

Adherence to Guidelines of Secondary Prevention in patients with Ischemic Heart Disease in a Tertiary Cardiac Center

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Abstract

Background: Coronary heart disease (CHD) is the leading cause of death in United State (U.S.). Controlling of modifiable risk factors such as smoking, hypertension (HT), diabetes mellitus (D.M.), dyslipidemia, physical inactivity & obesity will prevent other serious cardiovascular complications.

Objective: This study was designed to determine the adherence of the patients who were known to have ischemic heart disease (I.H.D.) to the ACC/ AHA Guidelines of secondary prevention of I.H.D.

Patients and methods : This is an outpatient base study ,was conducted at the Iraqi Center of Heart Disease outpatient clinic from 1st. of October 2009 till 31st. of March 2010. Where two hundred & forty tow (242) patients were selected. Variable data were taken from the patients as follows: age, gender. Level of education, type of I.H.D., smoking habits, body weight & height, hypertensive patients, the control of blood sugar by measuring of HbA1c level for the diabetic patients. Fasting lipid profile, renal function testes, Hb also were tested. Baseline cardiac investigations in form of CXR, ECG, Echocardiography , TMT & previous coronary angiography were reviewed & finally several questioners for the patients regarding their disease, risk factors, cardio protective drugs & times of visits their physicians during a month.

Results: One hundred & sixty seven patients (69%) were smokers, (65%) of them quit smoking. (64%) were hypertensive, 57 % of them had uncontrolled HT. 16.5 % were diabetics, 90% of them had uncontrolled D.M. which is estimated by measurement of Hb1Ac $\leq 7\%$. (69%) were overweight, 24.4% of them were obese.

Conclusion: Most of the patients included in the study were not reaching a goal according to AHA/ACC Guidelines of secondary prevention apart from quit smoking & this may put them at high risk of development of further life threatening cardiovascular events like: recurrent ischemia, acute coronary syndrome, heart failure or even death.

Keywords: Ischemic heart disease, ACC/AH Guideline, secondary prevention

Introduction: Cardiovascular disease (CVD) is the leading cause of death & disability in developed nations & is increasing rapidly in the developing world ⁽¹⁾. Precipitation of the crucial role of risk factors in the Development of coronary heart disease (CHD) is one of the most significant advances in the understanding of this important disease.

Extensive epidemiological research has established cigarette smoking, diabetes. Dyslipidemia & hypertension as independent risk factors for CHD. In addition, treatment of these risk factors has been shown to reduce the risk of further cardiac event ⁽²⁾. IHD is the most common serious chronic life threatening illness in U.S. where 13 million persons have IHD; more than 6 million have angina pectoris & more than 7 million with acute myocardial infarction (MI) ⁽³⁾.

Atherosclerosis is a complex arterial disease in which cholesterol deposition; inflammation, extracellular matrix & thrombus formation play major roles ⁽⁴⁾. Atherosclerotic cardiovascular disease refers to the diffuse condition of atherosclerosis involving the heart (coronary arteries), brain (carotid, vertebral & cerebral arteries), aorta & peripheral arteries. Most of the risk factors that apply to one arterial bed also apply to others .coronary atherosclerotic disease include a wide range from silent ischemia & exertion induce angina to the acute coronary syndrome (ACS).stable angina (usually exertional) or stable silent ischemia commonly result from increases in myocardial oxygen demand that outstrip the ability of stenosed coronary arteries to increase oxygen delivery ⁽⁵⁾. In contrast ,ACS is characterized by an abrupt mismatch ,with about one third caused by increase in myocardial O₂ demand & two third caused by a thrombotic occlusion related to local vessel wall substrates(i.e. plaque ulceration or erosion),rheology (high shear stress after plaque distruption or distortion ,vasoconstriction) & systemic factors (i.e. blood hyperthrombogenicity) ⁽⁵⁾. Such factors also contribute in various consequences, to whether the ACS is manifested clinically as UA/ NSTEMI or STEMI.

Risk Factors of I.H.D.

Modifiable risk factors: include Cigarette smoking, Hypertension, Diabetes mellitus, Obesity (BMI ≥ 30 Kg / m²), Physical inactivity, Dyslipidemia (which is defined by any of the following, total serum cholesterol > 200

mg/dl, S.TG >150 mg /dl, LDL-cholesterol level >100 mg/dl. or HDL-cholesterol >40 mg/dl in male > 50mg/dl in female⁽⁶⁾

Non modifiable risk factors: include, Age (men \geq 45 years, women \geq 55 years) Family history of premature CAD (CAD in male 1st. degree relative < 55 years, CAD in female 1st.degree relative <65 years) or SCD⁽⁶⁾.

Emerging (Novel) risk factors⁽⁷⁾: C-reactive protein, Lipoprotein a, Fibrinogen, Homocystein, Although these Novel (emerging) risk factors are associated with vascular disease risk , their optimal use in routine screening & risk stratification remains to be determined⁽⁸⁾ .

Adherence to cardio protective medication: The cardioprotective drugs include: Antiplatelets, Statins, B Blockers, and Renin-angiotensin –aldosteron blockers. Medication adherence is associated with improve outcome among patients with diabetes &IHD. The goal is to use ACC/AHA guidelines to provide feedback to hospital & physician regarding their use of appropriate therapy. The success of this program will restart the ability of continuous quality improvement process to guide clinicians to optimal approach using ACC/AHA guidelines⁽⁹⁾.

Aim of study: To evaluate the adherence of patients who were known to have IHD according to the ACC/AHA guidelines of secondary prevention of IHD.

Patients and methods:

The Cross sectional descriptive study was performed in the Iraqi Center for heart Diseases. Total of two hundred & forty two (242) patients who were attending the outpatient clinic from 1st.of October 2009 till 31st. of March 2010 were selected. Each had a full history & clinical examination including assessment of coronary risk factors, Age, Smoking(smokers, nonsmokers or quit smoking (stop smoking for less than 2 years)),HT, D.M, Obesity, physical inactivity ,dyslipidemia & family history of premature C.A.D. or SCD, We select 2 types of presentations, those with stable angina & those with STEMI .

Blood sample were taken from all pahents to measure fasting Blood sugar, Hb A1c, blood urea, serum creatinin, Hb level &fasting serum lipid profile & readings were categorized as well controlled or dyslipidemic. dyslipidedmia was defined by any of the followings, Total serum cholesterol > 200 mg /dl, Serum LDL-cholesterol > 100 mg/dl, Serum HDL-cholesterol < 40 mg /dL in men & < 50 mg /dl in women and Serum TG > 150 mg/dl.

Cardiological assessment including CXR, ECG, TMT, TTE & coronary angiography were performed & looking for significant CXR finding like Cardiomegaly, pleural effusion (unilateral or bilateral) ,venous congestion Or Kerly B- line (interstitial oedema). On other hand significant ECG finding include: ST-T changes, LBBBB, LVH, pathological Q-wave or poor progression of R-wave . Body mass index (BMI) was calculated according to the equation, $BMI = \text{body weight in Kg} / \text{height in square meter}$ & categorized as normal BMI (18- 24.9 Kg/m²),Overweight (25-29.9 Kg/m²), Obese (>30 9Kg/m²). Diabetes mellitus defined as: polyuria or polydipsia plus random blood glucose concentration more than 200 mg /dl or fasting plasma glucose more than 126 mg/dl or 2 hours plasma glucose more than 200mg/dl during oral glucose tolerance test, or previous history of D.M. on oral hypoglycemic medication or insulin therapy. Blood samples were taken from diabetic patients to measure HbA1c &their reading were tabulated as well controlled (\leq 7%) Or uncontrolled ($>$ 7%).

Hypertension defined as: BP of 140/90mmHg or more, in two or more separated occasions, or history of hypertension on antihypertensive medication. Hypertensive patient categorized as controlled if BP< 140/90 mmHg or uncontrolled if BP >140/90mmHg. Previous coronary angiography or percutaneous coronary intervention reports were reviewed & the patients were classified to have (one ,two, three, four vessels disease or LMS lesion.) Several questions were asked to the patient about the diagnosis of their disease, risk factors of CAD &cardioprotective drugs & the frequency of visiting their physicians monthly & how they adhere to instructions provided by their treating physicians.

Exclusion criteria: include the followings, UA/NSTEMI, previously known primary valvular heart disease, Congenital heart disease, peripheral vascular disease, previous CABG.

Statistical analysis: All data were coded & enter to the computer by using statistical package of social science (SPSS 15) associated between different variables were measured by using Chi square test. Multiple linear regression models were used to differentiate between dependent & independent risk factors. P value below 0.05

consider as level of significance.

Results:

The age range of study was (35-72 year) & median age of 53.48 year & median of $53.40 \pm 2SD 7.628$. The distribution of patients according to age as shown in table (1) that show the majority of sample (40%) fall in age group (50-59) &the minority of them (2.5%) fall in age of <40.

Table (1) distribution of patients according to age.

Age group (year)	No.	%
< 40	6	2.5 %
40-49	64	26 %
50-59	98	40 %
60-69	54	22 %
≥70	18	7 %
Total	242	100 %

Table (2) distribution of patient according to gender, the table illustrate more than 2/3 Of sample were male.

Gender	No.	%
Female	44	18 %
Male	198	82 %
Total	242	100 %

Table (3) Distribution of patients according to the risk factors

The table showed that 1.156 pt.(64%)were hypertensive , 43% of them had controlled HT & 57%had uncontrolled HT.

2. 40 .pt. (16.5) were diabetic, 10% of them had controlled diabetes & 90% had uncontrolled diabetes.
- 3.161(66%) were dyslipidemia
4. 167(69%) had overweight, 24.4 were obese
5. 167(69%) were smokers, 65% quit smoking & 35% current smokers.
6. 33 (13.6%) had positive family history of premature CAD

Risk factor	Controlled		Uncontrolled		Total	
	No.	%	No.	%	No.	%
Hypertension	67	43 %	89	57 %	156	64 %
Diabetes	4	10 %	36	90 %	40	16.5
Body mass index	121*	73.3 %	46**	24.4%	167*	69 %
Smoking	109	65 %	58	35 %	167	69 %
Family history	209	86.4 %	33	13.6 %	242	100 %
Dyslipidemia	81	34.4 %	161	65.9 %	242	100 %

* mean over weight

** mean obese

-The table (4) shows that:

1. (78%) of the studied sample had significant ECG finding (ST-T changes, LBBB, LVH, pathological Q-wave or poor progression of R-wave) .the table also illustrate that about 41% of patients had significant CXR finding (cardiomegaly, venous congestion, pleural effusion or Kerly B-line (interstitial edema).
2. About one third of patients had EF less than 40%, 152 (62.8%) of patients have no TMT, the reasons either they were at high risk regarding test of probability or STEMI patients or this was the opinion of their physicians. Two third of patients has high level of S.LDL, 62 % has decreased level of S.HDL, 53% has increased level of S.TG, 42 % has increased level of S. Cholesterol.

Table(4): Baseline cardiac investigations of studied sample

Test	Non significant		Significant	
	No.	%	No.	%
ECG	51	22 %	197	78 %
CXR	143	59.1 %	99	40.9 %
EF	159*	65.7 %	83**	34.3 %
TMT	152	62.8 %	90	37.2 %

* mean EF > 40 %

** mean EF < 40 %

The table (5) showed significant association between gender, conventional risk factors & no. of affected coronary arteries.

Table (5): number of affected vessel according to risk factors

Risk factor		Normal vessel		One vessel		Two Vessel		Three vessel		Four vessel		Total		p-value
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Gender	Female	26	4.7	8	12.5	7	10.1	3	10	0	0	44	18.2	0.03
	Male	49	65.3	56	87.5	62	89.9	27	90	4	100	148	81.8	
Hypertension	Not HT	33	44	29	45.3	21	30.4	3	21.7	0	0	86	35.5	0.02
	Controlled HT	33	44	8	12.5	15	21.7	11	36.7	0	0	67	27.7	
	Uncontrolled HT	9	12	27	42.2	33	47.8	16	53.3	4	100	89	36.8	
Diabetes Mellitus	No DM	70	93.3	64	100	50	72.5	14	46.7	4	100	202	83.5	0.03
	Controlled DM	0	0	0	0	4	5.8	0	0	0	0	4	1.7	
	Uncontrolled DM	5	6.7	0	0	15	21.7	16	53.3	0	0	36	14.9	
BMI	Normal	15	20	12	18.8	18	26.1	8	26.7	4	100	57	23.6	0.04
	Overweight	47	62.7	42	65.6	18	26.1	14	46.7	0	0	121	50	
	Obese	13	17.3	10	15.6	33	47.8	8	26.7	0	0	64	26.4	
Dyslipidemia	No dyslipidemia	27	52.9	31	67.9	15	29.3	8	22.7	0	0	81	34	0.02
	Dyslipidemia	43	47.1	26	32.1	56	70.7	30	77.3	0	0	161	66	
smoking	Not smoking	45	60	13	20.3	14	20.3	3	10			75	31	0.042
	Quit smoking	28	37.3	29	45.3	37	53.6	11	36.7			109	45	
	Smoker	2	2.7	22	34.4	18	26.1	16	53.3			58	24	
Family history	Negative	72	96	46	71.9	61	88.4	26	86.7	4	100	209	86.4	0.001
	Positive	3	4	18	28.1	8	11.6	4	13.3			33	13.6	
Total Number		75		64		69		30		4		242		

Table (6): the distribution of answers of the patients to 7 questions answers for the patient's sample

Questions	Yes		No			
	No.	%	No.	%		
Q1/Do you know your clinical diagnosis?	179	74	63	26		
Q2/Do you know what are types of investigations & medications did you receives during hospitalization?	200	82.6	42	17.4		
Q3/ Do you know the cause of your disease?	198	81.8	44	18.2		
Q4/What is your opinion about the risk factors of CHD?	165	68.2	77	31.8		
Q5/ Do you know the drugs that used for your disease?	61	25.2	181	74.8		
Q6/Did any physician in the center explain to you any of the risk factors of CHD?	174	71.9	68	28.1		
Q7/ How many times you are visiting your physician during a month?	Once monthly		Twice monthly		On need	
	37	15.3	175	71.9	30	12.8

The table shows most of the studied patients know their clinical diagnosis, type of treatment, role of risk factors in CHD & most of them visit their physician twice monthly.

DISCUSSION:

The majority of patients fall in age group (50-59 year).Framingham Heart Study Investigators categorize the patients according to their age in groups & estimate the ten years risk for development of cardiovascular events, that range from (30-34 yr.) 3% to (70-74 yr.) 30 % ⁽¹⁰⁾.This demonstrate that our patients were seventeen year younger than in Framingham's, probably due to consumption of unhealthy diet which is rich in fat, poor awareness about the importance of achieving better control of risk factors such as hypertension ,diabetes and hyperlipidemia and also because of poor drug compliance.

Most patients in the study fall in category of overweight, which was estimated by BMI (25-29.9 Kg/m²). In this study 69% of patients were overweight, of whom 24.4% are obese. As compare to NHANES study in US which show 64.5% of men & women were overweight, of whom 30.5% were obese ⁽¹¹⁾. In this study 69% of the patients were overweight & were not adhere to guidelines & their physicians advises about programs of weight reduction ,regular physical activity & healthy diet ,or improper advise was given by their treating physicians as a consequence ,this may lead to uncontrolled HT ,D.M. & lipid metabolism & add more adverse cardiovascular events & mortality.

In this study 69% of patients were smokers, 65% of them quit smoking while 35% still smoking that is mean, most of the smokers quit their smoking habit, possibly because of good advice by their physician & patient adherence. Clinical practice guidelines from the U.S. Public Health Services recognize that tobacco dependence is a chronic condition that generally requires repeated intervention, they recommend asking patient about tobacco use at every visit, a strategy supported by the U.S. Preventive Services Task Force ⁽¹²⁾.

The total number of diabetic patients in the study was 40 ,only 10% of them had controlled diabetes that is estimated by measuring of HbA1c level which is < 7% as recommended by AHA/ACC guidelines & 90% had uncontrolled D.M. which is estimated by HbA1c level which is > 7%. In U.S. 7 % of population have D.M. , approximately 90% are type 2 D.M ⁽¹³⁾. One third of people with diabetes are not aware that they have the disease. The prevalence of diabetes appears to have increased over the last decade which may be a reflection of increasing BMI ⁽¹⁴⁾.

Patient who were included in the study were not reaching the require limit of diabetic control according to the guidelines & did not follow their physician advise about weight reduction , regular exercise, healthy diet & medication ,probably because of poor communication between the patient & their physician & poor circumstances that may prevent the patient from regular medical visits to obtain their proper medication. About two third of patients in the study were hypertensive, 57% of them had uncontrolled HT (BP > 140/90 mmHg). The prevalence of HT increases with age, from 7% of those aged 18 – 34 yr. to 66% of those older than 60 years ⁽¹⁵⁾. In the U.S. HT prevalence appears to be increasing. Although control of HT improved throughout the 1990s, particularly among older patients, control rate remain low (30%) ^(16, 17). Studied have consistently demonstrated that elevated systolic or diastolic BP is associated with increased risk of CVD ⁽¹⁸⁾.

In the study 57% of hypertensive patients were not at the required level of BP control, probably due to poor communication with their physician, inability to obtain their proper medication & achieve a healthy diet with low salt & fat & rich in fruits & vegetables. Poor drug compliance also plays a role.

Two third of patients included in the study had dyslipidemia according to the cutoff point mentioned in the AHA/ACC guidelines. 50% of American adults have cholesterol level $> 200\text{mg/dl}$ ⁽¹⁹⁾. Fasting TG level represent a useful marker of the risk of CHD, so it is atherogenic & meta-analysis suggest that elevated TG level is an important risk factor for CHD & mortality⁽²⁰⁾. In the study, two third of the patients had dyslipidemia, that is mean they are not adhere to guidelines & this lead to increase the risk of developing serious adverse cardiovascular events & death.

Conclusion: Only smoking was reasonably controlled as 65% of smokers were succeeded to quit his habit and Most of the diabetic patients had uncontrolled blood sugar level which was estimated by HbA1c level 57% of Hypertensive patients were not achieving the target of BP control ($< 140/90$ mmHg) and two third of patients still out of control of their lipid profile as recommended by NCEP panel 3. More than two third of patients were overweight, quarter of them were obese and more than two third of patients know their clinical diagnosis, quarter of patients know their medications & more than two third of patients visit their physician twice monthly .

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