Imaging of acute and chronic aortic dissection by 18F-FDG PET/CT.

Abstract:
By conventional imaging modalities, the discrimination between acute and chronic aortic dissection (AD) for surgical risk evaluation is not possible. However, acute and chronic stable AD potentially may be distinguished by detection of reparatory hypermetabolism in the lacerated aortic wall of acute AD using (18)F-FDG PET/CT. In this study, we analyzed the (18)F-FDG uptake in the aortic wall of acute and chronic stable AD. METHODS: Eighteen patients with acute (n = 9), symptomatic progressive (n = 2), or known chronic stable (n = 7) type B AD underwent (18)F-FDG PET/CT. Images were analyzed qualitatively and quantitatively considering (18)F-FDG uptake patterns and the standardized uptake values (SUVs) of the aortic wall, dissection membrane, and luminal (18)F-FDG activity. The SUV ratio (maximum SUV in the aorta divided by mean SUV in the blood pool) was calculated to relativize individual luminal (18)F-FDG spillover effects. RESULTS: In contrast to chronic stable AD, all acute or acute progressive AD showed accentuated (18)F-FDG uptake at the injured aortic wall or dissection membrane. The maximum SUV of the dissection membrane or aortic wall was significantly higher (P = 0.02) in acute AD than in chronic stable AD. Thereby, SUV varied from 3.03 to 4.64 (average maximum SUV, 3.84 +/- 0.51) for the dissection membrane and from 2.22 to 4.60 (average maximum SUV, 2.94 +/- 0.81) for the aortic wall,
with false-negative and false-positive outliers. The discrimination between acute and stable AD was improved significantly (P< 0.001), and false-positive or -negative outliers were eliminated, using the SUV ratio method. CONCLUSION: Our results indicate that (18)F-FDG PET/CT might be useful in differentiation of acute from chronic AD in clinically unclear cases. However, larger studies are needed to confirm our preliminary results.