

PREDICTORS OF EARLY REHOSPITALIZATION IN PATIENTS WITH ACUTE CORONARY SYNDROME



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Background:

- Readmission following an acute coronary syndrome (ACS) is frequent in our community. Patient specific factors identifying those at risk of readmission are poorly described.
- Readmissions, in general, and following percutaneous coronary intervention (PCI), in particular, represent a significant clinical and economic burden to our healthcare system.
- Identifying the causes of readmission may help identify strategies to prevent readmission.

Methods:

Analyzed variables:

type of acute coronary syndrome (STEMI/NSTEMI/APNS), location of MI, gender, age, risk factors and comorbidities: hypertension (HTA), hyperlipidemia (HLP), diabetes melitus (DM), chronic obstructive pulmonary disease (COPD), coronary artery disease (CAD), peripheral vascular disease (PVD), cerebrovascular disease (CVD), ejection fraction (EF%), type of treatment (PCI versus noninvasive), extensiveness of coronary disease, GRACE and TIMI risk score, occurrence and type of morbidity during hospitalization, and reason for rehospitalization (ischemic events, heart failure, malignant arrhythmias etc)

Measured variables:

heart rate (HR), systolic blood pressure (SBP), body mass index (BMI), ejection fraction (EF%), GRACE risk score and TIMI risk score.

Statistical analysis:

SPSS 17 statistical packed; descriptive and comparative analysis, t-test, Chi square, univariate (binary logistic and linear regression) and multivariate linear regression (stepwise backward).

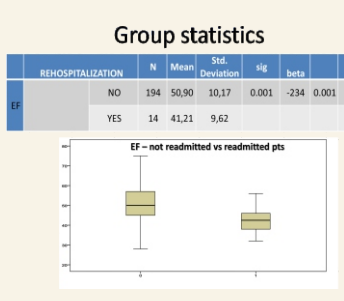
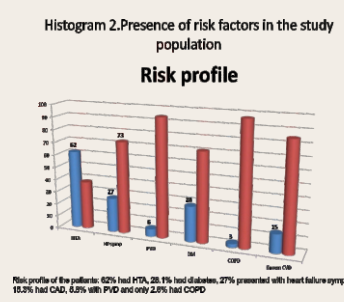
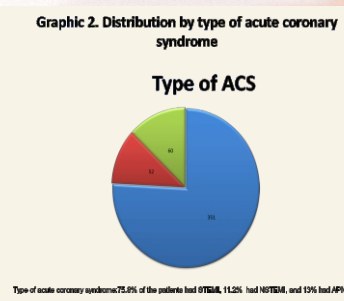
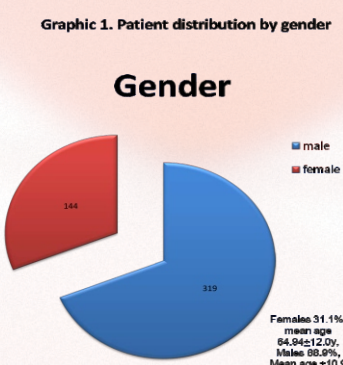
Results:

- 463 patients were enrolled: 68.9% males mean age 60.4±10.9, and 31.1% females mean age 64.94±12.0 (p 0.000).
- MI type: STEMI 75.8%, NSTEMI 11.2%, APNS 13%;
- MI location: 40.2% anterior, 39,7% inferior, 3% lateral and 3.7% multiple locations (p 0.000).
- Risk profile: 15.3% HCAD, 27% HF, 62% HTA, 28.1% DM, 5.8% PVD, 2.6% COPD.
- Mean BMI was 27±2.9, mean SBP 138.8±28.5mmHg, mean HR 84.3±24.2, mean EF (in 208 pts.) 50.2±10.4%, mean GRACE score (in 72 pts.) was 148.9±60.6, mean TIMI score (in 263 pts.) was 3.9±2.3.
- 87.5% were treated with PCI procedure, with mean disease's CA 1.84 (range 1-5), median 1 (p 0.000).
- Hospital morbidity was present in 16% of pts., 6.9% minor bleeding complications, 3% major bleeding complications, 2.4% acute HF, 1.9% pericardial effusion, and 1.1% early stent thrombosis.
- Early rehospitalization rate was 6.3% (29/463): 14 ischemic/trombotic events; 9 acute heart failures, 3 malignant arrhythmias, and three fatal events.
- Univariate predictors of RH: HR (R square 0.014, p 0.014, beta .116, r -.217, p 0.002); EF (%) (R square 0.055, p 0.001, beta -.234, r -.231, p 0.001). HTA was significantly associated with reduced hospitalization risk (Chi square 4.28, p 0.039, exp B .405, p 0.054), diabetes (Chi square 10.04, p 0.002, exp B 3.45, p 0.001), PVD (exp B 2.85, p 0.070), early in-hospital morbidity (exp B 2.12, p 0.084), and NSTEMI pts. had OR 1.3, and APNS pts. OR 1.16 for rehospitalization (higher but not significantly in comparison to STEMI pts.).
- Multivariate model with variables that were found significantly associated with HR, identified two strong independent predictors of early rehospitalization (mean square.424, sig 0.000), EF (beta -.220, p 0.001), and diabetes (t 2.52, p 0.012)

Purpose:

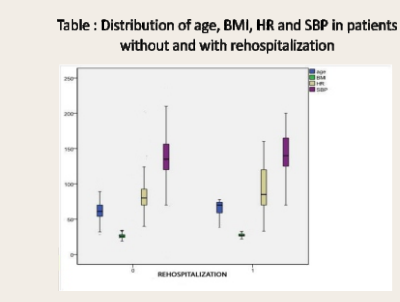
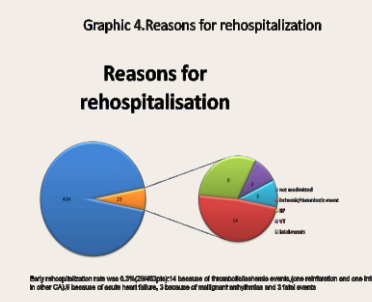
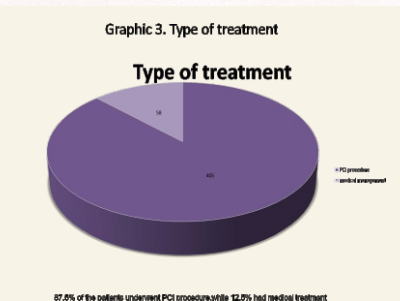
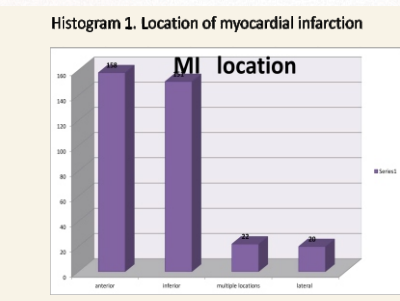
- The aim of our study was to analyze early rehospitalization rate, defined as 90 days after the acute event, in patients with acute coronary syndrome, in an attempt to identify significant predictors that can help us recognize patients at risk for readmission.
- To assist in the efforts to risk-stratify patients, we conducted a systematic review to identify models designed to compare hospital rates of readmission or predict patients' risk of readmission after acute coronary syndrome.

Comparative analysis was performed between patients with early rehospitalization and others



Comparative analysis of the variables as a function of rehospitalization

Variable	REHOSPITALIZATION	N	Mean	St. Dev.	sig
age	NO	434	61.50	11.43	.121
	YES	7	65.00	11.91	
BMI	NO	410	26.40	2.92	.032
	YES	25	27.72	3.75	
HR	NO	417	83.64	21.42	.014
	YES	27	94.44	31.11	
SBP	NO	412	138.09	28.93	.051
	YES	27	141.26	31.19	
Extensiveness of coronary disease	NO	385	1.83	1.06	.431
	YES	27	2.00	1.14	
EF	NO	194	50.90	10.17	.001
	YES	14	41.21	9.62	



Comparative analysis of the variables as a function of rehospitalization

	REHOSPITALIZATION NO	REHOSPITALIZATION YES	sig
HEART FAILURE	NO	317	21
	YES	117	8
HTA	NO	264	6
	YES	254	23
PVD	NO	411	25
	YES	24	4
DM	NO	320	13
	YES	114	16

Univariate predictors of early readmission were:

- Heart rate(beta .116, r -.217, p 0.002)
- EF(%) (beta -.234, r -.231, p 0.001)
- HTA-associated with reduced risk(exp B .405, p 0.054)
- Diabetes(exp B 3.45, p 0.001)
- PVD(exp B 2.85, p 0.070)
- Early in-hospital morbidity(exp B 2.12, p 0.084)

Multivariate stepwise backward regression model

Model	Unstandardized Coefficients	Standardized Coefficients	t	sig.	95.0% Confidence Interval for B
1	(Constant)	.284	.124	2.281	.024
	HR	.009	.001	.025	.984
	EF	-.005	-.002	-.208	.000
	HTA	.017	.037	.033	.461
	DM	.051	.038	.169	.248
5	(Constant)	.284	.124	2.281	.024
	HR	.009	.001	.025	.984
	EF	-.005	-.002	-.220	.001
	DM	.051	.037	.169	.252
	early complications	.089	.046	.131	1.948

Conclusion:

- Left ventricular systolic dysfunction was again proven to be a strong predictor of the clinical outcome in terms of early hospital readmission in patients with acute coronary syndrome no matter how they were treated, and diabetes was the single strong independent predictor-risk factor for this event

Multivariate stepwise backward regression model (heart rate, EF, HTA, DM, PVD, early complications, type of MI) at step 5 identified two strong independent predictors of early rehospitalization, EF(beta -.220, p 0.001) and diabetes(t 2.52, p 0.012)