

McConnell's sign in a patient with pulmonary embolism

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DESCRIPTION

A 76-year-old non-smoking woman with a sedentary lifestyle, hypertension, lumbar spondylosis and degenerative lumbar disk disease was electively admitted for bilateral lumbar decompressive laminectomy. After a 12-hour surgery, the patient became hypotensive. The ECG and echocardiogram were suggestive of pulmonary embolism (PE). Chest CT with contrast confirmed an acute pulmonary thromboembolism.

Echocardiogram (figures 1 and 2, and video 1) showed right ventricular free wall hypokinesia with apical sparing (McConnell's sign)¹ and the left ventricle was under-filled and hyperdynamic, suggestive of PE. The patient was treated with intravenous fluid and heparin. Her blood pressure improved. The patient was discharged 6 days later on warfarin.

PE is a major, but preventable, cause of in-hospital mortality.² In the last decade the incidence of PE increased for many reasons, including suboptimal prevention and improvement of the sensitivity of diagnostic modalities.³ Patients with spinal surgery are at a higher risk for PE partly related to long surgical times.⁴ For this reason, dual prophylaxis (mechanical and pharmacological) methods should be used in patients who undergo spine surgery.⁵

Echocardiography is a very useful modality with a high specificity in diagnosing PE in patients with high pretest probability.⁶ Several signs that can be detected by echocardiography are suggestive of PE, including right ventricle (RV) hypokinesia, McConnell's sign,¹ pulmonary artery hypertension, RV strain,^{7 8} RV thrombus and tricuspid regurgitation.^{7 9}

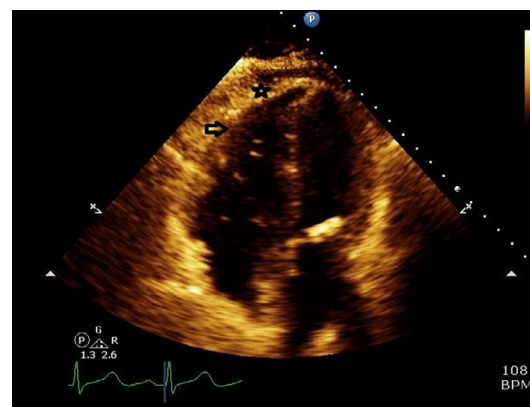


Figure 2 The RV during diastole showing relaxed mid-free wall (arrow) and apical segment (star).

RV dyskinesia has been reported by many investigators, such as Kasper *et al*¹⁰ and Goldhaber *et al*¹¹ but McConnell *et al* were the first to describe the localised pattern of dyskinesia that affects the mid-free wall of the RV. The first explanation for this dyskinesia was that the RV may become ball-shaped to distribute the stress of a sudden increase in the pulmonary pressure. Second, the RV apex accompanies the movement of the hyperdynamic left ventricle as both are linked to each other.¹

McConnell's sign sensitivity and specificity were described in many observational studies. It was shown to be highly specific for the acuity of PE, especially in critical care settings, however it lacks sensitivity.^{6 12} In summary, McConnell's sign is a typical echocardiographic and useful sign of acute PE.

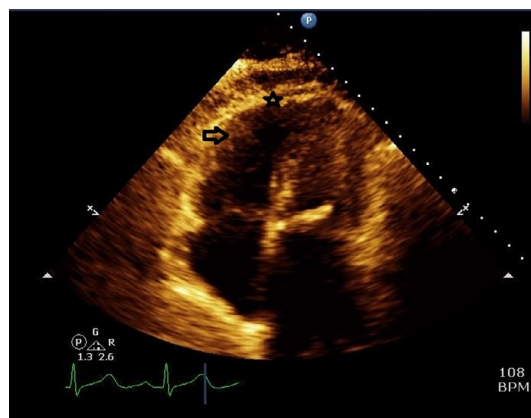


Figure 1 The right ventricle (RV) during systole showed hypokinesia of the mid-free wall (arrow) with apical contraction (star).



Video 1 Cardiac echo showing hypokinesia of the mid-free wall with apical sparing.



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Learning points

- Pulmonary embolism (PE) is a major cause of in-hospital mortality, especially in those who had spine surgery.
- McConnell's sign, when present, is a valuable marker of PE diagnosis.
- Clinicians should be familiar with echocardiographic signs, including McConnell's sign, that correlate with haemodynamic instability of PE.

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