

Incidence and Risk factors leading to Stress test and Coronary intervention in the patient presenting with Atrial Fibrillation in the ED

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Background

Many patients that have new onset Atrial Fibrillation (A fib) or present with A fib RVR (rapid ventricular response) in the Emergency Department (ED) undergo stress testing to rule out underlying Ischemia once their heart rate is controlled. This study looks to identify risk factors that may warrant stress testing and rule out those that do not in order to help decrease healthcare costs.

Methods

This study is a retrospective Cohort. The tests included are Stress Transthoracic Echocardiography (Echo), Myocardial contrast perfusion Echo, Gated heart pool scan, Exercise Stress testing involving a treadmill or bicycle, and Heart flow reserve measure. Data was obtained from the HCA Healthcare database looking at hospital admissions from the year 2016-2020 with an admitting diagnosis of atrial fibrillation.

Demographics

Initial Inclusion criteria had 12,403 encounters but after excluding patients greater than the age of 90, patients of undefined sex, Prisoners, those that left against medical advice, End Stage Renal Disease patients, patients with unknown Smoking status, and those with missing labs 8,761 encounters were included of whom 1387 received stress tests. The average age of the population was 69.08 ± 12.56, with 81.1 % White and the rest of other races, More than 70 % of the population had no diagnosis of Heart Failure, Diabetes, or COPD and had BMI greater than 24.9.

Discussion

A Fib is the most frequent cardiac arrhythmia seen in the emergency room and is associated with many cardiac disorders, Ischemia being among them. New Onset A fib is seen in approximately 10.7% of the population after Myocardial Infarction. The initial clinical symptoms of patients in A fib include but are not limited to Palpitations, Chest Pain, and Syncope; thus it becomes difficult to identify the etiology, however ischemia is often high on the differential of the Clinician. In our study, of the 1387 patients that underwent Cardiac stress tests, 198 underwent Left Heart Catheterization of whom 20 underwent a Percutaneous Coronary Intervention and 7 underwent Coronary Artery Bypass Grafting. Predictive Factors for Intervention in our patient population are seen in Table 1.

It is difficulty to determine which patients who initially complained of A fib also reported chest pain, which may have contributed to the clinician's decision to order a stress test, as well as the presumptions that patients who underwent a stress test and further had an intervention had a positive stress test, and vice versa, are the study's limitations. It is also challenging to determine if the patient in the ED had previously been diagnosed with A fib or the presentation is new onset A fib.

Conclusions

Patients that present to the ED with an admitting diagnosis of A fib and are either female, have a history of CHF, have elevated troponins, or have no history of CAD may benefit from Outpatient workup and may not require hospital admission for reasons other than immediate rate control leading to a decrease in total healthcare cost as compared to Male patients with a history of CAD and those that have a Cardiac stress test performed.

References

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Predictor	Estimate	SE	χ^2	p	Odds Ratio	95% Confidence Interval on Odds Ratio
Intercept	-7.073	1.483	23.710	< .0001	0.001	[0, 0.015]
Age	0.002	0.011	0.022	.883	1.002	[0.981, 1.023]
Sex (Male vs. Female)	0.824	0.286	9.078	.003	2.28	[1.324, 4.088]
Race (White vs. African American)	-0.239	0.452	0.295	.587	0.787	[0.292, 1.768]
Race (White vs. Other/Multiracial)	-0.832	0.545	2.913	.088	0.435	[0.125, 1.116]
Hypertension (Present vs. Absent)	-0.331	0.251	1.757	.185	0.719	[0.435, 1.17]
Congestive Heart Failure (Present vs. Absent)	-0.228	0.452	0.269	.604	0.796	[0.296, 1.785]
Hyperlipidemia (Present vs. Absent)	-0.320	0.250	1.633	.201	0.726	[0.445, 1.188]
Coronary Artery Disease (Present vs. Absent)	1.143	0.259	19.925	< .0001	3.135	[1.896, 5.249]
Chronic Obstructive Pulmonary Disease (Present vs. Absent)	-0.136	0.322	0.182	.670	0.873	[0.448, 1.594]
Peripheral Vascular Disease (Present vs. Absent)	-0.406	0.657	0.425	.514	0.666	[0.142, 2.022]
Cardiac Stress Test (Performed vs. Not)	1.235	0.252	21.212	< .0001	3.437	[2.076, 5.594]
Troponin (Elevated 1 or More Times vs. Never-Elevated)	0.311	0.247	1.612	.204	1.364	[0.847, 2.243]
GFR (G1 vs. G2)	-0.379	0.377	0.948	.330	0.685	[0.34, 1.51]
GFR (G1 vs. G3a)	-0.842	0.492	2.929	.087	0.431	[0.16, 1.132]
GFR (G1 vs. G3b)	-0.198	0.524	0.144	.705	0.821	[0.28, 2.266]
GFR (G1 vs. G4)	0.202	0.660	0.091	.763	1.224	[0.29, 4.127]
GFR (G1 vs. G5)	-0.766	0.453	2.764	.096	0.465	[0.191, 1.152]
Creatinine (Normal vs. Low)	-0.188	0.312	0.566	.452	0.829	[0.432, 1.48]
Creatinine (Normal vs. High)	0.464	0.584	0.377	.539	1.59	[0.422, 4.368]
BMI	0.000	0.000	0.000	.986	1	[1, 1]
Average MAP	0.014	0.013	1.207	.272	1.014	[0.989, 1.039]
Smoking (Ever-Smoker vs. Never-Smoker)	0.364	0.255	2.072	.150	1.438	[0.878, 2.393]

•Table.1 Predictive Factors of Cardiac Intervention in New Onset A fib Patients