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Management of thromboembolism in atrial fibrillation

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Abstract
Context: Atrial fibrillation is the most common sustained arrhythmia, increases with age, and presents with highly variable symptoms and severity. Paroxysmal, persistent, and permanent form require very individualized approaches to management. The most important aspect of diagnosis is the risk groups and risk stratification with respect to risk of thromboembolism. The general goals in treatment are, in order of importance: Prevention of thromboembolism, control of ventricular response, restoration of sinus rhythm, and maintenance of sinus rhythm by preventing recurrence.
Objective: To assess risk groups and risk of thromboembolism of AF patients.
Patient and method: 150 patients were included in this study all have permanent AF. The final diagnosis was based on careful evaluation of clinical data and the results of various investigations, all were studied by history, examination, ECG, radiology, echocardiography and biochemical tests when indicated, ischemic heart disease was diagnosed by the history of chest pain typical of chest pain of myocardial ischemia and electrocardiographic criteria of myocardial ischemia, risk groups for thromboembolism in AF and indication for anticoagulation were determined.
Results: The high risk group patients was the highest in the prevalence among risk groups patients (40.7%), followed by moderate risk group (32.7%), then the very high risk group patients (22%), lastly the low risk group patients (4.6%). There was under prescription of warfarin in very high and high risk groups so that in very high risk group the indicated patients were (22%) and the non-treated patients were (78.8%) (p=0.035). In high risk group patients the indicated patients for warfarin were (40.7%) and the non-treated patients were (80%) (p=0.003). In moderate risk group patients the indicated for treatment were (61.2%) (p=<0.001). That because aspirin can be used for treatment in this group with same efficacy and many patients were on aspirin. Lastly the low risk group patients who were indicated for aspirin were (4.6%) and the treated were (14.3%) (p=NS). The complicated cases with thromboembolism were 30 cases, (80%) of them were stroke, (13.4%) were visceral thromboembolism, and (6.6%) were ischemic limb.
Conclusion
1- The majority of our patients with AF were from high risk group and all need anticoagulation.
2- Under prescription of warfarin was very clear in very high (p=0.035) and high risk groups (p=0.003).

Keywords: Atrial fibrillation, Thromboembolism risk, Anticoagulation treatment, Risk stratification, Warfarin under-prescription

Introduction
ATRIAL FIBRILLATION (AF) is the most common supraventricular arrhythmia. It is the result of multiple reentrant loops continuously circulating in both atria, generating chaotic atrial depolarization with resultant ineffective atrial contraction [1]. On surface ECG AF is characterized by irregular ventricular pattern and absence of organized atrial activity (i.e., no p wave presents) [2]. Atrial fibrillation has been judged to promote stroke by favoring thrombus formation in local zones of static blood, especially in left atrial appendages [3]. The morbidity associated with AF is related to.
(1) Excessive ventricular rate, which in turn may lead to hypotension, pulmonary edema or angina pectoris in susceptible individual (2) The pause following cessation of AF can cause AF (3) Systemic embolization (4) Hemodynamic changes causing heart failure (6) Anxiety secondary to palpitation (7) AF may cause cardiomyopathy related to persistent rapid rates (so called tachycardia induced cardiomyopathy) [4, 5].
The causes of AF are most common in patient with cardiovascular diseases such as coronary artery diseases, hypertension, valvular heart diseases especially mitral stenosis and regurgitation, cardiomyopathy, atrial sepal defect, thyrotoxicosis in elderly patients [6-8].
AF is classified into paroxysmal short self-limiting-terminating episodes, persistent recurrent episodes requiring intervention for restoration to sinus rhythm, and permanent with no intervention restore sinus rhythm [9-11].

AF patients have 4-5 fold increase in stroke than unaffected population [12], and treatment adjusted dose warfarin (Target 2-3) reduce the risk of stroke by two-third, at the annual risk of bleeding of approximately 1-1.5% whereas treatment with aspirin reduce the risk of stroke by only one-fifth, warfarin is indicated in patient at high or very high risk of stroke, while patients with moderate risk of stroke may be treated with warfarin or aspirin after discussing the balance of risk and benefit with patients, while very low risk of stroke they don't require warfarin but may benefit from aspirin [5, 9].

with AF > 65 year old age and one other risk factor, moderate risk group that include any patient with AF > 65 year old age and no other risk factor or < 65 year old age and one other risk factor, low risk group that include any patient with AF < 65 year old age and no other risk factor [13, 141].

The main risk factors for systemic thromboembolism in AF

- Advanced age > 65year
- Female sex
- Hypertension
- Previous emboli
- Diabetes mellitus
- Heart failure
- Thyrotoxicosis
- Hypercoagulability
- Previous TIA or CVA
- Ischemic heart disease
- Valvular diseases

By echocardiographic the risk for thromboembolism are

- Increased left atrial size > 4 cm [14]
- Left ventricular dysfunction
- Mitral annular calcification
- Left atrial thrombus
- Left atrial "smoke"

Risk groups of patients with AF can be classified into: very high risk group that include any patients with AF and history of previous stroke or TIA, high risk group that include any patient with AF > 65 year old age and one other risk factor, moderate risk group that include any patient with AF > 65 year old age and no other risk factor or < 65 year old age and one other risk factor, low risk group that include any patient with AF < 65 year old age and no other risk factor [9, 13].

Aim of the study

- To determine main risk factors of thromboembolism in AF and their frequencies
- To determine risk groups of AF and there frequencies
- To determine the prescription of anticoagulation in each risk group and there frequencies

Patients and methods

One hundred fifty patients were admitted to Tikrit teaching hospital from April 2019 to June 2020 all were studied. Their ages were 20 to 90 years, with a mean age of (62.15±13.7).

All were studied by history, examination, ECG, radiology, echocardiography and biochemical tests when indicated, they all have the diagnosis of AF on the basis of 12 leads ECG, by the absence of P wave and variable degree of fibrillary activity with R-R intervals showing no ordered pattern. The causes of AF were determined; the blood pressure of each patient was measured according to WHO criteria and phase 5 was recorded as the diastolic blood pressure and known cases of hypertension or reading above 140/90 was regarded as hypertension [15].

Ischemic heart disease was diagnosed by the history of chest pain typical of myocardial ischemia and electrocardiographic criteria of myocardial ischemia i.e. old myocardial infarction and or ischemic S-T segment, T wave changes [3].

Valvular heart diseases, congenital heart diseases and cardiomyopathy were diagnosed clinically and by electrocardiography, echocardiography and radiology. T_3, T_4, TSH were measured for thyrotoxic patients, pulmonary function test was made for patients with COPD, while lone AF was diagnosed by exclusion.

Then the risk groups for thromboembolism in AF were determined by the following table [9, 13].

Table 1: The risk groups for thromboembolism in AF were determined

Risk groups	Character
Very high risk group	History of TIA or CVA
High risk group	Age > 65 year with any risk factors
Moderate risk group	Age > 65 year without risk factor or age <65 year with risk factor
Low risk group	Age < 65 year without risk factor

Main risk factors of thromboembolism in AF and their frequencies were determined.

The prevalence of risk groups were determined, the indicated patients for anticoagulant drugs or aspirin and the actual numbers of these patients who took anticoagulant or aspirin were determined. The complicated cases of AF by thromboembolism and types of their complications were determined.

Table 2: Risk factors for thromboembolism in 150 AF patients

Risk factors	No	%
Age over 65	88	58.6%
Left atrial dilatation	83	55.3%
Ischemic heart disease	74	49.3%
Heart failure	61	40.6%
Mitral valve disease	37	24.7%
Previous stroke	33	22%
Diabetes mellitus	31	20.6%

Table 3: Prevalence of risk groups and indication for anticoagulant in 150 AF patients

Risk groups	Treated	Non Treated	Indicated for TX No (%)	P-value
Very high	7 (21.2%)	26 (78.8%)	33 (22%)	0.035
High	12 (20%)	49 (80%)	61 (40.7%)	0.003
Moderate	30 (61.2%)	19 (38.8%)	49 (32.7%)	> 0.001
Low	1 (14.3%)	6 (85.7%)	7 (4.6%)	NS
Total	50	100	150	

Table 4: Prevalence of warfarin & aspirin prescription in cases of AF

Risk group	Nil	Warfarin	Aspirin	Total %
Very high	8 (5.3%)	7 (4.7%)	18 (12%)	33 (22%)
High	13 (8.7%)	12 (8%)	36 (24%)	61 (40.7%)
Moderate	19 (12.7%)	19 (12.7%)	11 (7.3%)	49 (32.7%)
Low	6 (4%)	0	1 (0.6%)	7 (4.6%)
Total	46 (30.7%)	38 (25.3%)	66 (44%)	150 (100%)

Results

One hundred and fifty patients were included, their ages ranged between 20-90 years with a mean age of (62.15±13.7).

Risk factors for thromboembolism in 150 patients with AF were

- Age over 65 years 88 case 58.65%.
- Echocardiography (feature of left atrial enlargement) 83 case.
- IHD 74 case 49.3%.
- Heart failure 61 case 40.6%.
- Mitral valve disease 37 case 24.7%.
- Previous stroke 33 case 22%.
- Diabetes mellitus 31 case 20.6%.

As in table (1).

The prevalence of risk groups of AF were 33 patients (22%) for very high risk group, 61 patients (40.7%) for high risk group followed by 49 patients (32.7%) for moderate risk group and 7 patients(4.6%) for low risk group, as in table (2).

The indication for anticoagulation in very high risk group 33 patients (22%) the non-treated patients is 26 patients (78.8%) (P=0.035). In high risk group patients the indicated for anticoagulation is 61 patients (40.7%) and the non-treated patients are 49 patients (80%) (P=0.003).

In moderate risk group the indicated for treatment is 49 patients (32.7%) and the treated is 30 patients (61.2%) (p>0.001). Lastly the low risk group patient who are indicated for aspirin are 7 patients (4.6%) and the non-treated are 6 patients (85.7%) (P=NS) as in table (2).

The percentage of patients on treatment were 7(4.7%) patients on warfarin, 18(12%) patients on aspirin, 8(5.3%) patients without treatment for very high risk group patients, 12(8%) patients on warfarin, 36(24%) patients on aspirin, 13(8.7%) patients without treatment for high risk group patients, and 19(12.7%) patients on warfarin, 11(7.3%) patients on aspirin, 19(12.7%) patients without treatment for moderate risk group patients, and 0 patient on warfarin, 1(0.6%) patient on aspirin, 6(4%) patients without treatment for low risk group patients, as in table (3).

Discussion

AF has been judged to promote stroke by favoring thrombus formation in the left atrial appendages. Oral anticoagulation with warfarin reduce the risk of strokes related by 60% [9].

The main risk factors for thromboembolism were identified as advancing age, left atrial dilatation, IHD, heart failure, mitral valve diseases, previous stroke and diabetes mellitus in order of frequency.

The study shows that the high risk group patients is the highest in the prevalence (40.7%), followed by moderate risk group patients (32.7%), then the very high risk group patients (22%), and lastly the low risk group patients (4.6%).

The explanation for this is due to the following:

1. The high risk group contains the main bulk of patients with IHD and those more than 65 year whom both predominate in the study (40.7%).
2. The moderate risk group contains the main bulk of patients with valvular cause and those less than 65 year whom both predominate secondly (32.7%).
3. The very high risk group contains the main bulk of patients with any history of previous CVA or Tia and they were 22%.
4. The low risk group contains the main bulk of the remaining patients 4.6% that is the lone AF.

Our study shows that there is under prescription of warfarin in very high and high risk group which is in agreement with other studies [16, 17] so that in very high risk group the indicated for warfarin 33 patients 22%, the non-treated patients were 26 patients 78.8%(P=0.035). In high risk group the indicated for warfarin were 61 patients 40.7% and the non-treated patients were 49 patients 80% (P=0.003). In moderate risk group patients the indicated for treatment were 49 patients 32.7% and the treated were 30 patients 61.2% (p- value <0.05 for treated cases) that because aspirin can be used for treatment in this group with equal efficacy [18, 19] and many patients were on aspirin and the main bulk of this group is valvular patients and good number of them were treated with warfarin. Lastly the low risk group patients who is indicated for aspirin were 7 patients 4.6% and the treated was 1 patient 14.3% (P=NS). So our problem is under prescription of anticoagulants in the management, this may be due to underestimation of the risk groups and poor complaints with treatment. If rate control proves unsuccessful or early cardio version is considered necessary and the duration of AF exceeds 2-3 days; a strategy of trans esophageal echocardiography-guided cardio version should be considered [16, 17]. For patients with AF, anticoagulation with warfarin to an INR target of 2.0-3.0 should be established and maintained indefinitely, at least for patients with at least on risk factor for stroke. An exception is the patient with lone AF (e.g., no evidence of risk factor who is under age 65 years) where antiplatelet is indicated.[18,19] Urgent cardio version is usually indicated in patient with shock or severe hypotension, pulmonary edema. Although AF has been present for more than 48 hours and there is potential risk of TE, the need for immediate rate control in these very unstable patients outweighs that risk. Electrical cardio version is usually preferred in unstable patients [19].

Conclusions

1. High risk group patients was the highest in the prevalence among risk groups patients 40.7%, followed by moderate risk group 32.7%, then the very high risk group patients 22% and lastly the low risk group patients 4.6%.
2. Under prescription of warfarin was in very high risk group patients (P=0.0035) and high risk group patients (P=0.003).

Conflict of Interest

Not available

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Not available

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