



## ORIGINAL ARTICLE

# Cerebellar infarction: Prognosis and complications of vascular territories<sup>☆,☆☆</sup>

L.M. Cano<sup>a,\*</sup>, P. Cardona<sup>a</sup>, H. Quesada<sup>a</sup>, P. Mora<sup>b</sup>, F. Rubio<sup>a</sup>

<sup>a</sup> Servicio de Neurología, Hospital Universitari de Bellvitge, IDIBELL, L'Hospitalet de Llobregat, Barcelona, Spain

<sup>b</sup> Servicio de Radiología, Hospital Universitari de Bellvitge, IDIBELL, L'Hospitalet de Llobregat, Barcelona, Spain

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### KEYWORDS

Cerebellar infarction;  
Cerebellum;  
Hydrocephalus;  
PICA;  
Stroke

### Abstract

**Introduction:** Cerebellar infarction (CI) is uncommon, but may result in severe complications. The aim of our study was to determine the characteristics of patients with CI, as well as their outcomes as regards the territories affected.

**Patients and methods:** Data were collected from 124 patients admitted to our department during a five-year period, with a radiological diagnosis of CI, and with or without involvement of other brain territories.

**Results:** The mean age in our series was 65.2 years, with most being male (68.5%). The posterior inferior cerebellar artery (PICA) was the most commonly affected territory at 49.2%, followed by superior cerebellar artery (SCA) at 17.7%, and anterior inferior cerebellar artery (AICA) at 10.5%. There was simultaneous supratentorial involvement in 13.7%, and two or three cerebellar arteries involved in 8.9%. The main aetiology in PICA was atherothrombosis ( $P = .02$ ). On the other hand, cardio-embolism was the main origin in cases with more than one affected territory ( $P = .04$ ). No particular aetiology could be found in SCA and AICA. There was haemorrhagic transformation in 29 patients (23.4%), particularly in the PICA and when other territories were involved. There was hydrocephalus in 15 patients (12.1%, 12 of them PICA;  $P = .02$ ) in  $2.9 \pm 1.5$  days from stroke onset. At discharge, the degree of disability was worse if more than one arterial territory was involved (Rankin  $\geq 3$ , 64% versus 31–36%;  $P = .05$ ). Four (3.2%) patients died.

**Conclusions:** CI is very heterogeneous. Nevertheless, it is noteworthy that PICA infarction is the most frequent type and its aetiology is usually atherothrombotic. Moreover, it is the territory most frequently associated with severe complications, which take place during the first week of the stroke.

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\* Corresponding author.

E-mail address: [lcano@bellvitgehospital.cat](mailto:lcano@bellvitgehospital.cat) (L.M. Cano).

**PALABRAS CLAVE**

Cerebelo;  
Hidrocefalia;  
Ictus;  
Infarto cerebeloso;  
PICA

**Infarto cerebeloso: pronóstico y complicaciones de sus territorios vasculares****Resumen**

**Introducción:** Los infartos cerebelosos (IC) son infrecuentes pero pueden presentar complicaciones graves. Nuestro objetivo ha sido estudiar las características de los pacientes con IC, así como su evolución, en función del territorio afectado.

**Pacientes y métodos:** Se han recogido datos de 124 pacientes ingresados en nuestro servicio durante un periodo de 5 años, con diagnóstico radiológico de IC, con y sin afectación de otras regiones cerebrales.

**Resultados:** La edad media de nuestra serie es de 65,2 años, con predominio masculino (68,5%). El territorio más afectado fue la arteria cerebelosa posteroinferior (PICA) en el 49,2%, seguido de la arteria cerebelosa superior (ACS) en el 17,7% y cerebelosa anteroinferior (AICA) en el 10,5%. Se afectaron territorios supra-infratentoriales en el 13,7% y dos/tres territorios cerebelosos en el 8,9%. La etiología aterotrombótica fue más prevalente en PICA ( $p = 0,02$ ) y la cardioembólica en la afectación de múltiples territorios ( $p = 0,04$ ), siendo similares en ACS y AICA. Se produjo transformación hemorrágica en 29 pacientes (23,4%), sobretudo en la afectación de múltiples territorios y en PICA. Se asoció hidrocefalia en 15 pacientes (12,1%, 12 de ellos PICA;  $p = 0,02$ ), apareciendo de media a los  $2,9 \pm 1,5$  días del inicio del ictus. Al alta, la dependencia funcional (Rankin  $\geq 3$ ) era mayor si la afectación territorial era múltiple (64% vs 31-36%;  $p = 0,05$ ). Se contabilizaron 4 defunciones (3,2%).

**Conclusiones:** Los IC tienen gran heterogeneidad. Sin embargo, cabe destacar que los infartos de PICA son los más prevalentes, su etiología suele ser aterotrombótica y son los más asociados a complicaciones graves, que ocurren durante la primera semana del ictus.

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**Introduction**

Cerebellar infarcts account for between 1.5% and 3% of all ischaemic strokes.<sup>1–3</sup> Their clinical manifestations are very diverse and often unspecific, meaning that this entity is often mistaken for other more benign conditions.<sup>2,3</sup>

At present, thanks to MRI brain scans, we can identify the affected territory more accurately, and detect other associated lesions. The mean age at which cerebellar infarcts appear is approximately 65 years. Two thirds of patients with this condition are male.<sup>3</sup>

The literature contains numerous studies of cerebellar infarcts in specific territories,<sup>5–12</sup> and others written from a more global point of view.<sup>1,3,4,13–17</sup>

Our objective is to analyse the epidemiology, aetiological factors, complications, and functional condition in patients with cerebellar infarct at time of discharge. We will also examine the relationship between those factors and the affected vascular territory.

**Patients and methods**

We performed a retrospective analysis of the 2480 patients admitted to our neurology department with a diagnosis of ischaemic stroke during a 5-year period (March 2005 to March 2010). Within this patient group, we selected and analysed the 124 patients (5%) with a radiological diagnosis of acute cerebellar infarct, with or without involvement of other vascular territories of the central nervous system. Radiological diagnosis was performed using computed tomography (CT) and/or brain MRI during hospitalisation.

Patients were grouped by affected territory using Amarenco's Diagrams<sup>14</sup>: superior cerebellar artery (SCA), anterior inferior cerebellar artery (AICA), posterior inferior cerebellar artery (PICA), more than one affected territory (CA+) and simultaneous affectation of supratentorial territories (ST) (Fig. 1).

Small vessel infarcts and boundary zone infarcts were not considered.

We recorded the following epidemiological variables from each patient: sex, age, presence of cardiovascular risk factors (smoking, high blood pressure, diabetes mellitus, dyslipidaemia, presence of cardioembolism) and aetiology (TOAST criteria<sup>18</sup>). We recorded the incidence rate of complications such as hydrocephalus, including the date of appearance or onset of haemorrhagic transformation. Prognosis was also assessed by analysing the baseline status and discharge status using the modified Rankin scale (mRS). Neurological sequelae were measured on the NIHSS scale.

Patients with a baseline mRS of 4 or 5 were excluded because their functional state limited their ability to be evaluated and treated.

Aetiology was determined by means of a vascular study (echo Doppler study of the supra-aortic trunks and CT angiography or MR angiography of the circle of Willis) and transthoracic echocardiogram. Patients were telemetrically monitored during their stay in a stroke unit. Where necessary, the study was expanded to include transoesophageal echocardiogram and transcranial Doppler ultrasound (TCD) with saline contrast to assess right-to-left shunt.

We checked for hydrocephalus and/or haemorrhagic transformation by performing sequential neuroimaging

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