,16-18] The aim of this study was to report six cases of male patients with lacunar infarction and mild motor symptoms of dysarthria and asterixis with a description of the symptoms, localization, and size of the lesions.

Patients' presentations and neuroradiological diagnosis

The clinical history of each patient was fulfilled according to the CARE guidelines checklist for case report.[19]

First patient (Figure 1 A): a 56-years-old man with history of type 2 diabetes and a severe uncontrolled hypertension. The patient presented with dysarthria and clumsy hand eight years ago, diagnosed with Weber syndrome and magnetic resonance imaging (MRI) showed in the flair sagittal section, a lacunar infarction in the right semioval center of 12 mm in diameter and in the sagittal T1 an infarct in the right cerebral peduncle of the midbrain with a diameter of 15 mm (Figure 1 B).

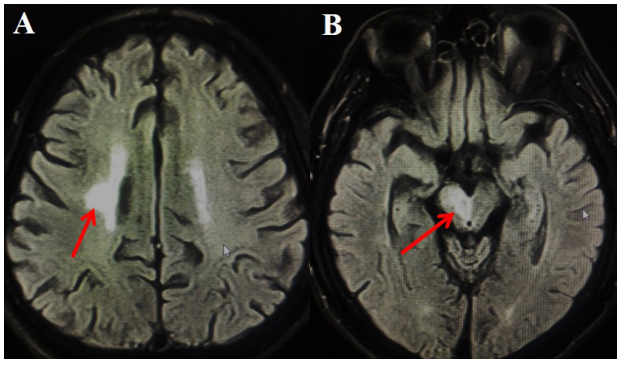

Figure 1. MRI image of a patient with clumsy- hand. Figure A shows a flair axial section with a lacunar infarction in the right semioval center, 12 mm diameter. Figure 1 B shows infarct in the right cerebral peduncle of the midbrain, 15 mm diameter.

Second patient (Figure 2 A): a 65-years-old man, smoker, history of type 2 diabetes, moderate hypertension, and a history of previous myocardial infarction. The patient has symptoms of dysarthria-clumsy hand and headache, the MRI images exams show in coronal flair section, an 8mm diameter lacunar infarct in the left semioval center.

The third patient represent a 55-years-old man (Figure 2 B). Patient with dysarthria during workday. Besides that, he had moderate uncontrolled arterial hypertension. Small 3 mm diameter pons lacunar infarct was revealed in the sagittal section MRI.

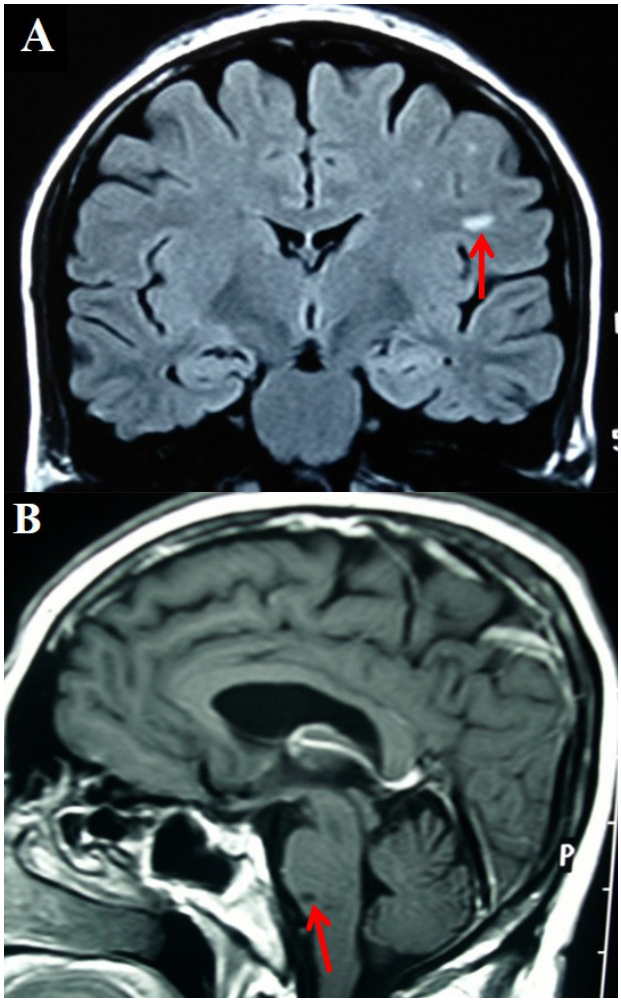

Figure 2. Two patients with dysarthria clumsy hand in MRI images exams. Figure 2A shows coronal flair section with an 8mm diameter lacunar infarct in the left semioval center. Figure 2B shows a sagittal section with a 3mm lacunar infarct in thepons.

The fourth patient is a 59-years-old man with severe arterial hypertension and diabetes mellitus. Figure 3 shows a lacunar infarct in the coronal T2 section, 10 x 4mm at the junction of the pons with the left posterior midbrain area.

The fifth case showed symptoms of left asterixis and facio-brachio-crural hemiparesis in a 65-year-old male with smoking history, type 2 diabetes mellitus, hypertension, and atrial fibrillation. A brain CT scan in cross section showed a lacunar 10 mm infarct in the right internal capsule (Figure 4 A).

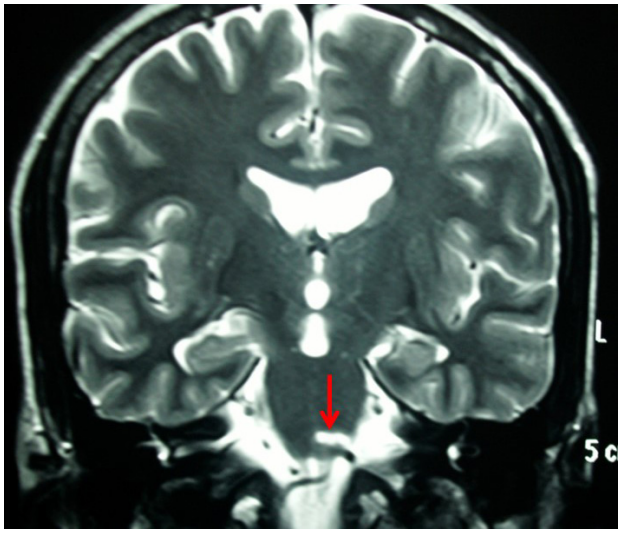

Figure 3. MRI image shows a male patient with clinical symptoms of dysarthria-clumsy hand and asterixis. Lacunar infarction in the T2 coronal section shows a longitudinal lacunar infarct of 10 x 4mm in the lower pons.

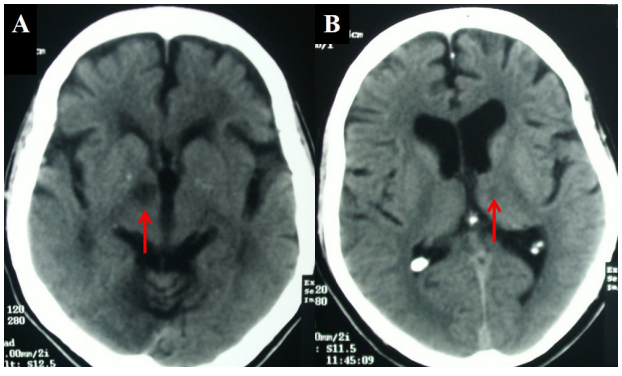

Figure 4. A brain CT scan represent two patients with asterixis. Figure A cross section shows a lacunar infarct of 10 mm in diameter in the right internal capsule. The figure 4 B shows a lacunar infarct 8mm diameter at the anterior pole of the left thalamus.

Sixth case (Figure 4 B) belongs to a 70-year-old man with type 2 diabetes and moderate hypertension, right asterixis and clumsy hand. Brain CT in cross section showed a lacunar 8 mm infarct at the anterior pole of the left thalamus.

All these results are resumed in table 1.

In these patients the treatment was dual antiplatelet therapy (DAPT; clopidogrel-aspirin) and orientation in controlling modifiable risk factors.

Discussion

Asterixis and dysarthria-clumsy hand syndrome is well known but infrequent lacunar syndrome. In this report, lacunar infarctions are presented in elderly adults (56-70-years-old) with hypertension and type 2 diabetes as comorbidities. Lacune of presumed vascular origin are associated with an increased risk of stroke, gait impairment, dementia, and commonly it is seen on imaging of elderly patients with no symptoms.[20,21] Interestingly, Fischer and colleagues described in the midbrain not to have typical lacunes in some cases,[3] but in this work we describe common sites lacune of presumed vascular origin as pons, white matter and thalamus. Hypertension is a significant risk factor for lacunar stroke compared with non-lacunar ischemic stroke.[22-24]

The main clinical comorbidities observed in this case series were elderly patients with hypertension, diabetes and smoking. The hypertension is the most important and prevalent risk factor for stroke.[25,26] Evidence has shown that patients without diabetes, lowering blood pressure reduces the stroke.[27] However, a systolic blood pressure of <120 mmHg when compared with <140 mmHg, had a non-significant 11% lower incidence of stroke in patients at high risk for cardiovascular events.[28] In the present study, all reported cases had a clear history of hypertension. Two reported cases with hypertension

Table 1. Clinical and lesions characteristics of patients with lacunar infarctions.

Case Report	Years	Characteristic	Clinical symptoms	Location of lesion	Size of lesion
1	56	Type 2 diabetes, uncontrolled hypertension	Dysarthria clumsy- hand. Antecedent of ischemic injury in synovial center (Weber syndrome)	Midbrain Right semioval center.	15mm 12mm
2	65	Type 2 diabetes arterial hypertension smoker Myocardial infarction	Dysarthria clumsy- hand Headache	Left semioval center (white matter underneath cortex)	8mm
3	55	arterial hypertension	Dysarthria and clumsy hand	Pons	3mm
4	59	Type 2 diabetes, arterial hypertension	Dysarthria, clumsy hand and Asterixis	Between pons and midbrain	10x4mm
5	65	Type 2 diabetes arterial hypertension smoker atrial fibrillation	Unilateral Asterixis Hemiparesis Facio-brachio-crural	Right internal capsule	10mm
6	70	Type 2 diabetes arterial hypertension	Unilateral asterixis (right) Dysarthria, clumsy hand	Anterior pole thalamus	8mm

were also smokers. Cigarette smoking increases risk of all ischemic strokes, including lacunes and this fact has been well documented,[29-31] likewise, the major risk factors for the increased severity of lacunes is significantly higher when lifestyle is associated with hypertension.[32-34] In fact, hypertension is known to increase the risk of lacunar stroke in until 8.9 times.[32] Furthermore, studies reported that diabetes and hypertension were factors related to the recurrence and multiple lacunar infarcts of lacunar stroke in patients.[22,32,35] Recurrent strokes were more likely to be lacunar if the patient presented the first event as lacunar.[36]

Diabetes may be an important risk factor to lacunar disease.[37] Almost all the reported cases in this study are associated with diabetes and hypertension comorbidities. According to a cross-sectional study, these comorbidities increased the potential risk for development a lacunar infarction in patients.[38] Harvard Cooperative and Aboix et al., showed that 29% and 28% (respectively) of lacunar diagnosed cases were from patients with diabetes.[39,40] Moreover, smaller lacunes may be associated with diabetes and glycated hemoglobin.[41] We observed in this study that diabetics patients presented up to 15 mm lacunes in midbrain, white matter, and thalamus. As previously indicated, diabetic patients with recent lacunar stroke have a distinctive neuroimaging characteristic on MRI scan as compared with those without diabetes and increased the incidence of posterior circulation infarcts but a lower burden of microbleeds and enlarged perivascular spaces.[42,43]

Epidemiological studies reported that survival after lacunar infarcts is greater among patients suffering lacunar infarctions compared with those with non-lacunar infarcts.[44,45] The consequences of lacunar infarction are cognitive impairment and dementia; these incidental lacunes double and more the risk of subsequent stroke and dementia.[14,19] Up to 20% of asymptomatic elderly persons have evidence of incidental lacunes on MRI scan.[14] Curiously, here we observed older people with lacunar infarction and mild motor symptoms (dysarthria and asterixis) without any symptoms of dementia.

Although the terminology of "lacunar infarction" a recent subcortical infarction does not always lead to a lacune in long-term follow-up. The small subcortical infarcts may occur in the perfusion territory of a small artery or arteriole penetrating the internal part of the brain (ie, cavities).[4,46,47] The terminology lacune of presumed vascular origin characterized by a round or ovoid, subcortical, fluid-filled cavity (signal similar to CSF) between 3 mm and 15 mm diameter, consistent with a previous acute small subcortical infarct or hemorrhage in the territory of one perforating arteriole.[4] The cause of most lacunes is presumed to be small subcortical infarcts, either symptomatic or silent that present many different clinical symptoms, including asterixis and dysarthria are associated.[9,16,17] Both neurological signs were confirmed in this report. Our related cases reinforce the hypothesis that risk factors as diabetes and hypertension added to the sensory motor symptoms may be an indicator of subsequent lacunar stroke occurrence.

In this study, we reported a case of thalamus lacunar infarction that was accompanied by unilateral asterixis. Asterixis or negative myoclonus occurs when a muscle contraction is suddenly interrupted. Usually, this involuntary movement is bilateral and accompanied by metabolic encephalopathy.[18,48,49] A study of 30 cases of unilateral asterixis revealed a prevalence of 1.9% focal post-stroke brain lesion, 19 of these patients presented thalamic lesions.[17] These abnormal involuntary movements are often transient (lasting from 2 to 12 days) and induced by contralateral lesions involving the thalamic ventrolateral and ventroposterior nucleus.[48] Asterixis may be mediated by the sensorimotor cortex rendered in an excessive inhibition as result of the thalamic lesion.[49] Unilateral asterixis has been reported in patients with thalamic lesion,[50,51] uncommonly is related in lacunar infarction outset.[16,18] Curiously, in our study, the classic characteristics of anterior thalamic infarction as neuropsychological deficits or altered levels of consciousness in early stages[52] or thalamic pain syndrome[53] were not detected in any patient. The reported cases in this study, the imaging exams of thalamic anterior lacunar infarction was accompanied by clinical manifestation of asterixis and dysarthria-clumsy hand. Although asterixis symptoms occurs because of thalamic injury,[49] further work is needed to understand the underlying motor symptoms mechanisms as injuries of small lacunar infarctions.

Dysarthria-clumsy hand is the most uncommon of all lacunar syndromes,[9] affecting between 2 and 6% of lacunar strokes.[40,54] Generally, these abnormalities occur due to a focal lesion in the basal ganglia causing damage to corticofugal fibers adjacent to axons of pontine neurons.[55,56] We reported five cases with dysarthria symptom and history of hypertension; these clinical symptoms developed abruptly in the setting of hypertension.[39,54] From the imaging studies (TC/MRI) it is possible to appreciate a small, deep infarction in a penetrating vessel territory reflecting an internal capsule or pons lesion. Regarding the possible location of lacunar infarctions with clinical consequence of dysarthria-clumsy hand, the encephalic pons is the most frequently site generating this clinical symptom.[9,54,57] Our results described one case of hypertension with lacunar infarct in the pons with dysarthria-clumsy hand, and other case with a lesion between pons and midbrain. In addition, in a study evaluating 35 patients with dysarthria-clumsy hand syndrome, 17% showed a pons lacunar infarct.[54]

Moreover, we reported one patient with lacunar

lesion in centrum semiovale. This region is supplied by the medullary artery of Duret, that comes off pial branches of the middle cerebral artery. This characteristic is suggested to be prone to embolism from large artery or perfusion failure, or atheromatous disease of the branch arteries.[58] However, some evidence controversy about infarcts in the centrum semiovale may be found in the magnetic resonance (MR) definition of lacunar infarct,[4,59] while other studies have supported that infarct in this location have lacunar mechanism.[4,9,60-62] White matter has a characteristic in the blood flow, known as watershed effect. This condition is the most vulnerable to suffer hypoxia/hypoperfusion.[63] Besides that, white matter hyperintensities may origin from several factors, such as demyelination, caused by chronic diffuse hypoperfusion or reduced cerebral blood flow, to break down of the blood–brain barrier, disturbances of small blood vessels, glial activation or loss of oligodendrocytes and small infarcts in the white matter.[63-65] In this study, MRI and CT showed lacunar infarction with a diameter between 8 and 15 mm.

The principal limitation of this study is lacking follow up of the patient's clinical course. This may be due to the fact that the patient, once diagnosed and placed in treatment, does not attend subsequent evaluations. As these lesions are mostly benign, the patient fully recovers and does not return to a subsequent appointment. On the other hand, there may be an under reporting of abnormal movements in the acute phase of stroke due to late presentation of patients to the healthcare facility. Another explanation may be a recall bias due to poor memory of the presence of abnormal movements in the acute phase of stroke, focusing on the more pronounced neurological manifestations and subtle asterixis or dysarthria-clumsy hand may not be noticed.

Conclusion

The report of a series of cases with intrinsic association between the presence of asterixis and dysarthria-clumsy hand as symptoms of ischemic lacunar infarction are presented here. The present work highlights the importance of considering abnormal neurological movements as a possible diagnosis of lacunar infarctions. Although asterixis and dysarthria-clumsy hand do not belong exclusively to the lacunar syndromes, they must be taken into consideration by the physicians. Due to the transience of these movements, the diagnosis at the appropriate time is essential, to obtain prompt exams, give adequate treatment, and prevent future strokes. These case series can contribute to the proper diagnosis of lacunar infarctions.

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