

## Registration and fusion of MRI and FDG PET images to assess pancreatic lesions

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**Aim:** Our study aimed to evaluate if image registration and fusion, using data acquired on stand alone MRI and FDG PET scanners, is able to increase the diagnostic accuracy of the two single imaging modalities, in the evaluation of pancreatic lesions.

**Methods:** We retrospectively evaluate 17 patients (13 male and 4 female), with a mean age of 65.5 y, ranging from 49 to 83 y. All patients were referred for a total-body FDG PET or an abdominal MRI scan for a clinically doubtful pancreas lesion and were studied during a 36 months period. Twelve out of 17 patients were studied for diagnostic and staging purposes, while 5 were evaluated for a suspected post-surgical relapse. Eleven patients had pancreatic adenocarcinoma, 1 a pancreatic neuroendocrine tumor and 5 had no definitive pathologic assessment. The mean interval between FDG PET and MRI assessment was 7 days, ranging from 0 to 28 days. MRI images were acquired on 1.5 Tesla Philips Achieva and Siemens Symphony scanners. Total-body PET images were acquired on a Siemens ECAT Accell LSO scanner, 60 minutes after the injection of 370-500 MBq of  $^{18}\text{F}$ -FDG. Patients were fasting for at least 8 hours prior the FDG administration and had blood glucose level below 150 mg/dL. MRI DICOM 3.0 images were imported from the Hospital PACS system on a Siemens Syngo console. Data set from different modalities were registered and fused using Siemens e-soft software, without using external confidential markers. No significant artifacts were encountered during the fusion process. All images were evaluated by consensus between an experienced nuclear physician and an experienced radiologist.

**Results:** Diagnostic conclusions were compared with pathology results or follow-up. In 4 out of 17 patients fused images were able to modify the diagnostic conclusion obtained on a single modality. In all cases fusion with MRI helped to improve anatomic localization of lesions seen on PET. Diagnostic accuracy for the single modalities was 76% (13/17) and improved to 94% (16/17) using fused images.

**Conclusion:** Our data suggests the use of image fusion between MRI and PET to evaluate pancreatic lesions. Due to the difficulties in the diagnosis of a pancreatic cancer, this approach offers a simple and effective way to improve diagnostic accuracy.