Correlation between high sensitivity C-reactive protein and recurrence of atrial fibrillation after cardioversion in patients with 1st. attack AF.

Thesis
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دراسة العلاقة بين البروتين المتفاعل سى ومعاودة الذبذبة الأذينية بعد إنتظامها

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مقدمه توطئة للحصول على درجة الماجستير فى أمراض القلب والأوعية الدموية

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List of Abbreviations

2D	**:**	Two dimensional
ACE	**:**	Angiotensin converting enzyme
ACS	**:**	Acute coronary syndrome
AF	**:**	Atrial fibrillation
AHA	**:**	American Heart Association
ANP	**:**	Atrial naturetic peptide
AV	**:**	Atrio-ventricular
BP	**:**	Blood pressure
BNP	**:**	Brain naturetic peptide
BMI	**:**	body mass index
CBC	**:**	Complete blood count
CHD	**:**	coronary heart disease
CAD	**:**	Coronary artery disease
C3	**:**	Complement 3
CDC	**:**	Centers for disease control
CSA	**:**	Chronic stable angina
CVA	**:**	Cardiovascular accident
CVD	**:**	cardiovascular diseases
Cx40	**:**	Connecxin 40
DM	**:**	Diabetes mellitus
ECG	**:**	Electrocardiogram
EF	**:**	ejection fraction
ERP	**:**	Event related potentials
HCD	**:**	Hypertrophic cardiomyopathy
HDL	**:**	high-density lipoprotein

HF	:	heart failure
HS.CRP	:	High sensitivity C-reactive protein
HSPs	:	Heat shock proteins
HTN	:	Hypertension
IHD	:	ischemic heart disease
IL6	:	Interleukin 6
LDL	:	Low-density lipoprotein
LVH	:	Left ventricular hypertrophy
LV	:	*left ventricular*
MI	:	myocardial infarction
MS	:	Mitral stenosis
MR	:	Mitral regurgitation
LA	:	Left atrium
LAAPD	:	Left atrium anteroposterior diameter
PAF	:	Paroxysmal atrial fibrillation
PCI	:	Percutaneous cornary intervention
PE	:	Pulmonary embolism
RA	:	Right atium
SAECG	:	Signal averaged electrocardiogram
SCD	:	Sudden cardiac death
TIA	:	Transient ischemic attack

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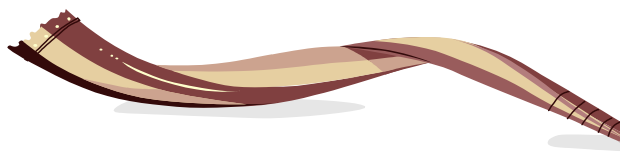Also, I would like to express my supreme gratitude to

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Atrial fibrillation

Prevalence:

Atrial fibrillation (AF) is the most common sustained arrhythmia seen by the physician. Its prevalence in the population increases with age, and it is estimated to affect over 4 percent of the population above the age of 60 *(Wolf et al., 1987)*.

Affected patients may be at increased risk for mortality (1.5- to 1.9-fold in the Framingham study), as result of deterioration in hemodynamics due to increased heart rate together with loss of atrioventricular (AV) synchrony, and progressive dysfunction of the left atrium and left ventricle, and for stroke and other embolic events from atrial thrombi *(Chugh et al., 2001)*

The prevalence of AF depends upon the population studied; the risk increases with age and with underlying heart disease *(Majeed et al., 2001)*.

The relationship between AF, age, sex and color was demonstrated in the ATRIA study, a cross-sectional study of almost 1.9 million subjects in a health maintenance organization in the United States. The following results were noted:

- The overall prevalence of AF was 1 percent; 70 percent were at least 65 years old and 45 percent were 75 years old.

- The prevalence of AF ranged from 0.1 percent among adults less than 55 years of age to 9 percent in those 80 years of age.

- The prevalence was higher in men than women (1.1 versus 0.8 percent), a difference seen in every age group.

- Among subjects over 50, AF was more frequent in whites than blacks (2.2 versus 1.5 percent). **(Go AS *et al.*, 2001)**

AF is uncommon in infants and children and when present, almost occurs in association with structural heart disease. Also healthy young adults are at low risk; in one report, for example, only five of over 122,000 routinely evaluated, healthy Air Force personnel had AF on a screening ECG *(HISS et al., 1962)*.

The prevalence of AF in the population is increasing. In a community-based study of 1.4 million patients in England, the age-standardized prevalence of AF between 1994 and 1998 increased by 22 and 14 % in men and women, respectively *(Feinberg et al., 1995)*.

In a recent report from the United States, the prevalence of AF in 2005 was 3.03 million, and the projected prevalence for 2050 will be 7.56 million *(Naccarelli et al., 2009)*.

Incidence:

The incidence of AF, like the prevalence, increases with advancing age and with the presence of cardiovascular disease *(Psaty et al., 1997)*.

In a longitudinal study in which 3983 male air force recruits were followed for 44 years, 7.5 percent developed AF. The risk increased with advancing age (from 0.5 per 1000 person-years before age 50 to 9.7 per 1000 person years after age 70) *(Krahn et al., 1995)*.

The lifetime risk for the development of AF was analyzed in a report from the Framingham Heart Study. A total of 8725 patients were followed from 1968 to 1999 (176,166 person-years of follow-up); 936 developed AF. The risk of developing AF from age 40 to age 95 was 26 percent for men and 23 percent for women. The risk of developing AF from age 80 to age 95 was 23 percent for men and 22 percent for women *(Lloyd et al., 2004)*.

CLASSIFICATION:

The following classification for AF when first detected has been proposed by the American College of Cardiology/American Heart Association/European Society of Cardiology (ACC/AHA/ESC).

- Paroxysmal (ie, self-terminating or intermittent) AF: If episodes terminate spontaneously in less than seven days, usually less than 24 hours.

- Persistent AF: If it fails to self-terminate within seven days. Episodes may eventually terminate spontaneously, or they can be terminated by cardioversion. A patient who has had an episode of persistent AF can have later episodes of AF that classify as paroxysmal (ie, self-terminating in less than seven days).

- Permanent AF: If the arrhythmia lasts for more than one year and cardioversion either has not been attempted or has failed.

- "Lone" AF: Describes paroxysmal, persistent, or permanent AF in individuals without structural heart disease. Lone AF has primarily been applied to patient's 60 years of age. This classification applies to episodes of AF that last more than 30 seconds and that are unrelated to a reversible cause. If the AF is secondary to cardiac surgery, pericarditis, myocardial infarction (MI), hyperthyroidism, pulmonary embolism, pulmonary disease, or other reversible causes, therapy is directed toward the underlying disease as well as the AF *(Fuster et al., 2006)*.

ETIOLOGY:

The most common causes are.

1. Hypertension: 16 to 34 %

2. Coronary artery disease: 6 to 24 %

3. Rheumatic heart disease: 3 to 14 %

4. Hyperthyroidism: 2 %

5. Miscellaneous: 12 to 16 % *(Suttorp et al. 1993)*.

Pathogenesis:

The factors that precipitate AF, particularly in patients without apparent structural heart disease, are incompletely understood. Atrial premature beats appear to be most importantfactor in initiation of AF *(Kolb et al., 2001)*.

Atrial premature beats: Several series in which Holter monitoring was performed have shown that the majority of episodes of AF are triggered by atrial premature beats, while a small number of AF episodes are preceded by typical atrial flutter or atrial tachycardia. Ectopic foci are most often located near the pulmonary veins, occurring in 89 and 94 percent of cases in two series. Other foci are located in the right and left atrium. The importance of the pulmonary veins in the genesis of AF is further illustrated by the beneficial effect of pulmonary vein isolation. Atrial premature beats appear to be most important as a trigger in patients with AF who have normal or

near-normal hearts. The relative importance of atrial premature beats or other triggers versus an abnormal substrate is much less clear in patients with significant structural heart disease *(Haïssaguerre et al., 1998)*.

Autonomic dysfunction: The autonomic nervous system may be involved, as both increased vagal (parasympathetic) and sympathetic tone can promote the development of AF. Increased sympathetic tone has been referred to as the adrenergic form of AF .Vagal tone is predominant in normal hearts, which may explain why vagally-mediated AF is often seen in athletic young men without apparent heart disease who have slow heart rates during rest or sleep, such patients may also have an ECG pattern of common atrial flutter alternating with AF *(Herweg et al., 1998).* Vagal stimulation and the associated hypotension may also contribute to the development of syncope in association with episodes of AF *(Brignole et al., 1993).*

Increased sympathetic tone may be associated with AF that occur in patients with underlying heart disease and during exercise or other activity .However, AF during exercise is a rare event; in a retrospective review of 3000 exercise tests, there were only four episodes of AF *(Graboys et al., 1980).* Sympathetic stimulation has also been suggested as the cause for AF associated with hyperthyroidism and coronary artery bypass graft surgery.