

Covered perforation of the right ventricular free wall as a very rare complication after chest trauma

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Background:

Perforation of the right or left ventricular free wall can be a complication after chest trauma. It is likely that in most cases patients with acute pericardial tamponade will not survive. The transthoracic echocardiography (TTE) is needed in cases of chest pain as the emergency imaging method. We present a case illustrating the use of cardiovascular magnetic resonance imaging (CMR) as the following imaging modality of choice. CMR makes the definitive diagnosis and is necessary to plan the cardiac surgery.

Objective / Methods / Results:

A 54-year-old man was admitted to hospital because of repeated chest pain. A myocardial infarction was ruled out. In the adoption of unstable angina pectoris coronary heart disease was excluded by a coronary angiography. The TTE (Figures 1 and 2) shows in the region of the right ventricular apex a structure with evidence of a direct flow connection to the right ventricle. The pericardium was thickened. There was an echogenic pericardial effusion. The CMR (Figures 3 and 4) shows in the region of the right ventricular apex an aneurysm spurious in the sense of a covered perforation (28 x 28 mm) in a fatty pericardial thickening and a circular hemodynamically not relevant pericardial effusion. In an extended anamnesis the patient admitted a trauma falling off the roof with contusion of the chest three months ago.

The patient was transferred to the cardiac surgery. The operation proves a covered aneurysm in the region of the right ventricular apex. The aneurysm was treated by resection. The postoperative course was without complications.

Discussion:

There were several problems and issues:

1. In the administration of contrast medium, the right ventricular flooding could have been used for an angiographic imaging of the aneurysm.
2. The anatomical assignment of different sharply demarcated areas was initially unclear. It lacks a fat-saturated MR sequence to prove the fatty epicardium.
3. Probably survival with a covered perforation of the right heart was encouraged by a fatty epicardial thickening as an additional buffer zone.
4. The boundary lines of the aneurysm showed as contrasted cystic representation, which has been discussed a congenital aneurysm.

Conclusion:

If all possibilities of CMR would have been fully utilized, the diagnosis would have been much more accurate. Covered perforation of the right ventricular free wall is a very rare but all the more surprising complication after chest trauma.

Abbreviations:

(C)MR (Cardiovascular) Magnetic Resonance, ED end-diastolic, EDD end-diastolic diameter, EDV end-diastolic volume, EF ejection fraction, ES end-systolic, ESD end-systolic diameter, ESV end-systolic volume, LA left atrium, LGE late gadolinium enhancement, LV left ventricle, RA right atrium, RV right ventricle TAPSE Tricuspid annular plane systolic excursion, TTE transthoracic echocardiography.

Disclosure Statement of Financial Interest:

I (Helmut Bültel) do not have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

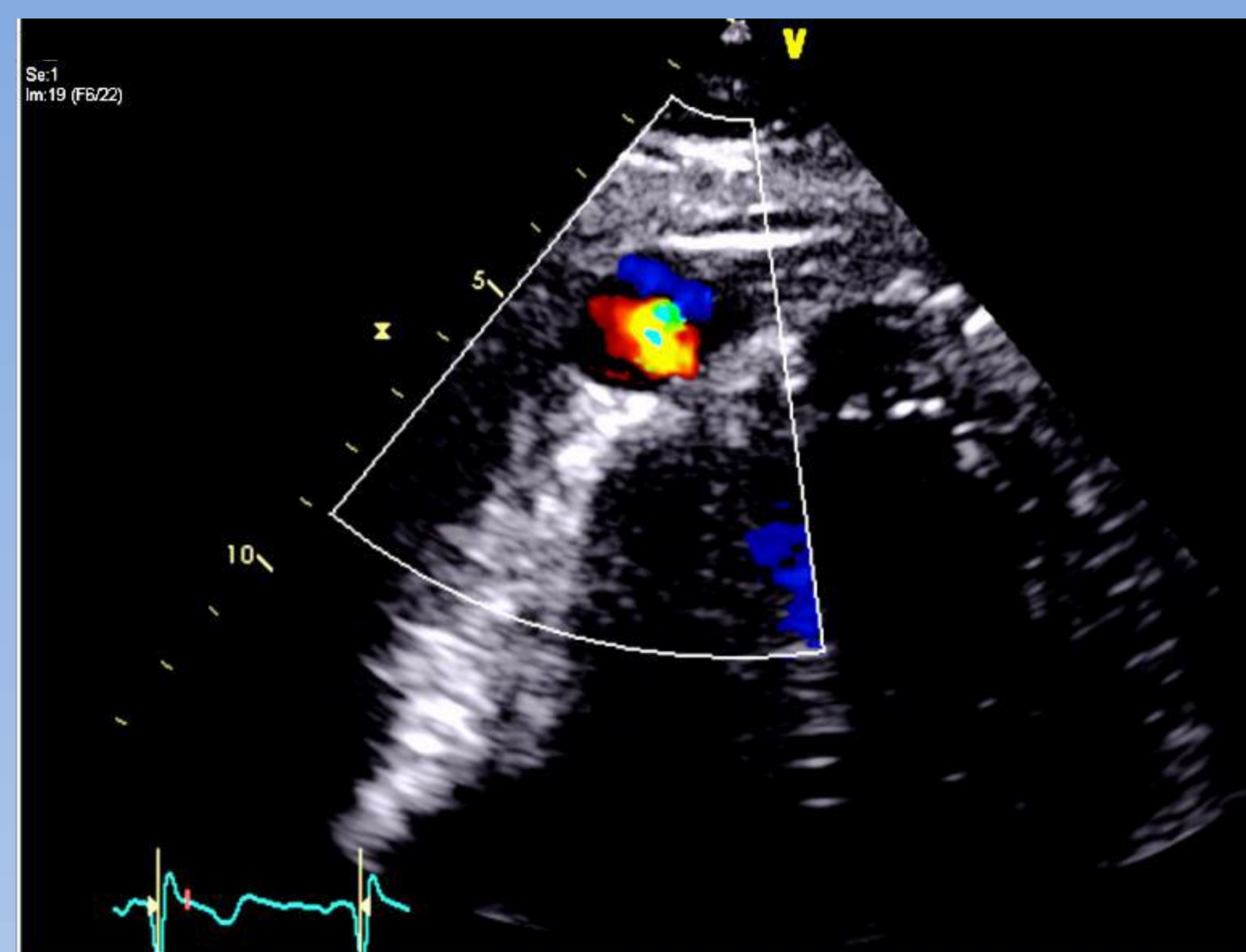


Figure 1:

TTE
color-coded Doppler

Apical focused slightly angled 4-chamber view:
Aneurysm with direct flow connection to the right ventricle.



Figure 2:

TTE:
contrast echocardiography

Apical focused slightly angled 4-chamber view:
Aneurysm with direct flow connection to the right ventricle.

CMR on 12/02/2014

LV EDD	51 mm	RV EDD	35 mm
LV Septum end-diastolic	12 mm	TAPSE	14 mm
LV Ejection fraction	60 %		
LA Area end-systolic	20 cm ²	RA Area end-systolic	16 cm ²

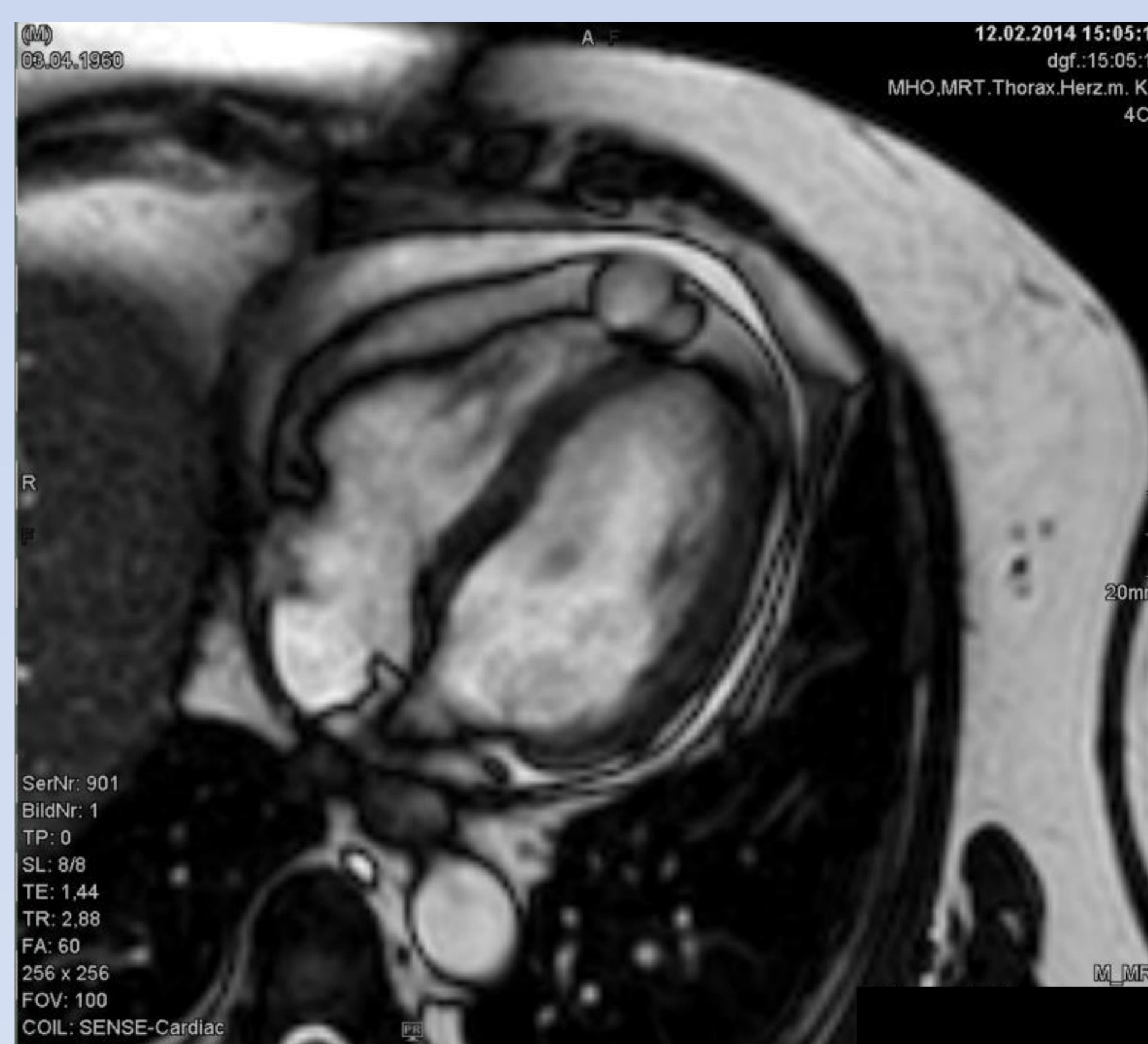


Figure 3:

CMR:
4-chamber view
(slightly angled)

Aneurysm spurious in the sense of a covered perforation at right ventricular apex.



Figure 4:

CMR
4-chamber view
(slightly angled)
LGE

Aneurysm spurious in the sense of a covered perforation at right ventricular apex.