Scientific Research Publishing

Neuroscience and Medicine, 2025, 16(3), 156-163
https://www.scirp.org/journal/nm
ISSN Online: 2158-2947
ISSN Print: 2158-2912

Clinical and Prognostic Characteristics of Carotid and Vertebral Artery Dissections at the Neurology Department of the CHI D'Aix en Provence

Nelly Diouf Mbourou[1], Sylvia Di Legge[2], Michel Arnaud Saphou Damon[1], Raymond Klevor[2], Elke Tsila[2], Annick Nsounda[1], Jennifer Nyangui Mapaga[1], Pupchen Nyngone[1], Grass Mambila[1], Chermine Mboumba Mboumba[1], Ibrahima Camara[1], Mael Ndao Eteno[1], Philomène Kouna Ndouongo[1]

[1]Neurology Department, Libreville University Hospital, Libreville, Gabon
[2]Neurology Department, CHI d'Aix EN PROVENCE, Aix en Provence, France
Email: mbouroud@yahoo.fr

How to cite this paper: Diouf Mbourou, N., Di Legge, S., Saphou Damon, M.A., Klevor, R., Tsila, E., Nsounda, A., Nyangui Mapaga, J., Nyngone, P., Mambila, G., Mboumba, C.M., Camara, I., Ndao Eteno, M. and Kouna Ndouongo, P. (2025) Clinical and Prognostic Characteristics of Carotid and Vertebral Artery Dissections at the Neurology Department of the CHI D'Aix en Provence. *Neuroscience and Medicine*, **16**, 156-163.
https://doi.org/10.4236/nm.2025.163016

Received: August 22, 2025
Accepted: September 26, 2025
Published: September 29, 2025

Abstract

Introduction: Cervicocephalic arterial dissection is a vascular condition caused by a cleavage within the arterial wall. While frequently investigated by radiologists, it remains less familiar to frontline clinicians. **Objective**: The primary objective of this study was to assess the clinical course and outcomes of intra- and extracranial arterial dissections. **Methods**: We conducted a single-center, retrospective and prospective descriptive study including 30 cases of carotid and/or vertebral dissections hospitalized between January 2018 and August 2023 in the Neurology Department of the Centre Hospitalier du Pays d'Aix en Provence. Magnetic resonance angiography with Fat-Sat sequences was considered the essential diagnostic tool. **Results**: The mean patient age was 45.1 years. In one-third of cases, ischemic stroke was the initial presentation, most often involving vertebral arteries. During hospitalization, most patients received antiplatelet therapy (93.0%) and a smaller proportion anticoagulation (13.0%). Clinical recovery occurred in an average of 4.8 months in 79.0% of followed patients. Overall, short-term outcomes were favorable in all cases, with no deaths reported; however, 30.0% of patients were lost to follow-up. **Conclusion**: Patients admitted for arterial dissection are typically active working adults, often presenting first to the emergency department before referral to neurology. Prognosis is generally favorable under antiplatelet therapy. Stroke is an uncommon complication, except in vertebral dissections.

Keywords

Aix, Carotid-Vertebral Artery Dissection, Outcomes

1. Introduction

Carotid and vertebral artery dissection is a vascular disorder typically observed in individuals under the age of 45 years [1]. It results from a separation within the arterial wall caused by a spontaneous intramural hematoma or a tear in the intima [2] [3].

It represents the second most common cause of stroke in young adults, after cardioembolic disease [4]. In most studies, the prognosis of these dissections is generally favorable.

Brain MRI, particularly axial T1 sequences with fat suppression (FAT-SAT), remains a highly sensitive diagnostic tool [5], as it allows direct visualization of the intramural hematoma as a spontaneous hyperintensity [6]. Duplex ultrasonography of the supra-aortic trunks is still considered the first-line imaging modality, routinely used in the diagnosis of extracranial dissections because of its accessibility [5] [7].

Once the diagnosis is confirmed, therapeutic management relies on the use of antithrombotic agents. However, no consensus currently exists regarding whether anticoagulation should be preferred over antiplatelet therapy [8].

The aim of this study was to provide a descriptive analysis of the demographic, clinico-radiological, and outcome characteristics of patients admitted to the Department of Neurology at the Intercommunal Hospital Center of Aix-en-Provence with a diagnosis of cervicocephalic arterial dissection.

2. Methodology

We conducted a monocentric, retrospective and prospective descriptive study between January 2018 and August 2023 in the Department of Neurology at Aix-en-Provence Hospital.

The study included 30 patients diagnosed with carotid and/or vertebral artery dissection and admitted during the study period.

The cervicocephalic dissections were confirmed by the visualisation of a wall haematoma on MRI (including Fat-Sat) and by the presence of stenosis, occlusion and aneurysm on angiographic sequences. All cases of dissections documented by imaging (MRI and/or CT) and hospitalized in the Stroke Unit during the study period were eligible.

Oral informed consent was obtained after patients were provided with explanations regarding study objectives and data use. Recruitment was based on an exhaustive review of patient files, combining data from the patient registry, the hospital medical information department (DIM) via discharge coding in electronic health record, and hospital discharge summaries. Additional information was ob-

tained by telephone interviews when necessary. Non-respondents were considered lost to follow-up.

The variables analyzed included demographics, annual distribution, mode of admission, occupation, clinical presentation, associated factors, lesion topography, imaging characteristics, acute-phase treatments, in-hospital course, and follow-up.

Data were collected on a standardized form and analyzed using Epi Info version 3.5. Descriptive statistics (means, proportions) and subgroup analyses were performed. The significance threshold was set at 5%. The study received verbal approval from the institutional ethics committee.

3. Results

We identified 30 patients. The mean age was 45.0 ± 10.35 years (range 27 - 67), with a median of 43.5 years. Eleven patients (37%) were between 40 and 49 years old.

Twenty patients (67%) were male and 10 (33%) female (sex ratio 2:1). Occupationally, 40% (n = 12) were manual workers engaged in physically demanding or repetitive tasks.

Most patients (60%) were initially admitted through the emergency department of Aix-en-Provence Hospital, either regulated or non-regulated via the Urgent Medical Aid Services (SAMU, center 15), before transfer to the stroke unit. Six patients (20%) were directly regulated via the SAMU, and another six (20%) were referred from affiliated institutions in the regional neurovascular network.

The number of dissections diagnosed increased over time, from 1 patient (3%) in 2018 to 11 patients (37%) between January and August 2023.

Presenting symptoms, alone or in combination, were: headache (53%), cervical pain (43%), Claude Bernard–Horner syndrome (27%), amaurosis (17%), vertigo (17%), sensorimotor deficits (46%), cranial nerve involvement (7%), and tinnitus (7%).

Ischemic stroke secondary to dissection was confirmed in 7 patients (23%): 4 in the vertebrobasilar territory (50% of vertebral dissections) and 3 in the carotid territory (10% of internal carotid dissections). Two patients (7%) presented with transient ischemic attacks.

All patients underwent CT angiography of the brain and supra-aortic trunks. MRI confirmation was obtained in 28 patients (93%), while duplex ultrasonography was performed in 19 (63%).

Internal carotid arteries were most frequently affected (73%, n = 22), followed by vertebral arteries (27%, n = 8). The most frequent acute topographies were subpetrous involvement for carotid dissections (37%) and V3-V4 segments for vertebral dissections (20%), predominantly right-sided (75%) (see **Photo 1**).

Imaging findings included intramural hematoma in all MRI-confirmed cases (90%), arterial stenosis with or without hemodynamic impact in 7 patients (23%), and intraluminal thrombus in 2 patients (7%). No dissecting aneurysms were ob-

served.

Photo 1. Axial and coronal cervical CT angiography. Cervical MRI, axial and sagittal sections, Fat-Sat sequence: Dissection of the left vertebral artery, 29-year-old female patient.

Risk factors were present in 53% of patients, mainly hypertension (30%), migraine (13%), and oral contraceptive use (10%). Environmental triggers preceded dissection in 17 patients (57%), including minor trauma (76.5%) such as heavy lifting (23%), non-traumatic sports (46%), operating machinery (15%), coughing/sneezing (15%), and cervical manipulations (10%). Direct trauma was re-

ported in 3 cases (10%) following boxing, surfing, or mountain biking accidents. The factors associated with the occurrence of dissection are summerized in Table 1.

Treatment consisted mainly of aspirin-based antiplatelet therapy (90%). Four patients (13%) received intravenous heparin, including one due to neurological worsening despite initial antiplatelet therapy. Vitamin K antagonists were introduced for those initially anticoagulated. Two patients underwent thrombolysis for early ischemic stroke with negative FLAIR sequences.

Table 1. Factors associated with the occurrence of dissection.

Associated Factors	Number	Percentage
Predisposing factors	2	7.0%
Vascular diseases (tortuosity/bending)	2	7.0%
Environmental Factors	17	57.0%
Recurrent minor trauma	13	76.5%
Cervical manipulation	3	17.7%
Prior infection	1	5.8%
Risk factors	16	53.0%
High blood pressure	9	56.0%
Migraine	4	25.0%
Oral contraception	3	19.0%
Pregnancy and post-partum	0	0.0%

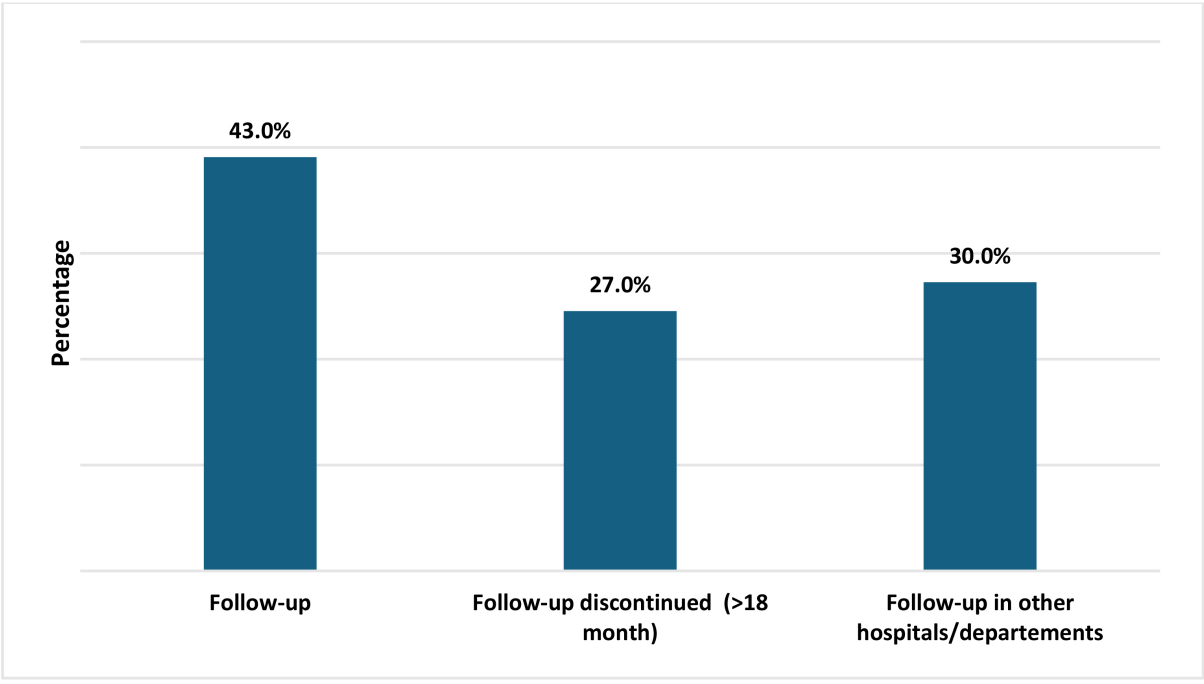

Figure 1. Outcome distribution.

Clinical evolution was favorable in all patients except one, who experienced dissection extension two weeks after discharge, necessitating therapy adjustment and subsequent recovery.

Follow-up imaging was performed in 70% of cases. Arterial healing was documented in 79% after an average of 4.8 months (range 3 - 12). No recurrences of dissection or ischemic events were observed.

A comprehensive workup for stroke in the young (cardiac, infectious, autoimmune, thrombophilia screening, homocysteine measurement, and vascular imaging for arterial wall disease or renal pathology) revealed no alternative etiology beyond dissection.

No deaths occurred. Mean follow-up was 14 ± 5 months. Thirteen patients (43%) continue follow-up in our center, 27% were stable but no longer under active follow-up, and 30% were followed elsewhere (**Figure 1**).

4. Discussion

This study aimed to assess the frequency, clinical presentation, management, and outcomes of cervicocephalic dissections in our center. Few series have been published, and often in specific contexts (e.g., pre-eclampsia, unusual presentations such as dysphonia, or in elderly patients) [2] [9].

Our cohort of 30 patients over 5 years and 8 months represented 0.9% of ischemic stroke/TIA admissions, a rate lower than the 2% typically reported in the literature. Under-reporting due to coding errors, exclusion of non-MRI-confirmed cases, and a large elderly stroke population in our center likely account for this difference.

We noted an increased number of diagnoses in recent years, peaking in 2023 (37% of cases), possibly due to prospective data collection and wider use of dedicated MRI sequences. The mean age (45 years) and male predominance were consistent with prior series [10]-[13]. Unlike some cohorts with a predominance of vertebral dissections, carotid involvement was more common in our study (73%).

Headache, cervical pain, and Horner syndrome were the most frequent symptoms, consistent with prior reports [7] [11]. Vertebral dissections were more strongly associated with ischemic stroke, highlighting the importance of considering this diagnosis in young patients with posterior circulation infarcts.

Environmental triggers and risk factors were both common, with hypertension emerging as a major modifiable factor. Indeed, high blood pressure due to arteriolopathy weakens the vascular wall, thereby increasing the risk of dissection. A recent study evaluating minor trauma and dissection did not show a clear link between cervical dissection and cervical manipulation, but practitioners should avoid any manipulation in cases of a history of cervical pathology [14].

Nevertheless, the small sample size precluded multivariate analysis in relation to confounding factors for these minor traumas and also for hypertension.

Treatment was largely antiplatelet-based, consistent with current practice, as no superiority has been shown for anticoagulation, though anticoagulation remains

considered in cases of progression [6] [15] [16]. Prognosis was favorable overall, with no recurrences and arterial healing in most patients by 5 months.

Patients lost to follow-up accounted for 30% of the total, but they had not responded to telephone calls, which could bias healing and recurrence. No deaths were observed. Mortality is low in the acute phase and, according to the series, is less than 5%.

Limitations include the small sample size and possible underestimation due to retrospective coding.

5. Conclusions

Cervicocephalic arterial dissection remains likely underdiagnosed, but its detection has increased with the availability of MRI angiography and dedicated sequences. It predominantly affects young adults, often manual workers, and commonly presents with headache or cervical pain. Hypertension and minor trauma are the main predisposing factors. Vertebral dissections are strongly associated with posterior circulation stroke.

Overall outcomes are favorable with antiplatelet therapy, although long-term follow-up is essential. Larger studies, dedicated imaging protocols, and clinician training are needed to improve recognition and reduce underdiagnosis.

Contributions

All authors contributed equally to this work. Diouf Mbourou Nelly, Dr. Di Legge Sylvia, and Dr. Tsila Elke drafted the manuscript. Dr. Saphou Damon Michel Arnaud and Dr. Klevor Raymond translated it into English. Dr. Nsounda Annick, Dr. Nyangui Mapaga Jennifer, Dr. Gnigone Pupchen, Dr. Mambila Grass, Dr. Mboumba Mboumba Chermine, Dr. Camara Ibrahima, and Dr. Ndao Eteno Mael conducted the literature review and revised the manuscript. Prof. Kouna validated all steps of the manuscript from conception to final submission.

Conflicts of Interest

The authors declare no conflict of interest.

References

[1] Stapf, C. and Arnold, M. (2010) Carotid Dissections: Histopathological Mechanisms and Patient Management. *Réanimation*, **19**, 498-504.

[2] François, G., Laurent, P., Eric, O. and Didier, L. (2019) Dissection carotidienne après 65 ans. *Revue Neurologique*, **175**, S67. https://doi.org/10.1016/j.neurol.2019.01.192

[3] Benninger, D.H., Georgiadis, D., Kremer, C., Studer, A., Nedeltchev, K. and Baumgartner, R.W. (2004) Mechanism of Ischemic Infarct in Spontaneous Carotid Dissection. *Stroke*, **35**, 482-485. https://doi.org/10.1161/01.str.0000109766.27393.52

[4] Sztajzel, R., Perren, F. and Michel, P. (2017) Dissections carotidiennes et vertébrales spontanées. *Revue Médicale Suisse*, **13**, 900-906. https://doi.org/10.53738/revmed.2017.13.560.0900

[5] Debette, S. and Leys, D. (2009) Cervical-Artery Dissections: Predisposing Factors,

Diagnosis, and Outcome. *The Lancet Neurology*, **8**, 668-678. https://doi.org/10.1016/s1474-4422(09)70084-5

[6] Markus, H.S., Levi, C., King, A., Madigan, J. and Norris, J. (2019) Antiplatelet Therapy vs Anticoagulation Therapy in Cervical Artery Dissection: The Cervical Artery Dissection in Stroke Study (CADISS) Randomized Clinical Trial Final Results. *Journal of Vascular Surgery*, **70**, 2098-2099. https://doi.org/10.1016/j.jvs.2019.09.003

[7] Souissi, W., Mariem, M., Zaouali, J., Derbali, H., Mansour, M. and Mrissa, R. (2017) Les dissections carotidiennes et vertébrales: Aspects cliniques, radiologiques et évolutifs. *Revue Neurologique*, **173**, S169. https://doi.org/10.1016/j.neurol.2017.01.323

[8] Fusco, M.R. and Harrigan, M.R. (2011) Cerebrovascular Dissections—A Review Part I: Spontaneous Dissections. *Neurosurgery*, **68**, 242-257. https://doi.org/10.1227/neu.0b013e3182012323

[9] Hoffmann, C., Augé, M., Falzone, E., Martel-Jacob, S. and Mercier, F.J. (2013) Dissection artérielle carotidienne bilatérale dans un contexte de prééclampsie sévère: Une cause inhabituelle de céphalées du post-partum. *Annales Françaises d'Anesthésie et de Réanimation*, **32**, 267-270. https://doi.org/10.1016/j.annfar.2013.02.008

[10] Chan, M.T.Y., Nadareishvili, Z.G. and Norris, J.W. (2000) Diagnostic Strategies in Young Patients with Ischemic Stroke in Canada. *Canadian Journal of Neurological Sciences*, **27**, 120-124. https://doi.org/10.1017/s0317167100052215

[11] Diouri, L., Guemmi, I., Ahsayen, F.Z., Amane, Y., Aqamour, R., Haddar, L., *et al.* (2023) Dissection et avc ischemique: A propos de 15 cas. *Journal of Neuroradiology*, **50**, 161-162. https://doi.org/10.1016/j.neurad.2023.01.090

[12] Van Damme, H., Martin, D., Stassen, M.P. and Limet, R. (1990) Dissections spontanées de la carotide interne. A propos de sept cas avec revue de la littérature. *Journal des Maladies Vasculaires*, **15**, 14-22. https://pubmed.ncbi.nlm.nih.gov/2179445/

[13] Kotchene, E.C. (2024) Aspects cliniques, paracliniques et thérapeutiques des dissections artérielles cervicales au Centre Hospitalier René Dubos de Pontoise (CHRD). Collections. Mémoires de spécialisations. Faculté de Médecine et d'Odonto-Stomatologie de Bamako, 1-50.

[14] Brown, S.P. (2024) Cervical Spine Manipulation and Causation of Cervical Artery Dissection: A Review of 10 Case Reports. *Cureus*, **16**, e62845. https://doi.org/10.7759/cureus.62845

[15] Debette, S., Mazighi, M., Bijlenga, P., Pezzini, A., Koga, M., Bersano, A., *et al.* (2021) ESO Guideline for the Management of Extracranial and Intracranial Artery Dissection. *European Stroke Journal*, **39**, 82-86. https://doi.org/10.1177/23969873211046475

[16] Furie, K.L., Kasner, S.E., Adams, R.J., Albers, G.W., Bush, R.L., Fagan, S.C., *et al* (2011) American Heart Association Stroke Council, Council on Cardiovascular Nursing, Council on Clinical Cardiology, and Interdisciplinary Council on Quality of Care and Outcomes Research Guidelines for the Prevention of Stroke in Patients with Stroke or Transient Ischemic Attack: A Guideline for Healthcare Professionals from the American Heart Association/American Stroke Association. *Stroke*, **42**, 227-276.