

## REPORT FROM FIELD

**Electrocardiogram as an important tool in Preventive & Community Medicine - A rare case report of asymptomatic non paroxysmal accelerated junctional rhythm detected on routine ECG**

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Fifty four year old asymptomatic employee was detected to have Inverted P waves with normal QRS complex on Electrocardiogram [ECG] during his Annual Medical Examination. The ECG reverted to normal after few days. Inverted P is suggestive of retrograde conduct of impulse from A-V Node. Case of Non Paroxysmal Accelerated Junctional Rhythm. Causes are inferior wall myocardial infarction, myocarditis or recent open heart surgery. Troponin T Test was negative, Treadmill test was negative, and 2D Echo showed 55 % ejection fraction with no regional wall motion abnormalities. It needs no treatment if underlying causes are ruled out. Case would have gone un-noticed as patient was asymptomatic, thus emphasizing the importance of ECG in preventive and community medicine.

**Key Words**

Electrocardiogram; Non Paroxysmal accelerated junctional rhythm

**Introduction**

Electrocardiogram [ECG] is a basic diagnostic tool and the case presented here highlights the importance of ECG in routine screening practices. This is a case presented on an annual medical examination of an industrial unit which is conducted as a routine screening for the health of the employees. A rare but serious condition-Non paroxysmal accelerated junctional rhythm- was detected here on ECG which might have gone have gone undetected as the patient was asymptomatic.

**Case History:** A Fifty four year old employee reported for Annual medical examination to the occupational health center of an Industrial Unit. Patient had no complaints. As per the protocol of the

annual medical examination he was subjected to the General Physical Examination, Systemic Medical Examination, Pathology Investigations and an ECG. **Personal and Medical History:** Non-smoker, non-alcoholic, no history of any regular medication, or any recent illness, or any drug allergies. **Physical Examination:** A normal healthy individual with body mass index 26.53, had normal physical parameters. His haemodynamic status was normal. His systemic examination revealed normal cardio-vascular status, normal neurological status and revealed no other systemic deficits. **Investigations:** His haemogram was normal and the biochemistry revealed normal glycaemic levels, lipids, liver functions and renal profile.

**First ECG [ECG 1]:**

E.C.G. Analysis: Heart rate: 72/ min, Rhythm-Regular  
 P Wave: Inverted P in Leads I,II, III, aVF and V2-V6.  
 Upright in aVR. One P wave for every QRS complex  
 PR interval 0.10 sec. – Short, QRS Complex duration  
 in V1: 0.12 sec Normal, QRS Complex direction in V1:  
 Negative, ST Segment: Normal. T Wave: Normal and  
 Upright. No ST-T Changes suggestive of Ischaemia or  
 Infarct. QTc: Normal

**Interpretation:** Non paroxysmal accelerated  
 junctional rhythm at Rate 72/ min.

**Rationale:** The ECG shows that the PR interval is  
 short 0.10 sec, and the conduction of P wave is  
 retrograde, suggestive of a junctional rhythm. Every  
 QRS is preceded by a P wave and the rhythm is  
 regular indicating that it is a supra-ventricular  
 rhythm.

**Course of Action:** Immediate Troponin T test was  
 conducted to rule out Infarction. It was negative.

Person was subjected to a repeat ECG after about an  
 hour [ECG No 2].

It revealed the same tracing. Patient was advised to  
 undergo Treadmill Test [TMT] and 2 D  
 Echocardiography at higher center, to rule out any  
 sub-clinical infarct or coronary insufficiency.

A repeat ECG [ECG No 3] after a few days revealed a  
 normal ECG with reversal of the changes and P wave  
 was erect in all leads wherein it was earlier inverted.  
 Person was asymptomatic all through- out, and was  
 on no medication.

He exercised for 8min 50 seconds during his TMT on  
 Bruce protocol achieving 85% of target heart rate.  
 The test was termed Negative for Exercise Induced  
 reversible myocardial ischaemia.

His Echocardiography revealed – No regional wall  
 motion abnormality. Overall left Ventricular Ejection  
 Fraction was 55%.

## Discussion

An Electrocardiogram [ECG] is a graphic recording of  
 electric potential generated by the heart. The ECG  
 leads are configured so that a positive [upright]  
 deflection is recorded in a lead if a wave of  
 depolarization spreads towards the positive pole of  
 that lead, and a negative [inverted] deflection is  
 recorded if the wave spreads towards the negative  
 pole. [1]

The normal atrial depolarization vector is oriented  
 downward and toward the subject's left, since this  
 vector points towards the positive pole of Lead II and  
 towards the negative pole of Lead aVR, the normal P

wave will be positive in Lead II and negative in aVR.  
 [1]

Retrograde activation of atria can occur with  
 impulses of A-V nodal and ventricular origin.  
 Sometimes a sinus impulse enters the AV nodal by  
 pass and returns back to atria in loop conduction,  
 depolarizing the atria in a retrograde fashion the  
 second time. [2]

An impulse originating from the AV Node may get  
 conducted in either of the following routes (a) to  
 both – the atria and the ventricles, (b) to ventricles  
 only, retrograde conduction to atria being blocked or  
 impeded by interference from a near synchronous  
 sinus impulse, or (c) Anterograde conduction of the  
 impulse to ventricles is blocked or impeded by  
 interference. [3]

As the case in discussions shows presence of both P  
 wave and QRS complexes, we are dealing with a case  
 where the A-V nodal rhythm is conducted to both  
 Atria and the ventricles. In this the Ventricular  
 conduction is through the normal pathways and  
 hence the QRS complexes are normal, whereas the  
 Atrial conduction is in reverse pattern – from below  
 upwards, and hence the P is retrograde or inverted.  
 The relationship of P to QRS will depend on the  
 speed of conduction. Hence (a) if the retrograde  
 conduction to atria is faster than the ventricular  
 conduction, the retrograde P will precede the QRS  
 complex, as in this case (b) if the anterograde  
 conduction to ventricles is faster than the retrograde  
 conduction to atria, the retrograde P will follow the  
 QRS complex, and (c) if the speed of conduction to  
 atria and the ventricle is same, the P will be hidden  
 in the QRS complex. [3]

Non paroxysmal accelerated junctional rhythm is an  
 acceleration of the inherent junctional rhythm, and  
 is similar to the enhancement of idioventricular  
 pacemaker in idioventricular tachycardia [3]. The  
 term was coined by Pick & Dominguez [4] in 1957 to  
 distinguish it from Extrasystole or the Paroxysmal  
 forms of A-V Nodal tachycardia.

Absence of protection of A-V nodal pacemaker in  
 non-paroxysmal accelerated junctional rhythm is  
 evident by the abolition of accelerated rhythm, if the  
 sinus rhythm accelerates and usurps control of the  
 heart once again. This was evident on the ECG taken  
 a few days later and also during the Treadmill test of  
 the patient.

Common causes of Non paroxysmal accelerated  
 junctional rhythm include underlying heart disease  
 like Inferior wall myocardial infarction, Myocarditis

as a result of Rheumatic Heart Disease, recent open heart surgery, and Digitalis toxicity.<sup>5</sup>

## Conclusion

Non Paroxysmal accelerated junctional rhythm is a condition where there is inherent propensity of the AV pacemaker to accelerate when the Sinus pacemaker slows down. It reverts on Sinus rhythm acceleration. Underlying causes should be ruled out. In absence of any definitive cause, it needs no significant treatment. As it is mostly in the same rate range as the sinus rhythm, hence does not cause haemodynamic changes.

This is a case detected on a routine annual medical examination, which would have otherwise gone unnoticed as the patient was asymptomatic. This emphasizes the role and importance of an ECG in preventive medicine and routine medical examination. Thus Electrocardiogram is a very cost effective, extremely useful diagnostic tool in

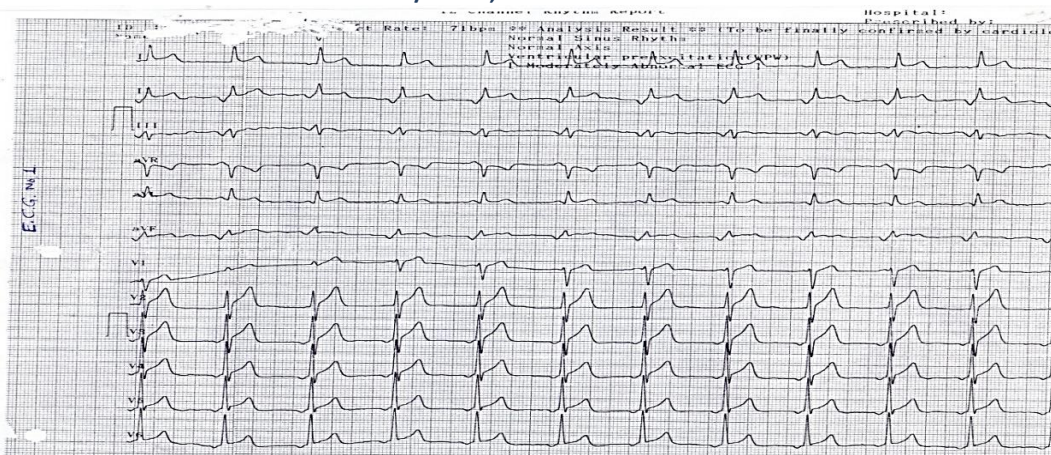
preventive and community medicine and can be implemented for large scale screening. It can detect many underlying cardiac conditions which may get ignored otherwise. Timely detection by this simple tool can save number of lives.

## References

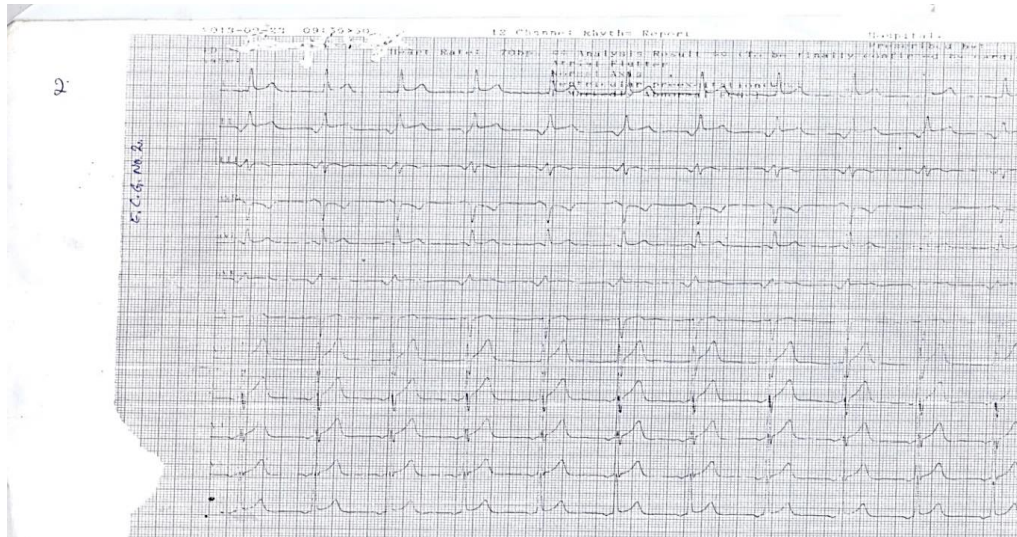
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## Figures

**FIGURE 1 E.C.G. ANALYSIS: HEART RATE: 72/ MIN, RHYTHM-REGULAR**



**FIGURE 2 PERSON WAS SUBJECTED TO A REPEAT ECG AFTER ABOUT AN HOUR**





**FIGURE 3 PERSON WAS SUBJECTED TO A REPEAT ECG AFTER FEW DAYS**