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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Abstract

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.

Methodology

Results

Conclusion

References

Citation


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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
Electrocardiogram as an intervention in non-paroxysmal accelerated junctional rhythm... | Deolalikar R

**Conclusion**

Non paroxysmal accelerated junctional rhythm is a condition where there is inherent propenicty 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**


**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