Navigating Acute Coronary Syndrome in Cameroon: Key Insights into Patient Profiles and Management from the DÉRICA Registry

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Received: 09 Jan 2026; **Accepted:** 20 Feb 2026; **Published:** 04 Mar 2026

Citation: Owona Amalia, Tang Nlend Serge Louis, Hamadou Ba, et al. Navigating Acute Coronary Syndrome in Cameroon: Key Insights into Patient Profiles and Management from the DÉRICA Registry. Cardiol Vasc Res. 2026; 10(2): 1-7.

ABSTRACT

Background: In Central Africa, data on the management of Acute Coronary Syndrome (ACS) remain scarce, particularly regarding comprehensive care within a cardiac catheterization laboratory.

Objective: To describe the epidemiological, angiographic, and therapeutic characteristics of patients managed for Acute Coronary Syndrome (ACS) at a cardiac catheterization unit in Cameroon, and to identify associated factors.

Methods: A descriptive and analytical cross-sectional observational study was conducted over a three-year period (November 2022–November 2025) at the Yaoundé General Hospital. Data were retrieved from the DéRICA registry. The study included all consecutive patients admitted for ACS with significant coronary lesions (≥50%) who underwent percutaneous coronary intervention (PCI).

Results: Among 115 patients admitted to the catheterization laboratory, 69 presented with ACS. The mean age was 56,97 ±11,69years, with a marked male predominance. Hypertension, diabetes, and dyslipidemia were highly prevalent. Elevated lipoprotein(a) was associated with ACS after adjustment (p adjusted = 0.039). Impaired left ventricular ejection fraction (LVEF < 50%) was significantly more frequent among STEMI patients. Most ACS patients sought medical attention within a timeframe of 1 to 30 days. Lesions of the left anterior descending (LAD) artery were significantly associated with ACS (aOR = 6,91). The severity of lesions according to the ACC/AHA classification did not differ significantly between the groups. As far as management is concerned, 39,2% patients presenting with STEMI underwent PCI with drug eluting stenting while 3,9% experienced CABG.

Conclusion: Our findings underscore the urgent need to enhance screening, facilitate access to coronary angiography and angioplasty, and expand interventional cardiology capacity.

Keywords
Acute Coronary Syndrome, Coronary Angiography, Percutaneous Coronary Intervention, Lipoprotein(a); Cameroon.

Introduction
Acute coronary syndromes (ACS) represent a leading cause of cardiovascular morbidity and mortality worldwide, constituting a major medical emergency that requires rapid and tailored management [1]. Long considered rare in sub-Saharan Africa, coronary artery disease is experiencing a progressive increase in the region, driven by the epidemiological transition, urbanization, and the rising prevalence of cardiovascular risk factors such as hypertension, diabetes, and dyslipidemia [2].

Coronary angiography remains the gold standard for the anatomical evaluation of coronary lesions during ACS, guiding therapeutic strategies whether medical, interventional, or surgical [3]. The angiographic characteristics of ACS are well-documented in

Western countries, where multivessel disease and complex lesions are frequent [4]. Conversely, data from sub-Saharan Africa remain limited and are often monocentric, failing to consistently reflect the specific epidemiological and lesional patterns unique to this region [5].

Furthermore, emerging markers such as lipoprotein(a) [Lp(a)] are garnering increasing interest as independent risk factors for coronary artery disease; however, their role in ACS within the African context remains understudied [6].

The objective of this study was to describe the clinical, angiographic, and therapeutic characteristics of patients managed for ACS in a coronary angiography unit in Cameroon, and to identify the factors associated with the occurrence of acute coronary lesions.

Materials and Methods
Study Setting and Design
This study was conducted in Yaoundé, the political capital of Cameroon, which houses the country's first and only functional cardiac catheterization laboratory. Located at the Yaoundé General Hospital, the unit has been operated by a single interventional cardiologist since November 2022. We performed a descriptive and analytical cross-sectional observational study over a three-year period (November 8, 2022, to November 8, 2025), in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines [7].

Data Source
Data were extracted from the Yaoundé Registry of Interventional Cardiology Achievements (**DéRICA**). This registry systematically records all patients admitted to the cardiac catheterization laboratory within the Cardiovascular Explorations Department of the Yaoundé General Hospital. Collected information included sociodemographic, clinical, biological, angiographic, and therapeutic data.

Study Population
The study population consisted of all patients admitted for an acute coronary syndrome (ACS) who underwent coronary angiography during the study period.

Inclusion Criteria
Patients were included if they met the following criteria:
- Aged 18 years or older.
- Admitted for an ACS (STEMI, NSTEMI, or unstable angina) according to international definitions [1].
- Presented with significant coronary lesions, defined as stenosis ≥ 50% via quantitative coronary analysis (QCA).
- Underwent percutaneous coronary intervention (PCI), regardless of procedural success.

Exclusion Criteria
The following were excluded:
- Patients with normal coronary arteries or non-significant lesions (< 50%).
- Incomplete or unusable medical records.
- Patients who refused to participate in the study.

Sampling Method
An exhaustive, consecutive, non-probability sampling method was employed, including all eligible patients during the study period.

Angiographic Procedure and Definitions
Coronary angiography was performed using a SIEMENS® Artis One imaging system via radial or femoral access, based on clinical assessment and operator preference. Coronary lesions were analyzed according to:
- The number of vessels involved (single-vessel, double-vessel, or triple-vessel disease).
- Lesion location (Left Main, LAD, Circumflex, Right Coronary Artery).
- Morphological severity according to the ACC/AHA classification [8].

A PCI was considered successful in the event of residual stenosis < 20% with TIMI 3 flow at the end of the procedure.

Variables Studied
The analyzed variables included:
- Sociodemographic variables: Age, sex.
- Clinical variables: Cardiovascular risk factors, medical and cardiological history.
- Biological variables: Notably lipoprotein(a), with an elevated threshold defined as >50 mg/dL.
- Echocardiographic variables: Left ventricular ejection fraction (LVEF), categorized as impaired if < 50%.
- Angiographic variables: Coronary dominance, number of vessels involved, lesion location, and severity.
- Therapeutic variables: Management strategy (PCI, optimal medical therapy, coronary artery bypass grafting [CABG], or Heart Team discussion).

Statistical Analysis
Data were analyzed using SPSS® version 26 (IBM Corp., Armonk, NY). Quantitative variables were expressed as mean ± standard deviation or as median with interquartile ranges, depending on their distribution. Qualitative variables were expressed as frequencies and percentages.

Inter-variable comparisons were performed using:
- Student's t-test or the Mann–Whitney U test for quantitative variables.
- Chi-square test or Fisher's exact test for qualitative variables.

Factors associated with ACS were analyzed using bivariate and multivariate logistic regression, with results reported as odds ratios (OR) and their 95% confidence intervals (CI). Statistical significance was set at $p < 0.05$.

Ethical Considerations

All patients provided free, informed, and written consent prior to the procedure. The study was approved by the Ethics and Pharmacovigilance Committee of the Yaoundé General Hospital and was conducted in compliance with the principles of the Declaration of Helsinki [9]. Data anonymity and confidentiality were strictly maintained.

Results

The overall mean age of the population (56,97 ± 11,69 years), with a range of 27 to 82 years, confirms that coronary artery disease in Cameroon affects relatively young patients compared to Western cohorts. The absence of a statistically significant difference between the STEMI and NSTEMI groups suggests that age, while a critical factor in the onset of coronary artery disease, is not a discriminating factor for acute presentation within this specific population.

A clear male predominance, more pronounced among STEMI patients, aligns with the classic epidemiological profile of acute coronary syndromes. However, the lack of a statistical association underscores that, in this context, sex acts more as a global risk factor than as an independent determinant of ACS.

Higher age groups (> 70 years) were proportionally more represented among ACS− patients; this finding may reflect a clinical selection bias, where older patients are more frequently referred for diagnostic exploration rather than for overt acute clinical presentations.

Hypertension, type 2 diabetes, and dyslipidemia were highly prevalent in both groups, confirming their central role in the pathogenesis of coronary artery disease. The absence of a significant difference between the groups reflects a similar exposure to these risk factors, regardless of whether the clinical presentation was acute or non-acute.

The relatively low prevalence of smoking confirms a risk profile dominated by metabolic factors, which is characteristic of urban African populations.

Elevated lipoprotein(a) was associated with ACS after adjustment (p adjusted = 0.039). This result, while requiring cautious interpretation, suggests that Lp(a) may play a significant role in the pathophysiology of ACS in this context and warrants particular attention as an emerging risk marker.

Impaired left ventricular ejection fraction (LVEF < 50%) was significantly more frequent among STEMI patients, reflecting the hemodynamic and myocardial impact of acute coronary events and highlighting its strong prognostic value.

Most ACS patients sought medical attention within a timeframe of 1 to 30 days, reflecting a significant delay in management. This delay is likely attributable to constraints regarding accessibility, symptom recognition, and referral systems.

Right coronary dominance was the most prevalent pattern in both groups, with no significant association observed, which is consistent with classic anatomical distribution.

Single-vessel disease was the most frequent finding, suggesting a less diffuse pattern of coronary artery disease than that observed in high-income countries; this may be related to a shorter duration of exposure to cardiovascular risk factors.

The radial access site was predominantly utilized in ACS+ patients, reflecting a shift toward internationally recommended practices.

The central finding of this study is the strong association between lesions of the left anterior descending (LAD) artery and ACS, which remained significant after adjustment (**aOR = 6.91**). This result confirms the pivotal role of the LAD in the pathophysiology of ACS, due to the extensive myocardial territory it irrigates.

Table 1: Sociodemographic characteristics of patients according to the presence of Acute Coronary Syndrome.

Variables	STEMI (n=51)	NSTEMI (n=18)	p Value	OR (95%CI)
Mean age ± SD	56,49 ± 10,70	58,33 ± 14,41	0,569	Mean diff: -1,84 (-8,27 – 4,59)
Age groups (years)				
≤40	4(7,8)	2(11,1)	0,647	0,68 (0,11 – 4,08)
[41 - 50]	9(17,6)	3(11,1)	0,715	1,71 (0,33 – 8,81)
[51 - 60]	20 (39,2)	6(33,3)	0,658	1,29 (0,42 – 3,99)
[61 - 70]	15 (29,4)	4(22,2)	0,761	1,46 (0,41 – 5,16)
≥70	3(5,9)	4(22,2)	0,070 Ajusted p= 0,365	0,22 (0,04 – 1,09) a OR = 0,39 (0,05 – 2,99)
Sex				
Male	42 (82,4)	12 (66,7)	0,193	2,33 (0,69. – 7,87)
Female	9 (17,6)	6(33,3)	0,193	0,43 (0,13 – 1,45)

STEMI: ST-segment elevation myocardial infarction; NSTEMI: Non-ST-segment elevation myocardial infarction; aOR: Adjusted Odds Ratio; CI: Confidence Interval.

Table 2: Medical history, cardiovascular risk factors, and comorbidities according to ACS status.

Variables	STEMI (n = 51)	NSTEMI (n = 18)	p-value	OR (95% CI)
Medical History				
Prior coronary artery disease	1(2,0)	0	1,00	
Hypertension	35 (68,6)	13 (72,2)	1,00	0,84 (0,26 – 2,76)
T2DM	13 (25,5)	5 (27,8)	1,00	0,89 (0,27 – 2,98)
Dyslipidemia	26 (51)	8(44)	0,633	1,30 (0,44 – 3,83)
Smoking	4(7,8)	4(22,2)	0,192	0,29 (0,07 – 1,35)
Heart Failure	11 (21,6)	4 (22,2)	1,00	0,96 (0,26 – 3,52)
Heart Diseases				
Hypertensive heart disease	24 (47,1)	9 (50,0)	0,83	0,89 (0,30 – 2,61)
Ischemic heart disease	23 (45,1)	4 (22,2)	0,087 Ajusted p= 0,786	2,87 (0,83 – 9,94) aOR = 1,25 (0,25 – 6,39)
Mixed heart disease	9 (17,6)	2(11,1)	0,715	1,71 (0,33 – 8,81)
Comorbidities				
HIV infection	4(7,8)	0	0,566	
Elevated Lp(a) (≥50 mg/dL)	21 (41,2)	12 (66,7)	0,063 Ajusted p = 0,039	0,35 (0,11 - 1,08) aOR = 0,18 (0,039 – 0,92)
Impaired LVEF (< 50%)	29 (56,9)	4(22,2)	0,011 Ajusted p = 0,290	4,61 (1,33 – 15,97) aOR = 2,17 (0,52 – 9,18)
Medical Treatment Prior to Admission				
DAPT	48 (94,1)	17 (94,4)	1,00	0,94 (0,09 – 9,67)
OMT	36 (70,6)	10 (55,6)	0,245	1,92 (0,63 – 5,81)

STEMI: ST-segment elevation myocardial infarction; NSTEMI: Non-ST-segment elevation myocardial infarction; T2DM: Type 2 Diabetes Mellitus; Lp(a): Lipoprotein(a); LVEF: Left Ventricular Ejection Fraction; DAPT: Dual Antiplatelet Therapy; OMT: Optimal Medical Therapy; aOR: Adjusted Odds Ratio; CI: Confidence Interval.

Table 3: Time to presentation and angiographic characteristics according to ACS status.

Variables	STEMI (n = 51)	NSTEMI (n = 18)	p-value	OR (95% CI)
Time from event				
< 24hrs	7(13,7)	0	0,177	
[1-30] days	34(66,7)	16 (88,9)	**0,123**	0,25 (0,05 – 1,21)
[1-3] months	3 (5,9)	1(5,6)	1,00	1,06 (0,10 – 10,92)
> 3 months	7(13,7)	1(5,6)	0,670	2,71 (0,31 – 23,66)
Coronary Dominance				
Right	31 (60,8)	14 (77,8)	**0,193**	0,44 (0,13 – 1,54)
Left	7 (13,7)	3 (16,7)	0,713	0,80 (0,18 – 3,47)
Balanced	13 (25,5)	1(5,6)	0,094	5,82 (0,70 – 48,11)
Number of vessels involved				
Single-vessel disease	24 (47,1)	7 (38,9)	0,549	1,40 (0,47 – 4,18)
Double-vessel disease	5 (9,8)	1(5,6)	1,00	1,85 (0,20 – 16,98)
Triple-vessel disease	8(15,7)	4(22,2)	0,497	0,65 (0,17 – 2,50)

STEMI: ST-segment elevation myocardial infarction; NSTEMI: Non-ST-segment elevation myocardial infarction OR: Odds ratio; CI: Confidence interval.

The morphological severity of lesions, as categorized by the **ACC/AHA classification**, did not differ significantly between the groups, suggesting that the location of the lesion appears more determinant than its morphological complexity in the occurrence of ACS.

Percutaneous coronary intervention (PCI) was the primary therapeutic strategy among STEMI patients, although no statistically significant difference was observed. The non-negligible proportion of patients managed with optimal medical therapy (OMT) alone or categorized under "other management strategies" reflects the structural and organizational constraints within the healthcare system.
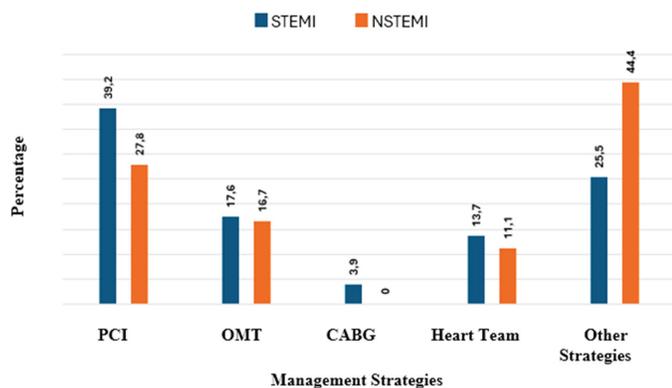

Figure 1: Therapeutic management strategies implemented according to ACS status.

The limited utilization of coronary artery bypass grafting (CABG) underscores the challenges in accessing cardiac surgery within the local context, thereby reinforcing the imperative for the expansion and development of interventional cardiology.

Discussion

A total of 115 patients were admitted to the coronary angiography unit, 69 of whom presented with an acute coronary syndrome (ACS), reflecting the high burden of coronary emergencies in our clinical setting. This proportion is comparable to those reported in several African series, where ACS represents the primary indication for both diagnostic and interventional coronary angiography [2].

Sociodemographic Characteristics

The mean age of the study population was 56.97 ± 11.69 years, with no significant difference between the ACS+ and ACS− groups. This relatively young age compared to Western series, where the mean age often exceeds 65 years, confirms the earlier onset of coronary artery disease in sub-Saharan Africa. This is likely attributable to a rapid epidemiological transition and inadequate control of cardiovascular risk factors [10]. The male predominance observed in ACS+ patients (82.4%) is consistent with current literature, as male sex is a recognized major risk factor for coronary artery disease, particularly in comparison to premenopausal women [11].

Medical History and Cardiovascular Risk Factors

Hypertension, type 2 diabetes, and dyslipidemia were prevalent in both groups, with no statistically significant differences. This high prevalence reflects the growing burden of cardiometabolic risk factors in Cameroon, which has been well-documented in

Table 4: Procedural and morphological characteristics of coronary lesions in patients with STEMI and NSTEMI.

Variables	STEMI (n = 51)	NSTEMI (n = 18)	p-value	OR (95% CI)
Coronary Angiography Access Site				
Femorale	18 (35,3)	10 (55,6)	0,132	0,43 (0,15 – 1,30)
Radial	33 (64,7)	8 (44,4)	**0,132**	2,29 (0,77 – 6,84)
Sites of Severe Obstructive Lesions				
Left Main (LM)	5 (9,8)	1 (5,6)	1,00	1,85 (0,20 – 16,98)
Left Anterior Descending (LAD)	32 (62,7)	5 (27,8)	**0,011** ajusted p = 0,033	4,38 (1,35 – 14,21) **aOR = 6,91 (1,17 – 40,98)**
Circumflex (LCx)	14 (27,5)	4 (22,2)	0,763	1,32 (0,37 – 4,72)
Right Coronary Artery (RCA)	14 (27,5)	7 (38,9)	0,365	0,59 (0,19 – 1,84)
Lesion Severity (ACC/AHA Classification)				
A	10 (20,4)	3(17,6)	1,00	1,20 (0,29 – 4,99)
B1	6(12,2)	2(11,8)	1,00	1,05 (0,19 – 5,76)
B2	5(10,2)	0	0,317	
C	6(12,2)	3(17,6)	0,684	0,65 (0,14 - 2,95)
NI (Not Identified/Specified)	22 (44,9)	9(52,9)	0,567	0,72 (0,24 – 2,19)

STEMI: ST Elevation Myocardial Infarction NSTEMI: Non ST Elevation Myocardial Infarction aOR: Adjusted Odds Ratio; CI: Confidence Interval; ACC/AHA: American College of Cardiology/American Heart Association

previous population-based studies [12]. Notably, smoking was relatively infrequent compared to European or North American cohorts, suggesting a distinct risk profile dominated by metabolic and hypertensive factors [13].

Lipoprotein(a) and Left Ventricular Function
A particularly compelling finding of this study is the association between elevated Lp(a) ($\geq$ 50 mg/dL) and the presence of ACS after adjustment (aOR = 0.18; 95% CI [0.039–0.92]). Although seemingly counter-intuitive, this relationship may reflect biases related to sample size or patient selection; however, it primarily underscores the growing importance of Lp(a) as an independent risk factor for coronary artery disease, now recognized by European and American guidelines [14]. Furthermore, impaired LVEF (< 50%) was significantly more frequent in ACS+ patients, reflecting the functional impact of ACS on the myocardium. This finding aligns with data demonstrating that left ventricular dysfunction is a powerful prognostic marker following an acute coronary event [15].

Angiographic Data
Angiographically, the predominance of left anterior descending (LAD) artery lesions in ACS+ patients was statistically significant after adjustment (aOR = 6.91). This observation is widely described in the literature, as the LAD is the artery most frequently involved in myocardial infarctions and is associated with the most severe forms due to the extensive myocardial territory at risk [3,8]. The majority of patients presented with single-vessel disease, which is comparable to several African series and contrasts with Western populations where multivessel disease is more frequent, likely due to a longer duration of exposure to risk factors [16].

Therapeutic Strategies
Percutaneous coronary intervention (PCI) was the most frequently utilized strategy in ACS+ patients, although no statistically significant difference was found compared to the ACS− group. However, the relatively high proportion of patients managed with optimal medical therapy (OMT) alone or referred for Heart Team discussion reflects constraints in accessibility, management delays, and technical resources frequently encountered in low- or middle-income countries. These results highlight the need to strengthen local interventional cardiology capacity and improve early management pathways for ACS.

Clinical Implications
This study highlights the specific angiographic profile of ACS in Cameroon, characterized by relatively young, predominantly male patients with a high prevalence of cardiometabolic risk factors and frequent LAD involvement. It also underscores the potential clinical utility of Lp(a) as a cardiovascular risk marker in our context, justifying larger-scale prospective studies.

Conclusion
This study elucidates the clinical, angiographic, and therapeutic landscape of acute coronary syndromes (ACS) managed in Cameroon. Our findings indicate that coronary artery disease in this region affects a relatively young population, with a marked male predominance and a high prevalence of traditional cardiovascular risk factors. From an angiographic perspective, lesions of the left anterior descending (LAD) artery were significantly associated with ACS, confirming its pivotal role in the pathophysiology of acute coronary events. Furthermore, the frequent observation of impaired left ventricular function underscores the severe myocardial and functional impact of these syndromes.

Additionally, the potential involvement of lipoprotein(a) highlights the clinical relevance of emerging risk markers within the African context. These results argue strongly for a multi-faceted approach: strengthening early screening programs, improving timely access to coronary angiography, and optimizing interventional management strategies. Such advancements are essential to mitigate the rising burden of ACS and improve cardiovascular outcomes in sub-Saharan Africa.

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