

Ventricular ectopic beats in structurally normal heart: When to stop investigations

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Abstract

Background and objective: Ventricular ectopic beats (extra systoles, premature beats) are frequently found in healthy people. Ectopic beats in patients without apparent heart disease are more prominent at rest and disappear with exercise. Treatment is not necessary unless the patient is highly symptomatic.

Methods: Patients having ventricular ectopic beats were assessed clinically, by ECG and by echocardiography. Those with normal structure hearts underwent exercise ECG and among those we selected 50 patients whose ectopics were suppressed by exercise then followed them for 5 years. The study started from 2000 to 2010.

Results: During 5-year follow-up of the above mentioned patients, relevant complications such as dangerous ventricular arrhythmias, ischemic heart diseases or heart failure were not recorded.

Conclusion: In patients having ventricular ectopic beats and structurally normal heart, the suppressibility of the ectopic by exercise indicated their benign origin and may preclude further invasive investigations and even specific treatment.

Keywords: Heart, Arrhythmia, Ectopic, ECG, Kirkuk.

Introduction

Ventricular ectopic beat refers to a premature depolarization originating from the ventricles. The impulse often does not conduct to the atria and thus does not reset the sinus node.¹ They are recognized on the surface electrocardiogram (ECG) by their wide (generally >120 msec) and bizarre QRS morphology, which occurs independently of atrial activation (P waves).² The types include bigeminy, trigeminy, quadrigeminy, and so on. Arbitrarily, three or more successive beats are termed ventricular tachycardia. Ventricular ectopic beats can have different contours and are often called multifocal (multiform, polymorphic, or pleomorphic).³ Epidemiologically, ventricular ectopy is exceedingly rare in infants but increases in frequency with age. It may occur in patients with and without structural heart disease and Holter Monitoring reveals that, at least one ectopic beat in 40 to 75% and complex ventricular ectopy in 5 to 10% of normal

adults. Ventricular ectopic beats occur with greater frequency and complexity in patients with structural heart diseases, especially ischemic and valvular heart disease and idiopathic cardiomyopathy. It may also occur in the setting of drug toxicity (e.g., digitalis intoxication) or electrolyte disturbances (hypokalemia).² Clinically, patients are usually asymptomatic but may complain from an irregular heart beat, missed beats or abnormally strong beats (due to the increased output of the post-ectopic sinus beat).⁴ The presence of frequent ventricular ectopics such as in a bigeminal rhythm can significantly lower the effective heart rate, resulting in a low cardiac output state. In such instances, symptoms might include dizziness, near syncope, and syncope. Reduced stroke volume, may occasionally cause fatigue, exertional intolerance, dyspnea, and lightheadedness.¹ Regarding prognosis, ventricular ectopics can have an impact on prognosis and risk for sudden

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death. Although they have no prognostic significance in patients with a normal heart, their presence in patients with heart disease is often associated with poor outcome, e.g. in patients with a history of myocardial infarction, the presence of ventricular ectopics increases mortality.² Regarding treatment, in the absence of underlying heart disease, the presence of ventricular ectopics usually has no impact on longevity or limitation of activity.³ As mentioned they are more prominent at rest and disappear with exercise. Treatment is not necessary unless the patient is highly symptomatic, in which case B-blockers can be used. In patients with structural heart disease, frequent ventricular ectopics and runs of nonsustained ventricular tachycardia have prognostic significance and may portend an increased risk of sudden cardiac death. However, no study has documented that elimination of ventricular ectopics with anti arrhythmic drug therapy reduces the risk of arrhythmic death in patients with severe structural heart disease. In fact, drug therapies that slow myocardial conduction and/or enhance dispersion of refractoriness can actually increase the risk of life-threatening arrhythmias despite being effective at eliminating ventricular ectopics.⁵ The aim of the study was not to subject patients with premature ventricular ectopic to further invasive investigation especially to angiography if by the available non-invasive investigations the heart appeared structurally normal and if their ectopic were suppressed by exercise and thus reassure the patient.

Methods

From February 2000 to February 2010 onwards, patients having ventricular ectopic beats (of whatever type and shape whether bigeminy, trigemny, unifocal or multifocal and irrespective of their frequencies) who attended private and outpatient consultation clinic (and CCU) in Azadi Teaching Hospital in Kirkuk, Iraq were assessed and followed for five years.

They were assessed clinically, by ECG and echocardiography. Only those patients with structurally normal hearts were studied and followed. These were 50 patients, their age ranged from 30-60 years and 37 were males 13 were females. The following steps were done with each patient:

1-History taking and apart from presenting symptoms, special emphasis was made on the presence of heart disease like coronary artery disease, valvular heart disease, hypertensive heart disease or heart failure or conditions precipitating heart diseases like thyrotoxicosis and any patient with the above mentioned diseases or precipitating factors was excluded (exclusion criteria). Moreover, any patients having prolonged drug ingestion-whatever and herbal or any suspicious drug intake was also excluded.

2-Physical examination was performed with especial emphasis on pulse examination, high blood pressure, displaced apex, thrills, soft or loud first heart sound, loud or split second heart sound and any murmur. The presence of any such signs excluded the patient from the study.

3-Then, ECG was done, and apart from ventricular ectopics, any abnormality like T-inversion or Q wave excluded the patient. i.e. their ECG were of normal baseline waves, segments and complexes.

4-Next, chest x-ray was taken in order to exclude any patient with cardiomegaly or pulmonary congestion.

5-Later, echocardiography was done so that any patient with abnormal echocardiography was excluded.

Lastly, for those with normal heart, we did formal treadmill exercise ECG, (on the assumption mentioned above that ventricular ectopic beats in otherwise healthy subjects are more prominent at rest and disappear with exercise). Those with non-suppressible ectopics or with positive exercise were also excluded. Finally, we were left only with those patients whose ectopics were suppressed by exercise. After all this "filtration" process, the gathered number of patients with ventricular ectopic beats and

structurally normal hearts were 50 cases. After explanation that suppressible ectopics are benign in origin and occur in normal heart,⁴ and reassurance we followed them for 5 years by having a 6-monthly clinical, ECG, Chest-X-ray, echocardiography evaluation. We studied the outcomes of these patients during the follow-up period. This study was approved by the Ethical Committee of Kirkuk College of Medicine and written consent was taken from each patient after full explanation and special emphasis was on the reassuring outcome.

Results

Regarding their treatment, 30 patients (60%) were satisfied by reassurance and needed no treatment. Ten of them (20%) were given B-Blocker every now and then. Five (10%) cases responded to simple sedativezers) and 5 (10%) were treated by a combination sedative and prokinetics (drugs enhancing gastrointestinal motility, and decrease gastric distension). It is worthy to mention that during our study, we found some results though unrelated to the main objective but are interesting to mention some of them,

- Ventricular ectopics were usually symptomatic.
- Patients initially were scared about the outcome.
- Most of them sought drug treatment or surgery to get rid of this feeling.
- Reassurance was very rewarding.
- From the excluded cases there were 5 (10%) case who were due to herbal medicine used for weight reduction (specially a Chinese one in a big can, coloured green, and was very popular in 2009 in local Iraqi markets). Having the primary outcome after 5 years, no complication was recorded. Table 1 shows the simple management strategies for patients

Table 1: Management strategies for patients

Management strategies	No (%)
Reassurance	30 (60%)
B- B-blockers	10 (20%)
Sedative	5 (10%)
edative (tranquilizers) & prokinetic (stimulants of gastric peristalsis)	5 (10%)
Total	50 (100)

Discussion

Exercise testing is an established procedure and widely used for diagnosing myocardial ischemia and to risk stratify patients with known coronary diseases. It has also been used to evaluate ventricular arrhythmias as early as 1927. The conventional impression is that ventricular ectopics that are not provoked by exercise or reduce in activity during exercise can be regarded as "benign" and not of clinical significance. However, this notion has not been subjected to detailed scientific examination.⁶ Early studies did not establish an association between exercise induced ventricular ectopic and prognosis over a relatively short follow up period (of around five years). Regarding long term prognosis, the results of studies are different, as in Jouven et al study (after 23 years of follow-up)⁷ and offspring of the original Framingham study participants⁸ (15 year study). A meta-analysis and systematic review to determine the long-term prognostic significance of premature ventricular complexes in adults without clinically apparent heart diseases concludes that most studies on ventricular ectopics prognosis in 'normal hearts' did not use advanced tests to rule out structural heart diseases. Among these patients, ventricular ectopics are associated with worse cardiovascular outcomes if the patients are older and have higher cardiovascular risk, suggesting that the poor prognosis studies may have inadvertently included patients with occult

structural heart disease, the population in which ventricular ectopics are known confer adverse outcomes.⁹ While the study on a cohort of the Multiple Risk Factor Intervention Trial (MRFIT)¹⁰ reported that the presence of ventricular ectopics identified on a rest two-minute ECG rhythm strip was associated with a high risk for sudden death in apparently healthy subjects over a 7.5 year follow-up. Similar outcomes were reported in apparently healthy subjects in the Framingham Heart Study¹¹ whereby ventricular ectopics were associated with a twofold increase in the risk of all cause mortality, myocardial infarction and cardiac death. These results have been criticized for the lack of rigorous measures to exclude underlying heart disease which may have confounded the outcomes. Pertaining to our study, which is centered on ventricular ectopics in persons with normal hearts and suppressed by exercise which is regarded as "benign" ectopics as they have been mentioned earlier, that "Ectopic beats in patients with otherwise normal hearts are more prominent at rest and disappear with exercise",⁴ K.Orth-Gomer et al¹² studied ectopic activity in 147 actively employed healthy men aged from 15 to 65 years who were examined by 24 hour Halter monitoring during their ordinary daily activities. During a six year follow up only two men died (from non-cardiac cause) and at necropsy neither had evidence of ischaemic heart disease or other cardiovascular disease. A study conducted by Kennedy¹³ in 1985, suggested that in the absence of structural heart disease, even frequent and complex ventricular ectopics are associated with a benign prognosis. Alessandro Biffi et al¹⁴ assessed 355 competitive athletes with ventricular arrhythmias on a 24-h ambulatory (Holter) ECG that was obtained because of either palpitations, the presence of ≥ 3 premature ventricular depolarization on resting 12-lead ECG, or both. They found that frequent and complex ventricular tachyarrhythmia are common in trained

athletes and are usually unassociated with underlying cardiovascular abnormalities. Such ventricular tachyarrhythmia (when unassociated with cardiovascular abnormalities) does not convey adverse clinical significance. This appears to be an expression of "athlete's heart syndrome," and probably does not per se justify a disqualification from competitive sports. Busby et al¹⁵ followed 1160 men and women ranging from 21 to 96 years of age from the Baltimore Longitudinal Study of Aging for a mean of 56 years. Cardiac events and all-cause mortality were not increased in the 80 subjects with frequent exercise-induced ventricular ectopics when compared with an age- and gender-matched control group. Mora et al¹⁶ examined a cohort of 2994 asymptomatic women 30 to 80 years of age enrolled in the Lipid Research Prevalence study over 20 years of follow-up. There was no relationship between frequent exercise-induced ventricular ectopics and all-cause mortality, but their presence did correlate to an increased risk of cardiovascular death. Ventricular ectopics are common in people with no structural heart disease. In this situation, the prognosis is generally excellent. Suppression of ventricular ectopics with anti arrhythmic medication is not indicated routinely, unless the patient is symptomatic or at risk of tachycardia-induced cardiomyopathy owing to the very high.¹⁷ In the absence of heart disease and if ventricular ectopics are infrequent or reduce in frequency on exercise tolerance test, with no documented ventricular tachycardia, patients should be reassured and no specific treatment is required especially if they are relatively asymptomatic. If these fail B-blockers may be considered. There is no evidence to support the use of other antiarrhythmic agents simply for the sake of suppressing ventricular ectopics especially considering their pro arrhythmic (for example, flecainide) and other side effects (for example, amiodarone).⁶

Conclusion

Ventricular ectopic beats in structurally normal heart (clinically by ECG and echocardiography) and suppressible by exercise needs only reassurance and probably no treatment is needed.

Conflicts of interest

The author reports no conflicts of interest.

References

1. Mohamed H, Hamdan. Cardiac Arrhythmias. In: Andreoli and Carpenter's Cecil essentials of medicine. 8th ed. USA : Saunders Elsevier; 2012. P. 121- 2.
2. William G S. Ventricular arrhythmias. In : Goldman;s Cecil Medicine. 24th ed. USA: Saunders Elsevier; 2012. P. 359-68.
3. Jeffrey E O, Douglas P, Zipes. Specific Arrhythmias Diagnosis and Treatment. 7th ed. Braunwald's heart disease. USA :Saunders Elsevier; 2005.P. 838-41.
4. D. E. Newby, N .R. Grubb, A. Bradbury. Et el Cardiovascular disease. In: Davidson's principles and practice of medicine. 21st.ed. UK:Churchill Livingstone Elsevier 2012.p 566
5. Marchlinski F. The Tachyarrhythmias. In:Harrison's principles of internal medicine. 17th ed. USA: McGraw Hill. 2008 p.1435
6. Andre NG. Treating patients with ventricular ectopic beats. Heart 2006; 92: 1707–12.
7. Jouven X, Zureik M, Desnos M. Long-term outcome in asymptomatic men with exercise-induced premature ventricular depolarizations. N Engl J Med 2000; 343: 826-33.
8. Morshedi-Meibodi A, Evans JC, Levy D. Clinical correlates and prognostic significance of exercise-induced ventricular premature beats in the community: the Framingham Heart Study. Circulation 2004; 109: 2417-22.
9. Lee V , Hemingway H, Harb R, Crake T, Lambiase P .The prognostic significance of premature ventricular complexes in adults without clinically apparent heart disease: a meta-analysis and systematic review. Heart; 98:1290-8.
10. Abdalla IS, Prineas RJ, Neaton JD. Relation between ventricular premature complexes and sudden cardiac death in apparently healthy men. AM J Cardiol 1987; 60(13) 1036–42.
11. Bikkina M, Larson MG, Levy D. Prognostic implications of asymptomatic ventricular arrhythmias: the Framingham Heart Study. Ann Intern Med 1992; 117 (12):990-6.
12. Orth-Gomer K, Hogstedt C, L Bodin L, Soderholms TB. Frequency of extra systoles in healthy male employees. Br Heart J 1986; 55: 259-66.
13. Kennedy HL, Whitlock JA, Sprague MK. Long-term follow-up of asymptomatic healthy subjects with frequent and complex ventricular ectopy. N Engl J Med 1985; 312:193-7.
14. Alessandro Biffi, MD, Pelliccia A, MD , Verdile L. Am Coll Cardiol. Long-term clinical significance of frequent and complex ventricular tachyarrhythmias in trained athletes Am Coll Cardiol 2002; 40(3):446-52.
- 15- Busby MJ, Shefrin EA, Fleg JL. Prevalence and long-term significance of exercise-induced frequent or repetitive ventricular ectopic beats in apparently healthy volunteers. J Am Coll Cardiol 1989; 14: 1659–65.
16. Mora S, Redberg RF, Cui Y .Ability of exercise testing to predict cardiovascular and all-cause death in asymptomatic women. JAMA. 2003; 290: 1600–7.
17. Omar A R, Lee L C, Seow S C, Teo S G, Poh K K. Managing ventricular ectopics: are ventricular ectopic beats just an annoyance? .Singapore Med J 2011; 52 (10):707-14.