A 20-year-old man presented with history of orthopnea and paroxysmal nocturnal dyspnea for 7 days. He had a history of acute febrile illness and coryza 10 days before the start of symptoms. On clinical examination, his pulse was 130 beats per minute, regular with beat-to-beat variation in pulse volume. Blood pressure was 80/48 mmHg. Bilateral basal crepitations were noted on chest auscultation. Cardiovascular examination demonstrated left ventricular S3.

Routine laboratory investigations were normal except for the increased total leukocyte counts (13,000/mm³) with lymphocytic predominance. Twelve-lead ECG showed sinus tachycardia, and pulsus alternans was evident on simultaneous plethysmographic waveform (Figure, A) in the form of strong and weak pulses. Transthoracic echocardiogram revealed left ventricular global hypokinesia with reduced ejection fraction of ≈30% (Movie I in the online-only Data Supplement). Doppler interrogation of the abdominal aorta and carotid artery revealed marked beat-to-beat alteration in blood flow velocity (Figure, B and C). In view of the antecedent history of fever, a diagnosis of probable viral myocarditis was considered. The patient was started on diuretics and inotropic support. He had significant clinical improvement after a few days and was discharged in good general condition after 10 days. At 1 month of follow-up, left ventricular ejection fraction improved to 40%.

Pulsus alternans was described by Traube in 1872. The proposed mechanism for pulsus alternans includes variation in the basic inotropic state of the myocardium; alternation in the number of cardiac fibers contributing to each systole could thereby induce this phenomenon. It is indicative of significant left ventricular systolic impairment and carries a poor prognosis.

Disclosures

None.

References

Figure. Electrocardiographic tracing and plethysmographic waveform (A) showing pulsus alternans. Doppler of carotid artery (B) and abdominal aorta (C) showing marked beat-to-beat alteration in blood flow velocity.
Pulsus Alternans: Doppler Demonstration
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Movie Legend:

**Movie 1.** Transthoracic echocardiogram- Colour compare in apical 4-chamber view demonstrating severe left ventricular dysfunction and mild mitral regurgitation. Best viewed with Windows Media Player.