Focal Atrial Tachycardia

Background

1. Definition: A type of atrial tachycardia
    - Regular rhythm
    - Constant rate of >100 beats/min originating outside of sinus node
    - Considered form of supraventricular tachycardia (SVT) with increased automaticity
        - Etiology in 10% of cases of SVT
    - Relatively uncommon
    - Can be difficult to treat medically
        - Long term success with catheter ablation

Pathophysiology

1. Pathology of Disease
    - Type of SVT with generalized increased automaticity.[1,2]
    - Arises from **single** site within left or right atrium
        - Atrial flutter and atrial fibrillation involve **multiple** sites or larger circuits.[1,2]
    - Common locations: adjacent to crista terminalis in right atrium or ostia of pulmonary veins in left atrium.[1,2]
2. Incidence, Prevalence
    - SVT Incidence – 35/100,000 (not including atrial fibrillation/flutter, and multifocal AT).
    - SVT Prevalence – 2.29/1,000[11]
        - 50-60% is AVNRT (Atrioventricular Nodal Re-entrant Tachycardia)
        - In children, AVRT (Atrioventricular Re-entrant Tachycardia) most common[12]

Diagnostics

1. History
    - Usually asymptomatic or minimally symptomatic
    - Common:
        - Chest discomfort/ pressure, dyspnea, fatigue, dizziness, palpitations[1,2]
    - Uncommon:
        - Severe chest pain, diaphoresis, nausea, syncope
    - Early childhood onset
    - Triggers:
        - Caffeine, stress, lack of sleep, febrile illness.[1, 2]
2. Physical Examination
    - Check for murmur
        - Congenital or acquired anomalies can cause focal atrial tachycardia
        - If murmur present, consider ECHO
    - Hemodynamic instability or febrile illness [1,3]
    - Orthostatic blood pressure[1, 2]

3. Diagnostic Testing
    - Electrocardiogram:
        - Long RP interval most common
        - P-wave shape/polarity variable
4. Laboratory evaluation
    - Check for other causes:
        - Complete Blood Count: anemia, infection.
        - Thyroid Stimulating Hormone: hyperthyroidism
        - Basic Metabolic Panel: electrolyte imbalance
        - B-type Natriuretic Peptide: congestive heart failure
        - Cardiac enzymes: myocardial ischemia/infarction
5. Diagnostic imaging[1,2,3]
    - Chest X-Ray: congestive heart disease or pulmonary pathology
    - Holter monitor or Event recorder: capture aberrant rhythm, frequency, duration to determine type of tachyarrhythmia
    - Graded exercise test: pre-excitation or aberrant rhythm determines type of tachyarrhythmia
    - Echocardiography: structural or valvular disease evaluate for structural causes and possible surgical intervention.

Differential Diagnosis

1. Atrial flutter
2. Multi-Focal Atrial Tachycardia
3. AVNRT
4. AVRT
5. Ventricular Tachycardia
6. Wolf-Parkinson-White Syndrome[2,3]

Therapeutics

1. Acute Treatment
    - Maneuvers to increase vagal tone, decrease heart rate such as carotid sinus massage[3]
    - Pharmacologic management: intravenous adenosine or verapamil.[5]
        - Recent reviews show calcium channel blockers have slightly higher conversion rate.
        - Adenosine has overall conversion rate of 60-80% at 6mg dose, and up to 90% with subsequent12mg dose[15,16]
        - Calcium channel blocker infusion has shown over 95% conversion rate.[15]
    - If hemodynamically unstable, electrocardioversion.
2. Long-Term Care
    - Treatment based on multiple factors:
        - Frequency and intensity of episodes
        - Overall impact on quality of life
        - Risks of chosen therapy
        - Discussion of these issues with the patient to determine the optimal treatment strategy.

        - If symptoms are infrequent without severe detrimental effect:
            - Continue vagal maneuvers or rescue medication for episodic symptoms.
        - If symptoms are frequently persistent and/or intensify:
            - Prophylactic treatment with beta blockers, verapamil, diltiazem, digoxin, or combination.
        - Consider electrophysiologic testing and catheter ablation as cure.[6,7]
3. Indications for Cardiology/Electrophysiology referral:
    - Symptoms not controlled by medications
    - Medications not tolerated
    - Worsening symptoms
    - Hemodynamic instability
    - High-risk occupation (pilot, truck driver, heavy equipment operator) or recreational activities (rock climbing, sky or scuba diving)
    - Clinical judgment of primary care physician (PCP)
    - Pre-excitation present on electrocardiography (ECG), or atrioventricular reciprocating tachycardia suspected
    - Supraventricular tachycardia accompanied by syncope
    - Wide QRS complex present on ECG
4. Further Recommendations[14]
    - Intravenous adenosine or verapamil safe and effective treatment choices for terminating SVT
        - Verapamil more effective for rhythm suppression over time. (SOR:B) [3,4]
    - Radiofrequency ablation safe, effective, and cost-effective method for suppressing SVT
        - Improves patient quality of life compared with medical treatment of SVT. (SOR:B) [3,7]
    - Vagal maneuvers effective first-line treatment option for SVT in younger patients who are hemodynamically stable
        - Can also be diagnostic for nodal-dependent SVT. (SOR:C) [3]
    - Adenosine may be used as diagnostic or therapeutic agent in patients with undifferentiated wide complex tachycardia. (SOR:C) [10]

Prognosis

1. Radiofrequency catheter ablation: experienced electrophysiology laboratories routinely achieve success rates of 95 percent in the ablation of accessory pathways
    - Recurrence rates of less than 5 percent[8]
    - Current rate of symptomatic heart block 0.5 to 1 percent. [9]

Follow-up

1. Regular annual follow-up with primary care physician or cardiologist depending on symptoms and severity. [2, 4]
2. Any interval changes or new development of symptoms should see primary care physician with referral to cardiology. [3, 4, 13]

Patient Education

1. Monitor symptoms. [3,4,13]
2. Pregnancy - premature atrial beats common (50%) during pregnancy; usually asymptomatic and resolves on own.
    - Sustained arrhythmia requires cardiology investigation and medication
    - Treatment should be decided depending on pregnancy effect risks and benefits. [4]
3. Congenital heart disease increases chance of developing SVT.
4. Quality of life - ablation has shown to improve quality of life and cost effective compare to other treatment.

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