

7. Cipriani V, Mannucci PM, Ardissino D, Ferrario M, Corsini G, Merlini PA, Notarangelo F, Lina D, Bernardinelli L. Familial aggregation of early-onset myocardial infarction. *Eur J Intern Med* 2010;**21**:511–515.
8. Madsen M, Davidsen M, Rasmussen S, Abildstrom SZ, Osler M. The validity of the diagnosis of acute myocardial infarction in routine statistics: a comparison of mortality and hospital discharge data with the Danish MONICA registry. *J Clin Epidemiol* 2003;**56**:124–130.
9. Kildemoes HW, Sorensen HT, Hallas J. The Danish National Prescription Registry. *Scand J Public Health* 2011;**3**(Suppl.):9:38–41.
10. Olesen JB, Lip GY, Hansen ML, Hansen PR, Tolstrup JS, Lindhardsen J, Selmer C, Ahlehoff O, Olsen AM, Gislason GH, Torp-Pedersen C. Validation of risk stratification schemes for predicting stroke and thromboembolism in patients with atrial fibrillation: nationwide cohort study. *BMJ* 2011;**342**:d124.
11. Clayton D, Hills M. *Statistical Models in Epidemiology*. Oxford, New York: Oxford University Press; 1993.
12. Friedlander Y, Arbogast P, Schwartz SM, Marcovina SM, Austin MA, Rosendaal FR, Reiner AP, Psaty BM, Siscovick DS. Family history as a risk factor for early onset myocardial infarction in young women. *Atherosclerosis* 2001;**156**:201–207.
13. Banerjee A, Silver LE, Heneghan C, Welch SJ, Bull LM, Mehta Z, Banning AP, Rothwell PM. Sex-specific familial clustering of myocardial infarction in patients with acute coronary syndromes. *Circulation* 2009;**2**:98–105.
14. Carter CO. The inheritance of congenital pyloric stenosis. *Br Med Bul* 1961;**17**: 251–254.

CARDIOVASCULAR FLASHLIGHT

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Perforation of the right ventricle by bone cement: a rare complication of kyphoplasty

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A 64-year-old woman was referred to our Department of Cardiology after a cardiac magnetic resonance imaging, ordered for evaluation of chest discomfort, had detected three foreign objects of unknown origin in the right heart (Panel A). After admission, echocardiography (Panels B and C, Supplementary material online, Videos S1–S4), chest X-ray (Panel D) and computed tomography (CT) (Panel E) confirmed the presence of three elongated foreign objects with thrombus formation in the right atrium and ventricle. Medical history revealed a balloon kyphoplasty which had been performed for osteoporotic fractures of the lumbar vertebral bodies 1 and 4 two months prior.

Due to the apparent thrombus formation and the patient's mild symptoms, a regime of oral anticoagulation was started. An attempt to inter-ventionally remove the objects within 4 weeks was scheduled and the patient was discharged. Two weeks later, however, the patient was re-admitted to our emergency department due to progressive dyspnoea and chest discomfort. A repeat CT scan now revealed dislocation of one object with consecutive perforation of the right ventricle and moderate pericardial effusion (Panels F and G). The patient underwent urgent cardiotomy on cardiopulmonary bypass and three bone cement filaments were retrieved (Panels H and I). Retrospectively, these filaments originated from the kyphoplasty during which several millilitres of polymethylmethacrylate must have accidentally been injected into a paravertebral vein and subsequently embolized into the vena cava. The postoperative course remained uneventful and the patient fully recovered.

Pulmonary embolism of bone cement has been reported to occur in up to 4.6% of all patients after kyphoplasty. However, physicians should also be aware of the possibility of cardiac complications. If detected, intracardiac foreign bodies should be monitored by repetitive echocardiographic imaging and evacuated in a timely manner.

Supplementary material is available at *European Heart Journal* online.

