International Journal of
Science Inventions Today
www.ijsit.com
ISSN 2319-5436
Review Article

APPROACHES ON CLINICAL PRESENTATION AND MANAGEMENT OF ATRIAL FIBRILLATION IN ELDERLY PATIENTS

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ABSTRACT

The prevalence of AF, which is mainly observed among the elderly population aged above 65 years, with 70% of the AF cases reported in people aged between 65 to 85. However, some cases are reported in populations as low as 40 years but at a low rate. AF is characterized by irregular and rapid contractions of the atrial muscles, which may also lead uncoordinated contraction of the ventricular muscles leading to arrhythmia. Various approaches in screening, diagnosis, prevention, and treatment are addressed with reference to relevant research studies and data from clinical trials of various studies. Screening is primarily done through pulse taking and evaluation of the heartbeat as well as the rhythm of the heartbeat. Electrocardiography is used in the detection of the flow of electrical impulses in the heart muscles. Diagnosis entails identification of the source of the abnormality in the electrical conduction of the cardiac muscles. Transthoracic echocardiogram (TTE) and transesophageal echocardiogram (TEE) aid in the presentation of the source of the irregular transmission of the electrical signals. Management of AF is achieved through various strategies such as medical therapy, procedures, and surgery. The most common medical therapy is the use of anticoagulants, which also facilitate the management of the symptoms and the risk factors. Catheter Ablation is highlighted as the most effective approach compared to the outcomes of medical therapy in the management of the AF.

Keywords: Atrial Fibrillation, Catheter Ablation, Anticoagulation, Warfarin, Electrocardiography, Castel-AF trial, CABANA Trial.

INTRODUCTION

Atrial fibrillation (A-fib or AF) is presented as cardiac arrhythmia, a condition in which there are irregular and rapid contractions and relations in the heart atria leading to irregular and rapid heartbeat (1). This condition is associated with poor coordination in the electrical impulses in the conduction of the heart. This is the most prevalent type of abnormal heartbeat. The disorientation in the electrical conduction of the heart results in the quivering of the upper chambers of the heart which eventually lead to very fast contractions often of over 300 beats in a minute which also occur irregularly (2). The rapid and irregular beating of the atria results in the rapid beating of the ventricles higher than normal. In this case, the ventricular beat can rise higher than 100 to 175 per minute compared to a normal ventricular beat of 60 beats per minute during resting time. On an electrocardiogram, the P waves are significantly absent in AF. Atrial fibrillation can be considered as a medical condition and not as a disease. However, the dramatic increase raises the risk of stroke, which causes permanent disabilities or in other cases, leads to death (3). In addition, according to Rao et al. (2014), 15-20% of cases of strokes emanate from AF. Other conditions related to AF include heart failure and dementia. In dementia, multiple strokes may affect the brain's memory centers and consequently lead to impairment of the memory capacity.

AF is the most familiar arrhythmia recorded in the US, and it accounts for one-third of the rhythm disorders in hospitalizations in the US. The prevalence is averagely 1% of the population with the increase in cases linked to age factor. According to Fitzmaurice and Hobbs (2014), the US population of over 80 reports AF condition, while 70% of the AF cases are reported in populations aged between 65 and 85 years. In this light, the number of AF case in the aging population is expected to rise to 150% by the year 2050 (4). Over 50% of AF patients are also expected to be over 80 years of age. People with AF condition are five to seven-fold higher greater risk of stroke compared to the general population. In this case, the burden of stroke is expected to rise tremendously among the aging population. In addition, the prognosis of stroke in patients with AF is more complicated compared to patients without AF. As observed in the Framingham population, AF is a significant independent mortality risk factor with odds of 1.5 in men while women record 1.9 odds. However, the data on AF, according to Rao et al. (2014) is notoriously hectic to affirm with estimates pointing at high risks in the aging population but also a sharp increase observed in population over 40 years which add up to 2.3% of the AF cases. This study will present comprehensive approaches in the diagnosis and treatment of AF as well as evaluating other works in diagnosis and prognosis of AF and other AF related conditions.

MATERIALS AND METHODS

The diagnosis and treatment of AF are still inadequate, with many people living with undetected AF. Similarly, associated conditions such as stroke are yet to attain optimum treatment results regardless of robust evidence in the success of stroke prevention. Also, those with detected cases receive insufficient treatment with the administration of aspirin, which is, however, insufficient in treating the symptoms and the condition effectively. More concerns also lie in the anticoagulant quality control in warfarin taking patients. Significantly,

to improve the patient outcome, screening for AF and treatment of the condition is advocated for in addition to management of the associated conditions such as stroke.

Screening for AF:

According to Freedman et al. (2017), screening of AF can be undertaken as a regular medical care procedure for elderly individuals over 65 years (5). Screening tests performed by the physician include checking for the pulse and recording the electrical activity of the heart. Based on a clinical trial designed by Freedman et al. (2017), to determine the most cost-effective AF detection method, screening for AF is a straightforward procedure which can be affected in older people. The procedure involves the use of simple tests such as electrocardiography (ECG). The presentation on the ECG can highlight the risks of AF and enhance the reduction of serious sequelae like a stroke on treatment (6). In a study by Brasier et al. (2018), screening was contacted based on two approaches, that is, systemic/ opportunistic screening and REHEARSE-AF. Under systemic screening, nurses were subjected to two-hour training on the assessment of the pulse rhythm (7). The importance of screening, as well as the available treatment option, were also outlined, giving a vivid presentation of the targeted outcome of the assessment. On the other hand, REHEARSE-AF was carried out twice a week with the elderly patients aged above 65 years taken through the screening program.

Additionally, a comparison of the effectiveness of the intervention approaches was designed with warfarin compared to placebo, warfarin with no treatment, patients with no treatment allowed to take aspirin while placebo-controlled trials restricted the use of aspirin as well as other antithrombotic medications (7). The average age of study participants in the trials evaluating the effect of warfarin was 67 to 74 years.

Detection of AF:

AF may be symptomatic or asymptomatic. Therefore, suspecting the presence of AF calls for the physician to evaluate the heartbeat by listening to irregular heartbeat with the use of the stethoscope. The help of cardiologist as well as electrophysiologist may also be sort for to ascertain the clear cause for irregularity in the heartbeat. Significantly, the electrocardiogram is used in the diagnosis of AF by reflecting the speed, rhythm, and the strength and timing of the electrical signals that pass through the heart (9). Electrocardiogram can also work hand in hand with the stress test, which exerts more stress to the heart to evaluate its response to fast beating and hard work. Since electrocardiogram provides results in a quick snapshot, detection of AF is not clear, and therefore, an external monitor is required to keep tabs on the heart's rhythm (10)

The Holter monitor is therefore used in the continuous recording of the electrical activity of the heart for 24 to 48 hours. The time allocated allows the device to record possible arrhythmia. An event monitor is also used in the detection of arrhythmia but records the activities of the heart at particular times and in most cases for 30 days period. Event monitor can automatically start its recording on detection of any abnormalities or can also be initiated upon feeling dizziness, lightheadedness, weakness, and a racing or fluttering heart. Mobile Cardiac Telemetry is also used in monitoring heart activity and transmitting the results to a data center for analysis. Echocardiogram deploys sound waves reflected on a computer as a moving picture of the heart (11). Echo is analyzed for the shape and size of the heart, the working of heart's chambers and valves, detection of

inactivity in parts of cardiac muscles, poor flow of blood, and the associated injuries. The presentation can be in the form of an image as highlighted on transthoracic echocardiogram (TTE) or transesophageal echocardiogram (TEE).

Treatment:

Based on the study by Fitzmaurice and Hobbs (2014), the treatment of AF is based on changes in lifestyle, procedures, medicine, and surgery aimed at preventing blood clots slowed heartbeat and restoring the normal heart rhythm. The underlying causative factor can also be treated to eliminate the risk of exposure. Such factors may include an overactive thyroid gland and sleep apnea. As stated by Kotecha et al. (2018), healthy eating patterns that reduce salt intake aid in lowering blood pressure. Physical activeness, stress management, quitting drug abuse, avoidance of alcohol, and other stimulants and quitting smoking are critical in long term treatment of AF.

Medication can also be used in the treatment of AF by facilitating slowed heart rate and stabilizing the rhythm of the heartbeat. As highlighted in a study by Kotecha et al. (2018), different drugs can be deployed in the treatment of AF, which based on the expected outcome. Beta-blockers function by lowering the ventricular pumping rate. The control in the rate of pumping provides enough time to the ventricles to fill with blood adequately and facilitate enough blood supply throughout the body parts. Ventricular action can also be treated with administration of calcium channel blockers which control the functioning of the ventricles in pumping blood to body parts. Some medication such as digoxin or digitalis controls the rate of blood pumping to body parts. As cited in a study by Kotecha et al. 2018, there are various drugs used to manage AF and the underlying causative factors. According to Rao et al. (2014), medicine can be used in the treatment of risk factors such as overactive thyroid, management of blood cholesterol, and lowering the blood pressure. AF complications such as stroke are also managed by medicine such as anticoagulation which includes aspirin and warfarin. On the other hand, blood thinners are used to prevent blood clotting and consequently lower the risk of stroke. The CHA_2 DS_2-VASc score is used in the assessment of the AF's risk factor to result in stroke (4). According to Fitzmaurice & Hobbs (2014), all patients with The CHA_2 DS_2-VASc greater than or equal to 2 should be subjected to anticoagulation.

Management of stroke-related to AF is facilitated by treatment such as warfarin, a vitamin K antagonist, direct thrombin inhibitors such as dabigatran as well as inhibitors of factor Xa such as apixaban and rivaroxaban (10). Warfarin, an anticoagulant is effective in the prevention of ischemic strokes with a success rate of 68%. These are FDA approved oral coagulants which are used for the prophylaxis of stroke in AF. In addition, the FDA is yet to approve edoxaban a Xa inhibitor, but it is expected to be approved for the prevention of stroke in AF (12).

As outlined by Fitzmaurice and Hobbs (2014), the procedure involved in AF treatment includes catheter ablation, electrical cardioversion, adoption of a pacemaker, plugging, closure or cutting of the appendage of left atrial as well as surgical ablation. Surgical ablation is aimed at destroying the cardiac tissue that relays faulty signals. Surgical ablation is done alongside valve replacement or may be done independently.

Plugging, on the other hand, prevents clot formation in the stroke-causing areas. Implantation of a pacemaker treats AF triggered by slow pumping of the heart. Low energy shocks can be relayed to the heart muscles to restore the rhythm of the heart through a process referred to as electrical cardioversion. However, Catheter ablation is also used in destroying the tissue that results in arrhythmia. Ablation can, however, lead to strokes, which makes it not always successful. According to Link (2018), Catheter ablation involves the use of heat or freezing in disrupting abnormal electrical signals. The procedure is performed on the failure of medicine to correct arrhythmia. According to the 2017 publication of *Catheter Ablation versus Standard Conventional Therapy in Patients with Left Ventricular Dysfunction and Atrial Fibrillation (Castle AF Trial)* and the late 2018 presentation of *Catheter Ablation versus Antiarrhythmic Drug Therapy in Atrial Fibrillation (CABANA trial)*, catheter ablation is significantly effective in the treatment of AF (13). According to the study findings of Castle-AF Trial, a decreased mortality rate was reported in the patients subjected to catheter ablation compared to patients who received medical therapy. Therefore, according to the study results, catheter ablation is preferably effective compared to antiarrhythmic drugs. The procedure is also available to all patients regardless of the severity of the arrhythmia.

The CABANA trial, on the other, is reported as one of the largest electrophysiological trails in the last five years (13). According to the results of the study, patients who underwent ablation recorded improved outcomes compared to patients subjected to medical therapy.

RESULTS AND DISCUSSION

According to Fitzmaurice and Hobbs (2014), the efficiency in diagnosis, prophylaxis, and treatment of AF lies in the detection of AF and its symptoms before the symptoms become severe. Complications in AF result in conditions such as blood clotting, stroke, heart attack, and in some patients may result in dementia. Screening is achieved through examination of the patient's pulse rate as well as the use of the stethoscope in listening at the heart sound and rhythm. According to Kotecha et al. (2018), a physician can easily detect abnormalities in the heart rate and rhythm by examination of the pulse and heartbeat. On the other hand, report by the study carried out by Kotecha et al. (2018), indicate that the use of ECG in screening of AF is significantly effective with various approaches such as use of external monitor to detect the arrhythmia in AF patients at different intervals with the data obtained transmitted to a data center for analysis (14). The results of the study indicate several approaches in the screening process, but ECG is the most effective.

On the other hand, according to the US Preventive Services Task Force (2018), there is insufficient evidence in establishing a balance between the benefits and the harms of ECG screening for AF (15). This indicates that there is a significant harmful impact on the procedure that is not significantly addressed. The various treatment approaches report significant success rate as well as underlying side effects. Healthy lifestyles are considered as the basis of prevention of the onset of AF. However, adherence to the lifestyle is not consistent with laxity in physical exercise and high cholesterol content in the food. The approaches to stress management, cessation of drug abuse, and smoking require other therapy. Medical therapy such as the use of

beta-blockers, blood thinners, calcium channel blockers and drugs such as digoxin pose more adverse effects regardless of their significant success rate in the treatment of AF. High dosage of beta-blockers can result in a slow heartbeat while blood thinners increase the risks of bleeding, indigestion along with heart attack. Medicine, such as digoxin, poses the risk of other forms of arrhythmia. According to the Castle-AF and CABANA Trials, the success rate in the treatment of AF is tremendous compared to medical therapy. In addition, modern techniques have influenced the procedure to less invasive as before.

Assessment of the risk of stroke and bleeding which may emanate from AF or treatment procedures are evaluated based on the CHA_2 DS_2-VASc score for the administration of anticoagulation and HAS-BLED score which is used in the assessment of bleeding risk. However, HAS-BLED is not used in determining patients for a recommendation on coagulation.

CONCLUSION

AF is caused by abnormalities in the heart's electrical conduction resulting in uncoordinated heartbeat and rhythm. The condition can, however, lead to higher risks such as heart failure and most commonly a significant cause of stroke. Diagnosis entails the use of basic examination basic patient's pulse rate, heart sounds, and rhythms. However, the use of ECG is highly recommended as it can reflect the heart movements and the electrical signal transmission of cardiac muscles. Prevention procedures entail embracing healthy lifestyles such as healthy food and regular physical activities. Medical therapy is used especially the use of anticoagulants like warfarin and aspirin. However, catheter ablation is deemed the most effective with a higher success rate in the treatment of AF compared to top medical therapy. The procedure is less invasive, making it suitable for the treatment of AF.

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