Evidence Based Pathway for Atrial Fibrillation Patients

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Objectives

• At the end of this focus group, participants will learn about:
  – Atrial fibrillation pathophysiology
  – The latest updates in the management of Atrial fibrillation
  – Proposed evidence based clinical pathway
Outline

• Background
• Purpose
• Literature review
• Proposed pathway
  – Initial assessment and diagnosis
  – Treatment strategy
  – Risk stratification and stroke prevention
What’s the biggest fear related to AF?

Atrial fibrillation
Background

- Atrial Fibrillation (AF) is:
  - The most common sustained arrhythmia
  - Has increased in prevalence with the aging population
    - Prevalence doubled in the past 50 years, cost of care increased 1.5 fold (Fuster et al., 2006)
    - Advances in management are rapid with continuous building of new evidence
- In Lebanon, Heart disease is the leading cause of mortality and main reason for admission to hospitals (Ministry of Public Health, 2011)
- In Lebanon, the aging population is increasing in prevalence, to reach 7.8% by the year 2015 (Sibai et al., 2004)
Background (2)

• At AUBMC (2012):
  – The number of patients admitted with AF is increasing, reaching 145 patients in 2012
  – Treatment of AF is based on physicians’ preference
  – Lack of standard guidelines to follow in managing patients
  – AUBMC’s 2020 vision includes expansion of facilities:
    • Heart and Vascular disease center is in the making
    • Expansion of the cardiac catheterization laboratory
    • Recruitment of new physicians with electrophysiology subspecialty
    • 12 ablation procedures were performed since 2010
  – Promotion of research and evidence based practice
Any ideas on Clinical pathway ??
Purpose

• To develop a clinical pathway for patients with atrial fibrillation using evidence-based approach in order to:
  – Standardize care
  – Improve efficiency of care
  – Achieve better patient outcomes
Literature review

- Literature review is divided into two major areas:
  1. Clinical pathways
     - Origin and characteristics
     - Impact on the quality of care
  2. Management of Atrial fibrillation
     - Definition and Pathophysiology of atrial fibrillation
     - Classification
     - Diagnosis and evaluation
     - Treatment
Clinical Pathways

- Introduced in the 1980’s in the US and in the 1990’s in the UK
- Different names: integrated care pathways, care maps, care pathways and critical pathways
- Condition- or procedure-specific pathways versus symptom-based or generic pathways
- Written in a time-task matrix format depending on the type
Clinical Pathways (2)

• Defined by the Australian government Department of Veterans Affairs as:
  – “Tool used in achieving coordinated care and desired outcomes within an anticipated time frame by utilizing the appropriate resources available. A blueprint that guides the clinician in the provision of care (Audimoolam et al., 2005).”

• European Pathway Association definition:
  – “A complex intervention for the mutual decision making and organization of care processes for a well-defined group of patients during a well-defined period” (Vanhaechtert et al., 2007).
What’s the benefit?
Clinical Pathways (3)

• Impact of clinical pathways:
  - Reduce hospital costs by decreasing the length of stay of patients
  - Early identification of patient complications and subsequent implementation of appropriate interventions.
  - Introduction of evidence-based medicine into practice, leading to better interdisciplinary communication, teamwork and care planning.
  - Provide clear standards of care and help reduce clinical variation
Management of Atrial fibrillation Guidelines
Management of Atrial fibrillation Guidelines

- American Heart Association (AHA)/American College of Cardiology (ACC) in collaboration with the European Society of Cardiology (ESC) have published practice guidelines for the management of atrial fibrillation in 2006 (Fuster et al., 2006).

- In 2011, AHA/ACC had a focused update on the 2006 guidelines in collaboration with the Heart Rhythm Society (Fuster et al., 2011). 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation: Executive Summary (not included in this pathway)

- ESC has published in 2012 a focused update independently (Camm et al., 2012).

- Australian and Canadian guidelines for the management of AF are mostly based on the ESC guidelines (Samardhi et al., 2011).
Definition
Definition of Atrial Fibrillation

• AF is a supraventricular tachyarrhythmia characterized by uncoordinated atrial activation with consequent deterioration of the atrial mechanical function (Fuster et al., 2006). Causes of AF include:
  – Cardiac: structural heart disease (e.g. valvular heart disease or atrial septal defect), myocardial ischemia/infarction, coronary artery disease, cardiac surgery
  – Non-cardiac: thyrotoxicosis, obesity, diabetes mellitus, hypertension, excessive consumption of alcohol and/or caffeine.
    (Samardhi, Santos, Denman, Walters & Bett, 2011)

• AF is highly associated with the risk of stroke (X 5), most frequently due to the stasis of blood over the left atrium appendage. (Fuster et al., 2006).
Pathogenesis of AF
Pathogenesis of Atrial Fibrillation

- Fibrosis of atrial tissue and loss of the atrial muscle mass with potential involvement of the sino-atrial (SA) and atrioventricular (AV) nodes (Fuster et al., 2006).

- Causes of atrial fibrosis include: genetic defects like Lamin AC gene mutations, inflammation such as in cardiac sarcoidosis, and autoimmune disorders.

- The presence of atrial fibrosis along with healthy tissue can lead to alterations in the electrical conduction and subsequent firing from different foci within the atria.
Pathogenesis of Atrial Fibrillation (2)

- Another mechanism involves electrical waves or wavelets reentering the atrial tissue that is currently and/or recently activated: reentry pathways (Nottingham, 2010).

- The single focal point is mainly located in the pulmonary veins, where the atrial tissue has a shorter refractory period.

- Atria fire at a rate of 150 to 650 beats per minute (Nottingham, 2010).
How do we classify AF?
Classification of Atrial Fibrillation

- Based on the duration of the episode of AF and the clinical presentation, different types were identified:
  - First detected AF: symptomatic or asymptomatic; the onset could be unknown.
  - Paroxysmal: spontaneous termination within less than seven days and most usually less than 48 hours.
  - Persistent: AF is not self-terminating; lasting more than seven days or prior to cardioversion.
  - Permanent: long lasting AF for more than one year and accepted after not being terminated by cardioversion or when cardioversion is not pursued (Fuster et al., 2006).
Diagnosis and Evaluation of Atrial Fibrillation

- An irregular pulse
- 12-lead ECG recording shows the below characteristics:
  1) Irregular RR intervals;
  2) No distinct P waves;
  3) Atrial cycle length variable and less than 200 ms. (Camm et al., 2010).

- History and physical exam
Diagnosis and Evaluation of Atrial Fibrillation

- Evaluation for nature of symptoms: onset, frequency, duration and precipitating factors (palpitations, dizziness…)
- Type of AF (newly diagnosed, paroxysmal, persistent, or permanent)
- Presence of underlying heart disease or precipitating factors to AF (e.g., hyperthyroidism, alcohol)
Diagnosis and Evaluation of Atrial Fibrillation (2)

- Transthoracic echocardiogram
  - To assess chambers, valvular disease, presence of left atrial thrombus (low sensitivity, transoesophageal echocardiography)

- Chest radiograph
  - To detect heart chambers enlargement, intrinsic pulmonary pathology and evaluate pulmonary vasculature

- Blood tests
  - Complete blood count, electrolytes
  - Thyroid, renal and hepatic function (important for first diagnosis of AF)

Fuster et al., 2006, 2011
Treatment of Atrial Fibrillation

• The initial strategy in the management of atrial fibrillation consists of three main strategies:
  – Rate control
  – Rhythm control
  – Prevention of thromboembolism

• These strategies are to be followed in parallel, especially in first detected AF.

Fuster et al., 2006, 2011
Rate Control

• Pharmacological
  – Beta Blockers: Metoprolol, Esmolol, Propranolol
  – Non-dihydropyridine calcium channel antagonists: Verapamil, Diltiazem
  – Others: Digoxin and Amiodarone (Heart failure or LV dysfunction)
  – Drug of choice depends on life style and underlying disease (COPD, beta1 selective blocker)

Fuster et al., 2006, 2011
Rate Control

- Non-pharmacological
  - Ablation of AV node or accessory pathway when drugs fail (catheter directed or via surgery)

Fuster et al., 2006, 2011
Rhythm Control

- Pharmacological
  - Flecainide, dofetilide, sotalol and propafenone (drug of choice in absence of SHD)
  - Amiodarone (more effective, drug of choice in HF) and Dronedarone (amiodarone derivative, less toxic profile)
  - Quinidine and procainamide (usefulness not established)

Fuster et al., 2006, 2011
Rhythm Control

- Non-pharmacological
  - Direct-current cardioversion (hemodynamic instability, relapse, intolerable AF)
- Cardioversion may also be achieved with administration of anti-arrhythmic (Flecainide, sotalol, amiodarone and propafenone)

Fuster et al., 2006, 2011
Prevention of Thromboembolism
Prevention of Thromboembolism

• Identify stroke risk score
  – Risk of stroke/thromboembolism is determined by a simple score CHADS$_2$ in patients with non-valvular AF
    • C = congestive heart failure or EF less than 40% (1 point)
    • H = hypertension (1 point)
    • A = Age (1 point)
    • D = diabetes (1 point)
    • S = stroke (2 points)
  – Extended version of CHADS$_2$ scoring system, the CHA$_2$DS$_2$VASc
    • Age > 75 (2 points)
    • Age 65-74 (1 point)
    • Valvular disease (1 point)
    • Sex (female) (1 point)

Fuster et al., 2006, 2011
Prevention of Thromboembolism (2)

- **Decide on type of oral anticoagulants (OAC)**
  - CHADS<sub>2</sub> ≥ 2 → OAC → Vitamin K antagonists (VKA) Warfarin
  - CHA<sub>2</sub>DS<sub>2</sub>VASc
    - Equal to 0 → none
    - Equal to 1 → OAC or Aspirin
    - ≥ to 2 → OAC or NOAC

- **New oral anticoagulants (NOAC)**
  - Two classes: direct thrombin antagonists such as dabigatran and factor Xa inhibitors such as rivaroxaban, apixaban, betrixaban and edoxaban (Fuster et al., 2011).
  - Proven to be more convenient, effective and safe

- **Decide on duration of anticoagulation** (3 weeks prior to cardioversion and 4 weeks post cardioversion)

Fuster et al., 2006, 2011
Proposed Pathway
Proposed Pathway

• Based on published clinical guidelines and aims to guide the multidisciplinary team in the management of patients with AF rapidly and efficiently.

• Subdivided in three major components.
  1. Initial identification and assessment of patients presenting with suspected diagnosis of AF
  2. Treatment strategy adopted based on the diagnosis obtained
  3. Risk stratification and prevention of stroke
Initial Assessment and Diagnosis
Incidental finding

Symptomatic presentation (palpitations, fatigue, lightheadedness, chest pain...)

Initial assessment: vital signs, history and physical examination
Assess for Acute Coronary Syndrome
Assess for Acute Heart Failure
Laboratory: CBC, PT, PTT, INR, LFT's, creat, BUN, TSH Radiology: CXR (PA/Lateral if possible)
Consult Cardiology

ECG confirmed AF

Hemodynamically stable

YES

NO

Perform synchronized DCC

If patient on Anticoagulation with therapeutic INR

Cardiovascular Etiology: HTN, post-surgery, acute heart failure, acute coronary syndrome, valvular heart disease.

Non cardiovascular Etiology: thyroid disease, alcohol or drug use, sepsis/infection, pulmonary disease.

Assess for duration of atrial fibrillation (paroxysmal, persistent or permanent)
If considered paroxysmal: anticoagulation as needed
If not, continue further management to include rate or rhythm control treatment strategy and appropriate anticoagulation therapy based on stroke risk stratification model.

DCC: direct current cardioversion
Treatment Strategy
AF duration < 48 hours (Documented)

Perform synchronized Direct Current Cardioversion

Sinus Rhythm restored

- Yes
  - Do Echo; and initiate rate control medication and start anticoagulation for 4 weeks

- No
  - Anticoagulation
  - Do Echo
  - Consider rate and/or rhythm control medication

Assess for cardiovascular disease:
- If present adjust antiarrhythmic as per guidelines
- If no, consider class Ic and III antiarrhythmic.
  - EP consult

Sinus rhythm restored → continue medication
Sinus rhythm not restored → consider alternative therapy (catheter ablation or advanced device insertion)
AF duration ≥ 48hours

AF considered persistent/permanent or Cardioversion failed or not indicated.

No

Heparin therapy

Do TEE and assess for thrombus

No thrombus

Cardioversion, Heparin therapy and anticoagulation till INR 2-3 for 4 weeks

Thrombus

Anticoagulation for 3 weeks (INR 2-3) rate control medication (β-blocker, CCB, or other)

Yes

Rate control (β-blocker, CCB, or other) and Anticoagulation Therapy

Successful Rate control

EP consult to consider AV node ablation or other alternative treatment

No

Follow previous algorithm for AF< 48 hours

CCB: calcium channel blocker; EP: electrophysiologist
Risk Stratification and Stroke Prevention
**CHA2DS2-VASc Score**

- CHF/LV dysfunction: 1
- Hypertension: 1
- Age >75: 2
- Diabetes mellitus: 1
- Stroke/TIA/thrombo-embolism: 2
- Vascular disease: 1
- Age 65–74: 1
- Sex category (i.e. female sex): 1

Score = 0, no antithrombotic therapy or aspirin 75-325 mg daily.

Score = 1. Either OAC/NOAC or aspirin 75-325 mg daily.

Score ≥ 2 start OAC/NOAC.
Proposed pathway

• This integrated pathway incorporates the keys for initial diagnosis and management of AF in a user friendly format
• Tables for the doses of drugs used in rate and rhythm control are supplemented
• An admission/order form is developed to guide the practice upon admission of these patients.
Case scenario

• This is a 65 y/o M who presents to the ED with:
  – dizziness,
  – shortness of breath, and
  – palpitations which began approximately two hours ago when he was playing with his grandson.
  – No syncope or chest pain.
Case scenario continued

• On physical exam:
  – Vital signs:
    • T= 36.6
    • BP=110/55,
    • HR=110-162 bpm
    • RR= 25. A&Ox4 w/ NAD.
  – Cardiac exam reveals tachycardia with an irregularly irregular rhythm.

• How would you approach the initial management of this patient?
Thank you