

## ASHMAN PHENOMENON: AN OFTEN UNRECOGNIZED ENTITY IN DAILY CLINICAL PRACTICE

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Dear Editor,

We decided to reply with this letter regarding the entity that is often unrecognized in daily clinical practice.

Ashman phenomenon is an aberrant ventricular conduction most frequently seen during atrial fibrillation. This phenomenon is an intraventricular conduction abnormality caused by a change in the heart rate. Ashman beat is typically seen when a relatively long cycle is followed by a relatively short cycle<sup>1</sup>. The beat with a short cycle often has right bundle-branch block (RBBB) morphology (Fig. 1a). This phenomenon may cause diagnostic confusion with premature ventricular complexes (PVCs) (Fig. 1b), and a series of consecutive aberrantly conducted supraventricular impulses may be mistaken for ventricular tachycardia (Fig. 1c).

The pathophysiology of Ashman phenomenon depends on the relative refractory period of the conduction tissues and the heart rate. The duration of the refractory period of the heart muscle is proportional to the R-R interval of the preceding cycle. A longer cycle will prolong the ensuing refractory period, and if a shorter cycle follows the beat terminating the cycle is likely to be conducted with aberrancy. The refractory period of the right bundle-branch is longer than the left one and it will still be in the refractory pe-

riod when supraventricular impulse reaches the His-Purkinje system resulting in a complex with RBBB<sup>2,3</sup>. Ashman phenomenon is principally diagnosed by a 12-lead surface electrocardiogram (ECG). Rarely, in difficult cases, invasive electrophysiological studies will be required to establish the source of an arrhythmia whether supraventricular or ventricular<sup>4</sup>.

For daily use, useful criteria to establish the diagnosis of Ashman phenomenon are those described by Fisch<sup>5</sup>: 1) relatively long cycle immediately preceding the cycle terminated by the aberrant QRS complex; 2) RBBB-form aberrancy with normal orientation of the initial QRS vector, a series of wide QRS supraventricular beats is possible; 3) irregular coupling of aberrant QRS complexes; and 4) lack of fully compensatory pause.

Clinically, Ashman phenomenon by itself is asymptomatic and does not require any specific treatment.

Finally, although Ashman phenomenon has been known for more than sixty years now<sup>1</sup>, it still often stays unrecognized, or misdiagnosed as PVCs. Understanding Ashman phenomenon is useful and necessary in daily clinical practice because, for example, in 24-hour Holter ECG records we can find even several thousand wide QRS complexes caused by Ashman phenomenon. It usually occurs with atrial fibrillation, and atrial fibrillation is the most common sustained cardiac rhythm disturbance, increasing in prevalence with age<sup>6</sup>. Furthermore, not only the cardiologists, but often physicians of different profiles such as neurologists, anesthesiologists, general practitioners, etc. see it and treat it.

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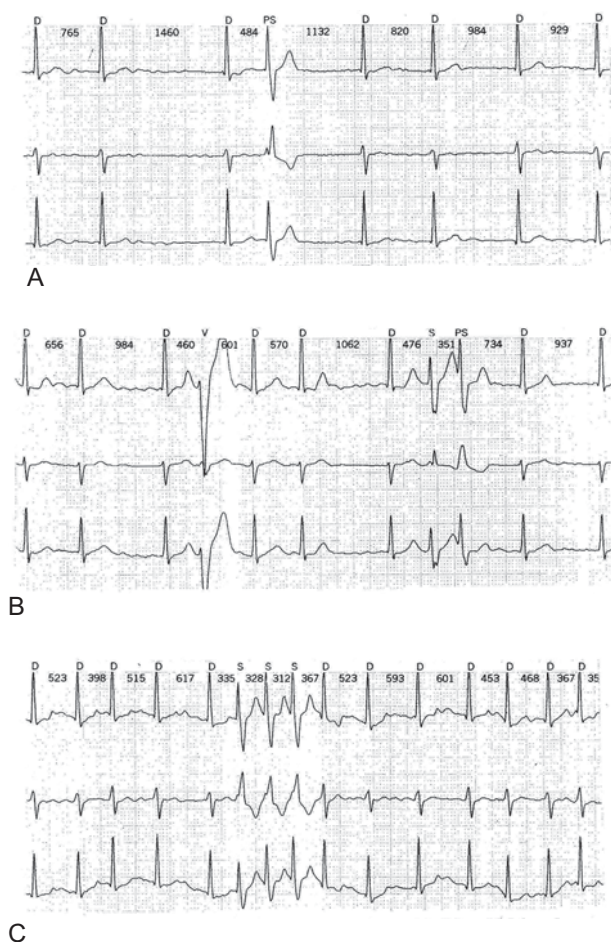


Fig. 1. Holter ECG records in Ashman phenomenon: (A) atrial fibrillation with aberrant conduction – Ashman phenomenon (4<sup>th</sup> beat); (B) the same patient – note the ECG morphology difference between ventricular ectopic beat (4<sup>th</sup> beat) and aberrant conduction – Ashman phenomenon (8<sup>th</sup> and 9<sup>th</sup> beats); (C) aberrant conduction run – Ashman phenomenon (6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> beats).

In conclusion, it is important to notice that in a patient with atrial fibrillation and wide QRS complexes with RBBB morphology, Ashman phenomenon must be considered to avoid further unnecessary diagnostic and, more important, therapeutic procedures.

## References

1. KENNEDY LB, LEEFE W, LESLIE BR. The Ashman phenomenon. *J La State Med Soc* 2004;156:159-62.
2. NAVE C, NARDI S, GAUDINO M, CURCIO N, CIRILLO T, IACONO A. The electrophysiological basis of aberrant intraventricular conduction during atrial fibrillation. *Cardiologia* 1996;41:1193-8.
3. SCHAMROTH L, JACOBS ML. A study in intracardiac conduction with special reference to the Ashman phenomenon. *Heart Lung* 1982;11:381-2.
4. QUAAL S, SCHAMROTH L. Aberrant ventricular conduction during atrial fibrillation. *Heart Lung* 1985;14:101.
5. FISCH C. Electrocardiography of arrhythmias. From deductive analysis to laboratory confirmation – twenty-five years of progress. *J Am Coll Cardiol* 1983;1:306-16.
6. FUSTER V, RYDÉN LE, CANNOM DS, CRIJNS HJ, CURTIS AB, ELLENBOGEN KA, *et al.* Task Force on Practice Guidelines, American College of Cardiology/American Heart Association; Committee for Practice Guidelines, European Society of Cardiology; European Heart Rhythm Association; Heart Rhythm Society. ACC/AHA/ESC 2006 guidelines for the management of patients with atrial fibrillation – executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the European Society of Cardiology Committee for Practice Guidelines (Writing Committee to Revise the 2001 Guidelines for the Management of Patients with Atrial Fibrillation). *Eur Heart J* 2006;27:1979-2030.