A 19-year-old man presented with general malaise, retrosternal chest pain, and palpitations. ECG demonstrated a flattening of T-waves in pre-cordial leads. Laboratory measurements showed elevated troponin I (6.6 ng/mL) and creatine kinase (477 U/L). Histopathological analysis of three samples taken from the right ventricle via endomyocardial biopsy (EMB) was unsuspicious, but polymerase chain reaction revealed DNA of parvovirus B19.

Simultaneous PET/MRI with $^{18}$F-fluorodeoxyglucose (FDG) was performed (Biograph mMR, Siemens, Germany). Myocardial glucose uptake was suppressed with high-fat-low-carbohydrate diet and i.v. administration of unfractionated heparin (50 IU/kg) 15 min before the FDG injection.

Cine imaging showed normal left ventricular (LV) function. No pericardial effusion was found. T2-weighted images revealed an oedema in the LV (Panel C). Dynamic perfusion imaging revealed hyperaemia in the LV anterior wall (Panel D). Subepicardial late gadolinium-enhancement (LGE; Panel A) was found in the LV anterior wall that was in excellent agreement with increased FDG uptake (Panel B).

An acute myocarditis, probably caused by parvovirus B19, was diagnosed. The negative histopathological results of EMB are most likely due to sampling errors, especially as the samples were taken from the RV, whereas imaging showed focal disease in the anterior wall of the LV.

The present case demonstrates the potential of FDG-PET/MRI in the management of myocarditis. With MR one can rapidly detect the disease, evaluate its extent, and quantify the impairment of cardiac function. $^{18}$F-fluorodeoxyglucose uptake is not only a sensitive marker of inflammation, but also a quantifiable parameter for disease activity that could complement MR in the detection, differential diagnosis, and monitoring of myocarditis.