Ashman phenomenon: a physiological aberration

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DESCRIPTION

A 24-year-old woman presented with palpitations. She had a history of rheumatic heart disease with mild mitral stenosis and moderate mitral regurgitation. ECG (figure 1) showed atrial fibrillation with aberrant conduction suggestive of 'Ashman's phenomenon'.

Ashman phenomenon, first reported in 1947 by Gouaux and Ashman,¹ is a physiological aberrancy of conduction of the ventricle as a result of a change in the QRS cycle length. Ashman beat is typically seen in atrial fibrillation when a relatively long cycle is followed by a relatively short cycle. It can also be seen in other supraventricular tachyarrhythmias. The Fisch criteria for the diagnosis of Ashman phenomenon includes—a relatively long cycle immediately preceding the cycle terminated by the aberrant QRS complex, right bundle branch block (RBBB)-form aberrancy with normal orientation of the initial QRS vector, irregular coupling of aberrant QRS complexes and lack of a fully compensatory pause.² The pathophysiology^{1 2} of Ashman phenomenon depends on the variability of relative refractory period of the conduction tissues depending upon the heart rate. The action potential duration (ie, refractory period) changes with the R-R interval of the preceding cycle. A longer cycle lengthens the ensuing refractory period, and if a shorter cycle follows, the beat

terminating the cycle is likely to be conducted with aberrancy. The RBBB pattern is more common because of the longer refractory period of the right bundle branch.

It is important to understand this phenomenon because it will be useful in differentiating aberrantly conducting beat from wide complex arrhythmia of ventricular origin as their prognosis and treatment are entirely different. The treatment involves the management of the underlying cardiac condition.

Learning points

- ▶ Ashman beat is an aberrantly conducted supraventricular beat due to change in refractory period of conduction system according to the preceding cycle length.
- ▶ Ashman phenomenon can be seen in any supraventricular arrhythmia.
- ▶ It should be differentiated from ventricular premature complexes or rarely ventricular tachycardia, as the prognosis and treatment of both are entirely different.
- ▶ Most commonly Ashman beat has right bundle branch block morphology but it can have LBBB morphology also.

Figure 1 ECG showing atrial fibrillation with aberrant conduction in sixth and 14th beat (black arrows). Note the variation in cycle length (R-R duration) in the preceding beats, that is, short-long-short cycle (black star).

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