International Journal of Research in Pharmacy and Pharmaceutical Sciences
ISSN: 2455-698X; Impact Factor: RJIF 5.22
Received: 05-09-2019; Accepted: 07-10-2019
www.pharmacyjournal.in
Volume 4; Issue 6; November 2019; Page No. 34-38

Assessment of major risk factors among abnormal cardiac rhythm patients in AL-Amyria general hospital

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Abstract
Background: Cardiac Arrhythmia is a disturbance of the electrical rhythm of the heart (also known as arrhythmia, dysrhythmia or irregular heartbeat) is a group of conditions in which the heartbeat is irregular, too fast or too slows.
Objectives: To evaluate the frequency of abnormal cardiac rhythm and assess the major risk factors among coronary heart disease patients in AL-Amyria distrect, in AL-Anbar province, western Iraq.
Methods: A cross sectional study was carried out on patients with abnormal cardiac rhythm admitted in the coronary care unit in AL-Amyria General Hospital from 1st of January 2019 to 30 of October 2019.Informative and detailed history was obtained concerning the presence of risk factor(s) and essential demographic data. General, cardiovascular examination, biochemical, and laboratory investigations, in addition to chest radiograph, and echo study of the heart were performed. This study was designed to identify risk factors of these disturbances.
Results: The total number of patients, admitted to the coronary care unit was 244 patients,76 patients (31.1%) of them had abnormal cardiac rhythm. Forty two patients (74%) were more than 60 years old with a mean age of 64.2 years. Ischemic heart disease was found in 39 patients (51.3%), 21 (53.8%) were males and 18 (46.2%) were females. Hypertension was found in 35 patients (46%), 19 (54.3%) were males and 16(45.7%) were females. Dyslipidemia was found in 41 patients (53.9%), 19 (46.3%) were males and 22 (53.7%) were females. Diabetes was found in 29 patients (38.1%), 13 (44.8%) were males and 16 (55.2%) were females. Multiple risk factors were found in 44 patients (58%).The most frequent arrhythmias were Atrial fibrillation in 29 patients (38.1%), Left bundle branch block in 17 patients (22.3%), and Bradycardias in 13 patients (17.1%).
Conclusion: Ischemic heart disease, Dyslipidemia, Hypertension, and Diabetes were the major risk factor for arrhythmia. People with multiple risk factors are more susceptible to develop arrhythmias. Atrial fibrillation, conduction system diseases, and Bradycardias were the most frequent types of arrhythmias.

Keywords: abnormal cardiac rhythm, hypertension**,** diabetes.

Introduction

Cardiac Arrhythmia is a disturbance of the electrical rhythm of the heart (also known as arrhythmia, dysrhythmia or irregular heartbeat) is a group of conditions in which the heartbeat is irregular, too fast or too slows. A heart rate that is too fast – above 100 beats per minute in adults – is called tachycardia, and a heart rate that is too slow – below 60 beats per minute – is called bradycardia [1]. Arrhythmias may occur at any age but are more common among older people (2).Arrhythmias are often a manifestation of structural heart disease but may also occur because of abnormal conduction of depolarization in an otherwise healthy heart (3). Arrhythmias are most likely to occur in patients with structural heart disease. The inciting factor for an arrhythmia in a given patient may be an insult such as hypoxia, infection, cardiac ischemia, catecholamine excess (endogenous or exogenous), or an electrolyte abnormality (4). Many types of arrhythmia have no symptoms. When symptoms are present, these may include palpitations or feeling a pause between heartbeats. In more serious cases, there may be lightheadedness, passing out, shortness of breath or chest pain (5). While most types of arrhythmia are not serious, some predispose a person to complications such as stroke or heart failure (1, 6).Others may result in sudden death (6). Sudden cardiac death is the cause of about half of deaths due to cardiovascular disease and about 15% of all deaths globally. About 80% of sudden cardiac death is the result of ventricular arrhythmias (7). Arrhythmia may be classified by rate (tachycardia, bradycardia), mechanism (automaticity, re-entry, triggered) or by site of origin (4) The major types of arrhythmias are:

1. Sinus rhythm.
- Sinus arrhythmias.
- Sinus tachycardia.
- Sinus bradycardia.

2. Atrial tachyarrhythmias.
- Atrial ectopic beats (extrasystoles, premature beats).
- Atrial tachycardia.
- Atrial flutter.
- Atrial fibrillation.

3. Supraventricular tachycardias.
- Atrioventricular nodal re-entrant tachycardia.
- Wolff-Parkinson-White syndrome.

4. Ventricular tachyarrhythmias
- Ventricular ectopic beats.
- Ventricular tachycardia.
- Ventricular fibrillation.
- Tosrsade de pointes.

5. SinoatriSal disease (sick sinus syndrome).
6. Atrioventricular block

- First degree AV block.
- Second degree AV blocks (Mobitz type 1 & Mobitz type 2).
- Third degree (complete) AV block.

7. Bundle branch block (right or left). (3)

The major risk factors for developing of arrhythmias are

1. Coronary artery disease.
2. High blood pressure.
3. Congenital heart disease.
4. Heart failure.
5. Structural heart disease (cardiomyopathy).
6. Thyroid problem.
7. Drugs.
8. Diabetes.
9. Obstructive sleep apnea.
10. Electrolyte imbalance.
11. Emotional stress.
12. Drinking too much alcohol.
13. Caffeine or nicotine use.

Management

The method of cardiac rhythm management depends firstly on whether the affected person is stable or unstable. Treatments may include:

1. Physical maneuvers: A number of physical acts can increase parasympathetic nervous supply to the heart, resulting in blocking of electrical conduction through the AV node. This can slow down or stop a number of arrhythmias that originate above or at the AV node. Parasympathetic nervous supply to the heart is via the vagus nerve, and these maneuvers are collectively known as vagal maneuvers (9).

2. Antiarrhythmic drugs: There are many classes of antiarrhythmic medications, with different mechanisms of action and many different individual drugs within these classes. Although the goal of drug therapy is to prevent arrhythmia, nearly every anti arrhythmic drug has the potential to act as a pro-arrhythmic, and so must be carefully selected and used under medical supervision. Several groups of drugs slow conduction through the heart, without actually preventing an arrhythmia. These drugs can be used to "rate control" a fast rhythm and make it physically tolerable for the patient. (9).

Electricity: Arrhythmias may also be treated electrically, by applying a shock across the heart either externally to the chest wall, or internally to the heart via implanted electrodes. Cardioversion is either achieved pharmacologically or via the application of a shock synchronised to the underlying heartbeat. It is used for treatment of supraventricular tachycardias. Defibrillation or cardioversion may be accomplished by an implantable cardioverter-defibrillator (ICD). Electrical treatment of arrhythmias also includes cardiac pacing. Temporary pacing may be necessary for reversible causes of very slow heartbeats, or bradycardia (for example, from drug overdose or myocardial infarction). A permanent pacemaker may be placed in situations where the bradycardia is not expected to recover (9).

Electrical cautery

Some cardiologists further sub-specialize into electrophysiology. In specialized catheter laboratories, they use fine probes inserted through the blood vessels to map electrical activity from within the heart. This allows abnormal areas of conduction to be located very accurately and subsequently destroyed by heat, cold, electrical, or laser probes in a process called catheter ablation. This procedure may be completely curative for some forms of arrhythmia, but for others, the success rate remains disappointing. AV nodal reentrant tachycardia is often curable by ablating one of the pathways in the AV node (usually the slow pathway). Atrial fibrillation can also be treated, by performing a pulmonary vein isolation, but the results are less reliable (9).

Complications

Certain arrhythmias may increase your risk of developing conditions such as:

Stroke

When your heart quivers, it's unable to pump blood effectively, which can cause blood to pool. This can cause blood clots to form. If a clot breaks loose, it can travel from your heart to your brain. There it might block blood flow, causing a stroke.

Heart failure

Heart failure can result if your heart is pumping ineffectively for a prolonged period due to a bradycardia or tachycardia, such as atrial fibrillation.

Aim of study

To evaluate the risk factors of cardiac arrhythmias and to assess the influence of multiple risk factors.

Patients and methods

The study population consisted of 76 patients were admitted to the coronary care unit of AL-Amyrea general hospital because of abnormal cardic rythm from 1/1/2019 to 30/10/2019, thorough evaluation was done including history determining specifically the main compliant, stressing on the onset and duration as well as the presence or absence of risk factor(s) like structural heart disease, hypertension, diabetes, ischemic heart disease, valvular heart disease, previous attack of arrhythmia, smoking, heavy alcohol consumption, emotional stress and drug history.History was taken from close relatives if the patient was unconscious or drowsy, making direct communication with the patient is impossible. Then full general and cardiac examination was carried out for those patients. The available investigations were done for them (complete blood picture, erythrocyte sedimentation rate, electrocardiogram, chest x-ray, echo study of the heart, thyroid function test …etc). Statistical differences between data sets were assessed by using chi-square test. When $p < 0.05$, data were considered to be significant.

Results

The majority of patients were in the age group of (61-70) years, {22 patients(28.95%)}, 12 patients(54.5%)of them were males and 10 patients(45.5 %)were females, the

second high number of patients were in the age group of (71-80)years,{17 patients (22.4%)}, 10 patients(58.8%) of them were males and 7 patients(41.2%) of them were females, while the third high number of patients were in the age group of (51-60)years,{14 patients(18.42%)},8 patients (57.1%) of them were males while 6 patients (42.9%) of them were females as showed in (Table 1).

Table 1: Distribution of patients according to age group and gender.

Age group	Sex				Total	
	Males		Females		No.	%
	No.	%	No.	%		
31-40	5	55.6	4	44.4	9	11.84
41-50	6	54.5	5	45.5	11	14.5
51-60	8	57.1	6	42.9	14	18.42
61-70	12	54.5	10	45.5	22	28,95
71-80	10	58.8	7	41.2	17	22.4
81-90	1	33.3	2	66.7	3	3.94
Total	42	55	34	45	76	100

Regarding the modifiable risk factors :It was found that 39 patients (51.3%) were having ischemic heart disease, 21 patients (53.8%) of them were males and 18 patients (46.2%) of them were females. 35 patients (46) were found to be hypertensive, 19 patients (54.3%) of them were males and 16 patients (45.7%) of them were females. Dyslipidemia was found in 41 patients (53.9%), 19 patients (46.3%) of them were males and 22 patients (53.7%) of them were females. The number of diabetic patients was 29 patients (38.1%), 13patients (44.8%) of them were males while 16 patients (55.2%) of them were females. Heart failure was found in 22 patients (28.9%), 13 patients (59%) of them were males and 9 patients (41%) of them were females. 11 patients (14.4%) had previous attack/attacks of cardiac arrhythmia, 6 patients (54.5%) of them were males and 5 patients (45.5%) of them were females. 9 patients (11.8%) developed cardiac arrhythmias after strong emotional stress, 3 patients (33.3%) of them were males and 6 patients (66.7%) of them were females. Thyroid dysfunction was found in 9 patients (11.8%), 5 patients (55.6%) of them were males and 4 patients (44.4%) of them were females.Cardiac arrhythmia developed in 6 patients (7.8%) after taking certain drugs (antihistamine), 4patients (66.7%) of them were males and 2 patients (33.3%) of them were females. Echo study showed that 1 patient (1.3%) had valvular heart disease, and he was male. Heavy alcohol consumption was found in only 1 male patient (1.3%). Finally we did not found any risk factor in 5 patients (6.5%), 2 patients (40%) of them were males and 3 patient (60%) of them was female as showed in (Table 2).

Table2: distribution of patients according to risk factor and sex

Risk factor	Males		Females		Total	
	No.	%	No.	%	No.	%
IHD	21	53.8	18	46.2	39	51.3
HT	19	54.3	16	45.7	35	46
DM	13	44.8	16	55.2	29	38.1
Thyroid dysfunction	5	55.6	4	44.4	9	11.8
Stress	3	33.3	6	66.7	9	11.8
Valvular H.D.	1	100	-	-	1	1.3
HF	13	59	9	41	22	28.9
Previous arrhythmia	6	54.5	5	45.5	11	14.4
Dyslipidemia	19	46.3	22	53.7	41	53.9
Alcohol	1	100	-	-	1	1.3
Drugs	4	66.7	2	33.3	6	7.8
Unknown	2	40	3	60	5	6.5

Table 3 showed that 9 patients (11.8%) had no risk factor, 5 patients (55.6%) of them were males and 4 patients (44.4%) of them were females. 23 patients (30.2%) with one risk factor, 14 patients (60.9%) of them were males and 9 patients (39.1%) were females. 44 patients (58%) with more than one risk factor, 23 patients (52.3%) of them were males and 21 patients (47.7%) of them were females.

Table 3: Distribution of patients according to number of risk

No. of risk factors	Males		Females		Total	
	No.	%	No.	%	No.	%
No risk factor	5	55.6	4	44.4	9	11.8
One risk factor	14	60.9	9	39.1	23	30.2
More than one risk factor	23	52.3	21	47.7	44	58
Total	42	55.3	34	44.7	76	100

X2 (chi-square) = P-value <0.05

There is strong association between the presence of multiple risk factors and development Table 4 showed that the most frequent arrhythmias in this study were atrial fibrillation (29 patients) (38.1%), left bundle branch block (17patients) (22.3%), and bradycardia (13 patients) (17.1%).

Table 4: Distribution of arrhythmias according to age group.

Age group	Type of arrhythmias								Total
	AF	LBBB	Bradycadia	V. Ectopic	SVT	WPW	VT	VF	
31-40	2	1	/	1	3	2	/	/	9
41-50	4	3	2	/	2	/	/	/	11
51-60	6	2	4	1	/	/	1	/	14
61-70	9	6	4	1	/	/	1	1	22
71-80	7	4	3	/	/	/	2	1	17
81-90	1	1	/	/	/	/	/	1	3
Total	29	17	13	3	5	2	4	3	76

Discussion

The total number of patient admitted to coronary care unit during the period of this study was 244 patient. 76 patient of them had abnormal cardiac rhythm (31.1%).This result is in agreement with standard results in and Kashmir and United Kingdom [11, 12] The majority of patients fall in the age group (61-70) years as shown by table (2), and the mean age was 62.56 years, this result is not in agreement with that in U.K [half of all cases occur in people above 75 years]. This is probably due to inappropriate primary and secondary preventive measures against the modifiable risk factors of ischemic heart disease and arrhythmia. Dyslipidemia was found in more than half of the patients (53.9 %), this is higher than in Kashmir. This may be due to difference in the life style as high fatty meal intake our society in addition to the bad control of this disease. Ischemic heart disease was found in 51.3% of patients while in Kashmir was 78% [11]; this low percent is due to that high number of deaths among ischemic heart patients.The frequency of hypertension in this study is (46%) which is lower than in Kashmir [1], which was 81%, this because in our society the program of early diagnosis of hypertension in people who are at high risk of developing hypertension (age, family history, women with high blood pressure during pregnancy,….etc.) is not well active and high death rate among hypertensive patients The frequency of diabetes in this study is (38.1%) which is higher than in Kashmir [11] which was 32%, This result may be due to difference in the genetics, life style, in addition to bad management and control of this disease.Thyroid abnormality in our study (11.8%),while in Kashmir is less (3%) [12]**,** this high result may be due to high percent of thyroid disease and bad control or the patients not taking medication properly. Valvular heart disease (rheumatic) was found in only one patients while in Kashmir was (9%) [11]**,** this due to patients with Valvular heart disease passed undiagnosed in early age because echo clinic is not much available.Stress in our patients was high (11.8%) because of many hard events was happened in our society as wars.Drugs intake without prescription is high in our society making overt side effects including cardiac arrhythmia. Finally (14.4%) had previous attacks of arrhythmia, this low percent is due to either the patients deny previous attack especially young patients or high death rate after first attack of cardiac arrhythmias.Patients with multiple risk factors are more susceptible to develop stroke as shown in table (3) with significant p-value (<0.05). Atrial fibrillation, bradyarrhythmias, and conduction system diseases account for most rhythm conditions.(table 4),this result is in agreement with results in United Kingdom

Conclusion

From this study, we can conclude the following:

1. population are not educated enough about the importance of primary preventive measures to suppress the development of risk factors for example weight reduction, decrease salt and fat intake,alcohol intake avoidance, ….etc.
2. Poor control of hypertension and diabetes by patients.
3. There are no obvious secondary preventive measures to prevent arrhythmias in high risk patients.
4. Patients with more than one risk factor are more susceptible for developing recurrent attacks of arrhythmias.

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