



## Multifocal Atrial Tachycardia [MAT]- A friend or foe ?

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### ABSTRACT

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### INTRODUCTION

Dysrhythmias in the emergency setting have varied presentation .Quick and decisive treatment strategies gains significance in the treatment of cardiac rhythm disturbances. Among the various arrhythmias multifocal atrial tachycardia is the most commonly overlooked rhythm in the hospital ED . Although benign and common in elderly patients ,it also occurs in younger individuals with comorbidities and acute illnesses and has an incidence of 0.05 % to 0.32 % of electrocardiogram presentations .It has been proved that structural abnormalities donot much contribute to its occurrence but increased right atrial pressure and calcium overload which inturn acts a “ common ground” for triggering various atrial depolarizations results in its occurrence in various pathologic conditions . (1,4)

This article reviews and explains about multifocal atrial tachycardia its presentation in emergency, association with acute illnesses and management strategies with case based discussion.

MAT is a rapid irregular rhythm belonging to the subset of supra ventricular tachyarrhythmias with multiple ectopic foci (supraventricular in origin) of impulse generation and transmission along the

conducting tract. Most commonly multifocal tachycardia occurs in elderly patients with COPD - Cor pulmonale that is 60% in patients with underlying lung disease, 20% in acute respiratory failure .The pathophysiology of multifocal atrial tachycardia is not clearly understood. Various theories have been postulated which suggest that ,they are three probable mechanisms -automaticity , reentry ,triggered mechanisms by which tachy arrhythmias occur .MAT mostly occurs from abnormal automaticity that is multiple ectopic foci which act as nidus for atrial pacemaker activity ,trigger automaticity in non pacemaker cells resulting in abnormal conduction in two or more pathways with unequal responsiveness .It often presents as discrete P wave morphologies with variable PR intervals on electrocardiogram .EKG criteria for diagnosis include, Heart rate >100 beats/min ,P waves of two or more types of morphology ,Varying P P , R R , P R intervals ,typically described as “Chaotic atrial tachycardia”, indeed a transitional rhythm between atrial flutter/fibrillation and premature atrial complexes (1,2) .

Although asymptomatic, evaluation of MAT is important as it is a sign of poor prognosis in acute illnesses like cardiac disease, drug overdose, acid base and electrolyte imbalances, renal failure etc.

**CASE DETAILS:** A 60 year old female patient came to ED with chief complaint of fever and altered sensorium since 3 days with no other associated complaints. **Primary Survey** : Airway -patent, Breathing – RR- 26 /min, Spo2- 85%, Circulation – BP -90/60mmHg, HR -106 beats/min, Disability – GCS- E 3 V 3 M 5, Pupils – normal size reaction to light present, Temperature - 99.6 F. No allergic history, k/c/o chronic liver disease and bronchial asthma on treatment, referred for further management from primary care hospital, No events preceding, Last Meal – 6hrs ago. **Secondary Survey** : H E E N T -Neck stiffness +, pallor +, **Systemic Examination**: CVS – S1, S2 present, RS – bilateral air entry present, no added sounds, GIT – P/A soft, no organomegaly, CNS – Motor – Tone decreased in all four limbs, Power -4/5 in upper limbs and 2/5 in lower limbs, Sensory -Normal, Reflexes - Hyporeflexia present bilaterally in all limbs. **Investigations** :ECG – Multi focal Atrial tachycardia, ABG- pH- 7.28, pCo2 -31, Hco3- 21, Po2 - 56; CBP – Hb 8.7gm%, TLC - 5900 cells/cumm, Platelet count-4.2 lakhs, Na+ - 137meq/l, K+ - 2.8 mmol/l, Cl- -97 mmol/l, Se Creatinine- 0.8mg/dl, Se Calcium -8.3 mg/dl, Se Mg 2+- 2.1mg/dl, ESR -32mm, Total Se Bilirubin - 8.3, Direct Bilirubin -3.5, Indirect Bilirubin -4.8, Ultrasound Abdomen and pelvis – Mild splenomegaly present, altered liver echotexture. MRI Brain -Normal, Cerebro spinal fluid analysis was sent. **Provisional Diagnosis**: Acute febrile illness with multi focal atrial tachycardia with Gulliane Barre Syndrome.

**Management** : On further work up patient was evaluated to have leptospirosis which was treated with antibiotics, antipyretics and bile acid supplements, during the treatment course patient had multifocal atrial tachycardia, calcium channel blockers -Verapamil was used for treatment of arrhythmia, dys electrolytemia was corrected with potassium and magnesium supplementation, patient also developed paraparesis, suspecting cardio embolic stroke Diffusion weighted Magnetic resonance imaging of Brain was done which was normal, Nerve conduction studies were suggestive of

Gulliane Barre Syndrome, patient was intubated in view of respiratory failure, mechanical ventilatory support was provided, IV immunoglobulin was administered, later was admitted and transferred to respective department (4).

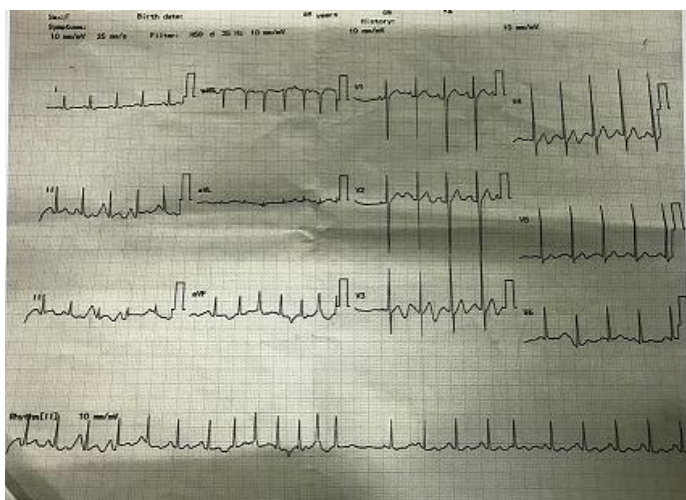
## DISCUSSION:

Multi focal atrial tachycardia although benign, can be a serious condition too if unrecognised, leading to decompensation of conditions like heart failure, sepsis etc. Wise suspicion, clinical examination and electrocardiogram with prompt and timely action would aid in diagnosis and prevention of complications. There has been a rapidly changing trends in the treatment of MAT in recent years with early recognition, increasing complexity, miniaturization and treatment. Early magnesium supplementation aids in attaining ionic equilibrium in atrial cardiomyocytes, innovative techniques like 'Ablate and Pace' approach, electrophysiological isolation of sites discharging action potential and atrioventricular junctional modification were found useful (3,5).

## CONCLUSION:

MAT should be suspected in elderly patients with irregular rhythm and tachycardia with underlying medical conditions. Diagnosis is not usually clinical, but made by electrocardiogram using the diagnostic criteria. If rhythm persists despite the treatment of medical condition basic work up and serum chemistry is required. Specific treatment is indicated in conditions where arrhythmia is causing decompensation of underlying cardiac and pulmonary disease which include correction of electrolyte imbalances like potassium and magnesium which aids in suppression of ectopic atrial activity. It is worth mentioning from existing studies that antiarrhythmic agents, cardioversion or anticoagulation have shown no much role in the treatment of patients with this rhythm, but Beta blockers and Calcium channel blockers can be used in selective cases. In refractory cases AV nodal ablation and permanent pacemaker insertion is done as per requirement (7,9).

**Fig 1:**



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