A 54-year-old male with previous coronary artery bypass grafting presented with an inferolateral non-ST segment elevation myocardial infarction. On admission, echocardiography showed a 25 × 27-mm rounded echo-free mass in the right atrium, best seen in the subcostal view (Panel A, arrow). Following this, he underwent cardiac MRI which characterized it as a 37 × 34-mm rounded structure at its maximal diameter, closely related to the pericardium and right heart. This is a vein graft aneurysm now occluded with thrombi (Panel B, arrow), the culprit lesion as seen during cardiac catheterization (Panel C), compared with its appearance 9 months earlier when it was patent (Panel D). While an aneurysmal vein graft can be diagnosed using various imaging modalities, each investigation was contributory to the diagnosis. Echocardiography can be performed quickly and safely in any patient setting and this case, the finding was made soon after admission. Cardiac MRI was able to fully reconstruct and further characterize the size and nature of the lesion due to its high resolution but is limited to the patient being compliant and haemodynamically stable. Cardiac catheterization is the definitive diagnostic and therapeutic modality allowing immediate intervention of culprit lesions in the setting of acute myocardial infarction. This case underscores the strengths and limitations of each modality and highlights the benefit of a multi-modal approach.