



ORIGINAL ARTICLE

Large artery occlusion diagnosed by computed tomography angiography in acute ischaemic stroke: Frequency, predictive factors, and safety^{☆,☆☆}

J.A. Matías-Guiu^{a,*}, C. Serna-Candel^a, J.M. Espejo-Domínguez^b,
M. Fernández-Matarrubia^a, P. Simal^a, J. Matías-Guiu^a

^a Servicio de Neurología, Instituto de Neurociencias, Hospital Clínico San Carlos, Instituto de Investigación Sanitaria San Carlos (IdISSC), Madrid, Spain

^b Servicio de Diagnóstico por Imagen, Hospital Clínico San Carlos, Madrid, Spain

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Abstract

Introduction: Demonstrating artery occlusion in ischaemic stroke has gained importance due to the increasing availability of endovascular therapies. This study evaluates the frequency of artery occlusion, its associated factors, and complications following the use of CT-angiography in acute stroke.

Methods: We retrospectively analysed a cohort of patients who suffered acute ischaemic stroke between July and December 2011.

Results: We included 157 patients (mean age, 74 ± 11 ; mean NIHSS score, 5 [2–13]). Of the total, 56.7% of the patients were admitted to hospital during the first 8 hours. CT-angiography was performed in 71 cases (45.2%), arterial large-vessel occlusion was detected in 37 (52.1%) of these cases, and the most frequent site was M1 (40%). Univariate analysis showed that the NIHSS score (17 vs 7, $P < .001$) and atrial fibrillation (64% vs 32%, $P = .006$) were associated with artery occlusion. A logistic regression analysis was performed subsequently, confirming these associations. There were no cases of contrast-induced nephropathy. Door-to-needle time for intravenous thrombolysis was 61.2 ± 24.5 minutes in patients who underwent CT-angiography, and 53.5 ± 34.3 minutes in those who did not ($P = .495$).

Conclusions: Arterial occlusions are seen in 23.6% of patients, especially in those who are admitted during the first few hours. NIHSS score serves as a useful predictive factor.

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* Corresponding author.

E-mail address: jordimatiasguiu@hotmail.com (J.A. Matías-Guiu).

PALABRAS CLAVE

Ictus;
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 Endovascular

Oclusión arterial de gran vaso diagnosticada por angiografía por tomografía computarizada en el ictus isquémico agudo: frecuencia, factores predictores y seguridad

Resumen

Introducción: Con la creciente disponibilidad de las terapias endovasculares, la demostración de oclusión arterial en el ictus isquémico agudo ha cobrado mayor relevancia. Este estudio evalúa la frecuencia de oclusión arterial y los factores asociados a la misma, así como las complicaciones derivadas del uso de angio-TC en el ictus agudo.

Métodos: Se analizan retrospectivamente a los pacientes con ictus isquémico entre el 1 de julio y el 31 de diciembre del 2011.

Resultados: Ciento cincuenta y siete pacientes (edad media de 74 ± 11 años, NIHSS 5 [2–13]). Un 56,7% llegó al hospital con menos de 8 h de evolución. Se realizó angio-TC en 71 casos (45,2%), detectando oclusión de gran vaso en 37 (52,1%). La localización más frecuente fue M1 (40%). En el análisis univariante se halló asociación de la escala NIHSS (17 vs. 7, $p < 0,001$) y la fibrilación auricular (64% vs. 32%, $p = 0,006$) con la presencia de oclusión arterial. Posteriormente, se realizó una regresión logística, confirmando dicha asociación. No se observó ningún caso de nefropatía por contraste. El tiempo puerta-aguja para fibrinólisis intravenosa fue de $61,2 \pm 24,5$ min en los pacientes en que se realizó angio-TC y $53,5 \pm 34,3$ en los que no se realizó ($p = 0,495$).

Conclusiones: La oclusión de gran vaso se detecta en el 23,6% de la muestra, especialmente en los pacientes traídos en las primeras horas. La escala NIHSS es un buen factor predictor.

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Introduction

Recent years have delivered an important breakthrough in the treatment of acute ischaemic stroke.¹ Identifying artery occlusion of extracranial and intracranial vessels has been identified as a prognostic factor for the response to revascularisation therapies.^{2–4} This finding is also used in selecting patients who are candidates for endovascular treatment with mechanical thrombectomy.^{5,6}

Computed tomography angiography (CT-angiography) is being used increasingly in acute stroke because it is reliable and can be performed quickly.^{7,8} However, the utility and risks of widespread use of this test remain open to debate in the literature. The frequency of arterial occlusion in acute ischaemic stroke remains unknown in our setting, and this information is relevant for identifying candidates for endovascular treatment.⁹ Our study's hypothesis is that large artery occlusion is frequently present in acute stroke and that performing CT-angiography is safe. A series of clinical factors could be useful for selecting patients who should undergo CT-angiography, which would optimise the diagnostic process. The aim of our study was to analyse the frequency of large artery occlusion, factors linked to occlusion, and complications derived from using CT-angiography in a consecutive series of patients.

Materials and methods

The study retrospectively selected all the patients diagnosed with acute ischaemic stroke and admitted to the stroke unit, neurology department, or intensive care unit

of our hospital between 1 July and 31 December 2011. We excluded patients with transient ischaemic attack whose symptoms resolved before arriving at the hospital, patients transferred from other hospitals for endovascular treatment, and patients transferred from other hospitals at more than 8 hours after onset.

Endovascular treatment began to be offered in our hospital in 2009 and performing CT-angiography is now a common practice in the diagnostic management of acute stroke. The acute ischaemic stroke care protocols implemented in our hospital include performing CT and CT-angiography in all patients with clinical suspicion of arterial occlusion and who may be candidates for endovascular treatment. Both tests are completed before starting intravenous thrombolysis, where this treatment is indicated. We performed a baseline brain CT scan and CT-angiography to assess the supra-aortic trunks and the circle of Willis from the aortic arch to the cranial vertex. The contrast medium used was Optiray Ultraject® 300 mg/mL. Images were captured with the bolus tracking technique and guided injection; consequently, the final volume of contrast injected depended on the patient, but volumes did not exceed 100 mL. After capturing images, we proceeded to manual post-processing. Large artery occlusion is defined as a contrast-filling defect in any of these arteries: internal carotid artery, middle cerebral artery (M1 and M2 segments), anterior cerebral artery, vertebral artery, basilar artery, and posterior cerebral artery. An additional vascular examination (neurosonology study, magnetic resonance angiography) was performed during the patient's hospital stay, typically in the 24 to 48 hours after admission.

Regarding risks and complications, this study evaluated contrast-induced nephropathy, allergic reaction to contrast,

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