

CONTRIBUTION OF DIABETES MELLITUS TO FIRST-EVER ISCHEMIC STROKE: RESULTS FROM A POPULATION-BASED STUDY

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Background. Diabetes mellitus (DM) is a well-known cerebrovascular risk factor whose presence has been associated with an increased risk of ischemic stroke [1, 2]. The present study evaluates the prevalence of DM in patients with a first-ever ischemic stroke (FEIS), the baseline characteristics of diabetic and nondiabetic patients, and the impact of DM on FEIS outcome.

Methods. All FEIS occurring in residents within the L'Aquila district were included in a population-based prospective registry (2011-2013) and followed up to 1 year after the event. All events were identified by active monitoring of all inpatients and outpatients health services. All the available sources were checked, including hospital admissions within the district and in nearby hospitals, and general practitioners referral. To avoid the omission of any FEIS patient, admission and discharge hospital lists were checked weekly. Besides, neuroradiology, neurophysiology and neurosonology services were systematically checked. DM was defined as fasting plasma glucose ≥ 126 mg/dL (7.0 mmol/L) or use of insulin/oral hypoglycemic agents, and history of diabetes confirmed by medical records. *Fasting* was defined as no caloric intake for at least 8 hours. In the absence of unequivocal hyperglycemia, repeat testing was needed [3]. Both newly- and previously-diagnosed diabetics were included.

Results. Within the study period, 884 FEIS patients were identified; 849 patients (mean age \pm SD 76.5 \pm 11.9 years) had available information about glycemia to be included in the study (445 women, 52.4%); Of these, 211 patients (24.9%) were diabetics (125 women, 59.2%). Diabetes prevalence was not significantly different in men and women ≤ 64 years (21.4% vs 15.8%; $p=0.470$), while it was significantly higher in women >65 years (29.8% vs 21.3%; $p=0.012$) and >85 years (27.4% vs 14.1%; $p=0.037$). According to the Oxfordshire Community Stroke Project (OCSP) classification, diabetics had a significantly higher proportion of TACI (30.3 vs 21.0%) and a significantly lower proportion of PACI (39.8 vs 51.5%), while proportions of LACI and POCI were similar in diabetic and nondiabetic patients [Figure 1]. No difference was found in the distribution of stroke subtypes according to the Trial of Org 10172 in Acute Stroke Treatment (TOAST) criteria between diabetics and nondiabetics ($p=0.805$). With respect to nondiabetics, diabetic patients had more frequently peripheral arterial disease (12.8% vs 3.0%, $p<0.0001$), higher NIHSS score at stroke onset (median score 8, interquartile range (IQR) 4-16 vs median score 6, IQR 3-12; $p=0.0007$), and higher mRS score at discharge (median score 4, IQR 2-5 vs median score 3, IQR 2-5; $p<0.0001$) [Table 1]. At the multivariate Cox regression analysis [Table 2], the NIHSS score at stroke onset was a predictor of 30-day mortality (HR=1.07, 95% CI 1.05-1.09; $p<0.001$). DM and NIHSS score at stroke onset were predictors of 1-year mortality (HR=1.38, 95% CI 1.01-1.88; $p=0.044$ and HR=1.06, 95% CI 1.05-1.08; $p<0.001$ respectively), while hypercholesterolemia was protective (HR=0.61; 95% CI 0.39-0.96; $p=0.032$). At the Kaplan-Meier analysis [Figure 2], 1-year survival was higher in nondiabetic than in diabetic patients (85.9% vs 71.9%; $p<0.0001$ and 76.4% vs 59.0%; $p<0.0001$, respectively).

Conclusions. DM was present in 24.9% of our FEIS patients, and mostly in elderly women (29.8%). The contribution of DM to FEIS severity and prognosis was relevant, suggesting that strict control of glycemia over time is mandatory, together with new strategies to prevent or delay the onset of DM in the population, mostly in elderly women.

Figure 1. Subtypes of stroke according to the OCSP classification for nondiabetic and diabetic patients.

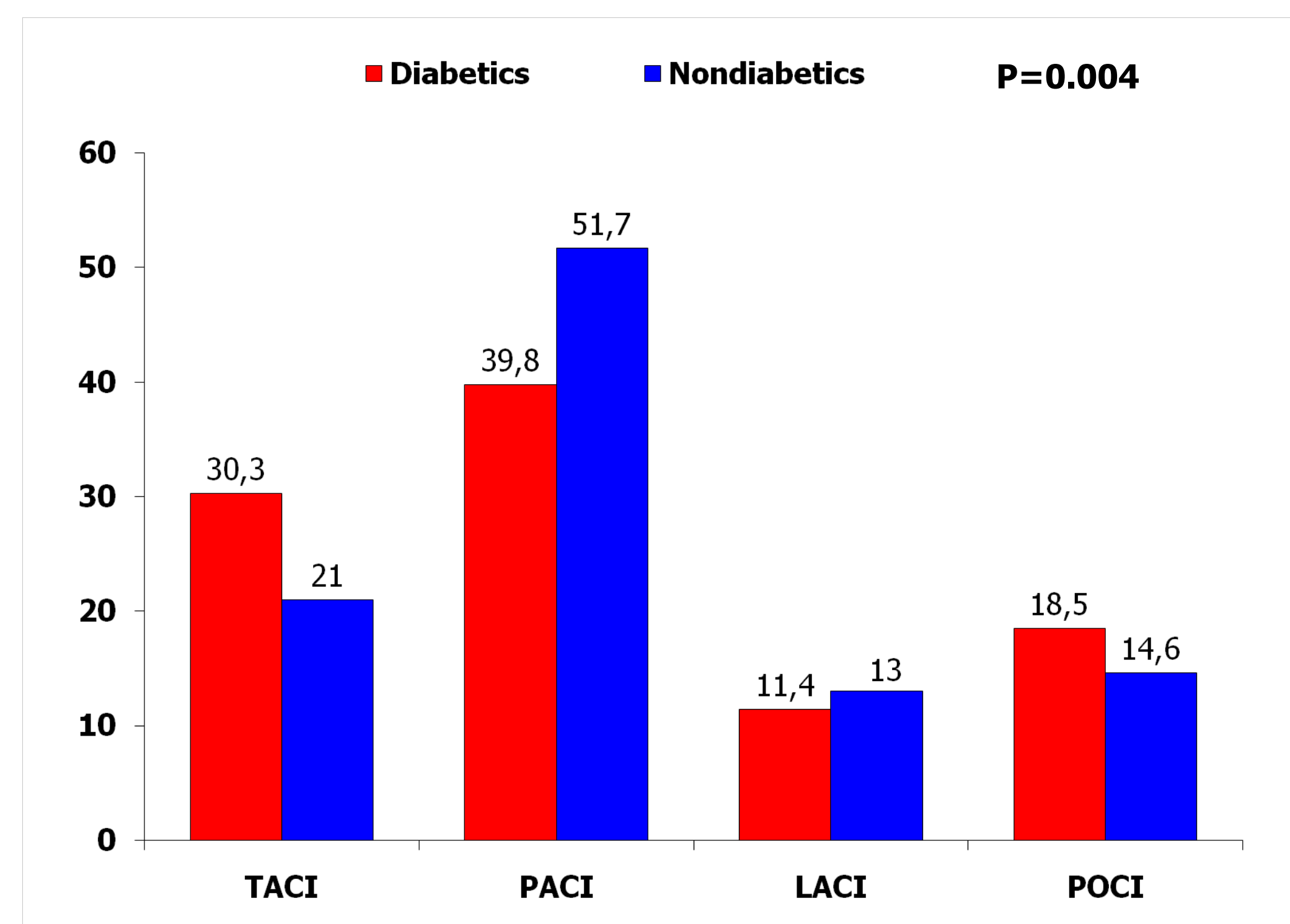


Figure 2. Kaplan-Meier survival analysis in nondiabetic and diabetic FEIS patients at 1 year.

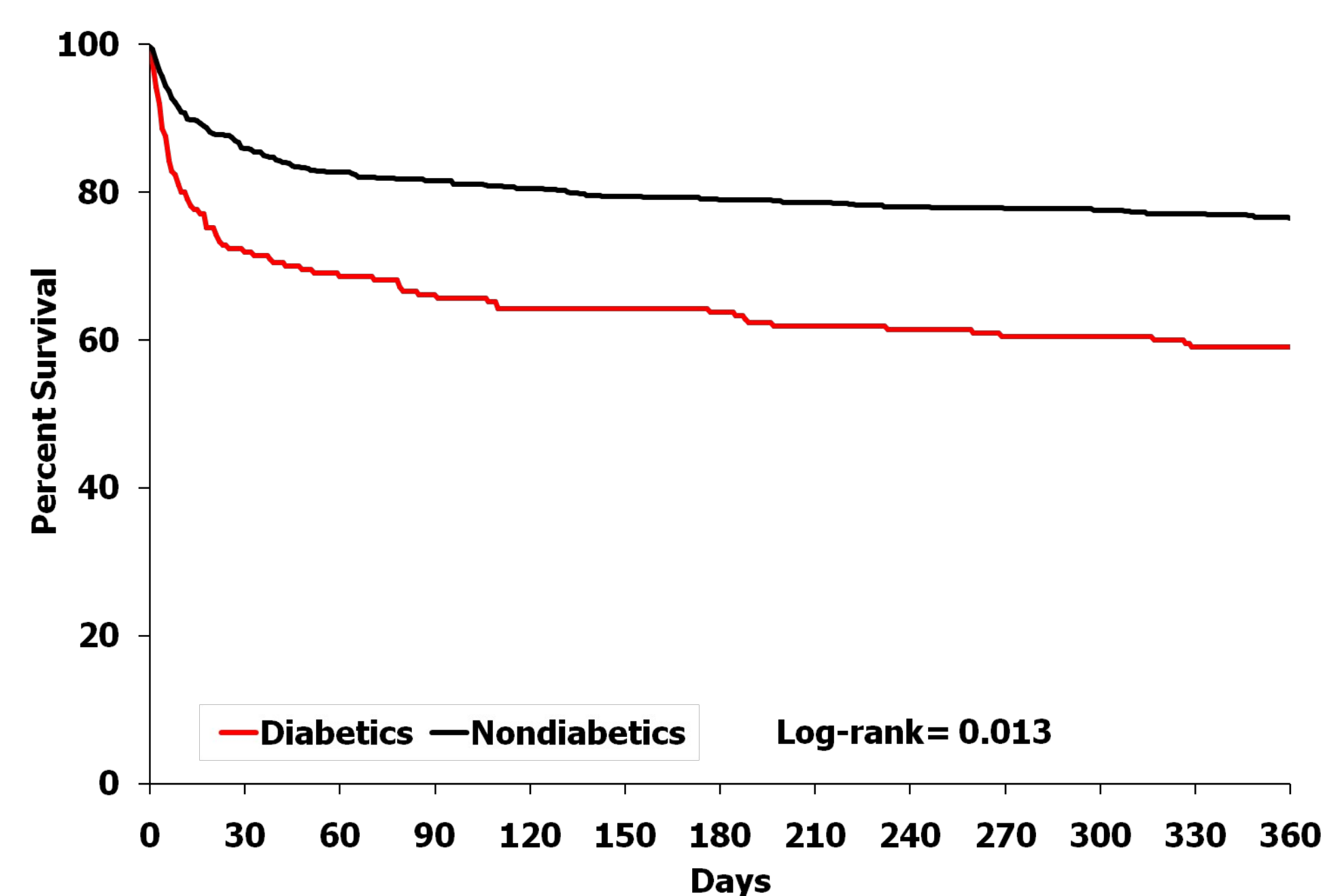


Table 1 Baseline characteristics of nondiabetic and diabetic FEIS patients.

Characteristics	DM- (n=638)	DM+ (n=211)	OR (95% CI)	p
Female/male, n (%)	320/318	125/86	1.44 (1.05-1.98)	0.002
Age ≥ 80 y, n (%)	292 (45.8)	112 (53.0)	1.34 (0.98-1.83)	0.065
Arterial hypertension, n (%)	484 (75.9)	171 (81.0)	1.36 (0.92-2.01)	0.121
Atrial fibrillation, n (%)	158 (24.8)	56 (26.5)	1.10 (0.77-1.56)	0.606
Coronary heart disease, n (%)	89 (13.9)	39 (18.5)	1.40 (0.93-2.12)	0.112
Hypercholesterolemia, n (%)	132 (20.7)	41 (19.4)	0.92 (0.63-1.37)	0.694
Cigarette smoking, n (%)	89 (13.9)	23 (10.9)	0.75 (0.46-1.23)	0.258
Peripheral arterial disease, n (%)	19 (3.0)	27 (12.8)	4.78 (2.60-8.80)	<0.0001
NIHSS at stroke onset, median (IQR)	6 (3-12)	8 (4-16)	-	0.0007
mRS at discharge, median (IQR)	3 (2-5)	4 (2-5)	-	<0.0001

Table 2. Predictors of 30-day and 1-year mortality in patients with FEIS.

Predictors	30-day		1 year	
	HR (95% CI)	p	HR (95% CI)	p
Atrial fibrillation	1.12 (0.76-1.65)	0.558	1.00 (0.74-1.34)	0.973
Male	1.29 (0.88-1.88)	0.187	1.15 (0.86-1.55)	0.337
Arterial hypertension	0.91 (0.57-1.45)	0.691	0.85 (0.60-1.21)	0.373
Diabetes mellitus	1.38 (0.94-2.03)	0.102	1.38 (1.01-1.88)	0.044
Coronary heart disease	1.14 (0.70-1.84)	0.600	1.21 (0.84-1.77)	0.311
Hypercholesterolemia	0.70 (0.40-1.23)	0.213	0.61 (0.39-0.96)	0.032
Cigarette smoking	0.98 (0.46-2.10)	0.955	0.87 (0.49-1.54)	0.626
Peripheral arterial disease	0.79 (0.40-1.57)	0.504	0.74 (0.43-1.26)	0.268
NIHSS at stroke onset	1.07 (1.05-1.09)	<0.001	1.06 (1.05-1.08)	<0.001

Bibliography

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