DIAGNOSTIC ACCURACY OF CZT-BASED MYOCARDIAL PERFUSION SPECT: IMPACT OF ATTENUATION CORRECTION USING A CO-REGISTERED EXTERNAL CT

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BACKGROUND-AIM

CT-based attenuation correction (AC) improves the accuracy of standard myocardial perfusion SPECT. Nevertheless, most dedicated cadmium-zinc-telluride (CZT) SPECT cameras are not equipped with an integrated CT component and as for now the impact of AC using CZT cameras has not been elucidated. We aimed to determine the impact of AC on diagnostic performance of CZT SPECT using co-registration with an external low-dose CT.

METHODS

51 patients underwent MPI SPECT on a CZT camera (Discovery 530c, GE Healthcare) with 99mTc-sestamibi at rest and following regadenoson stress. Using commercial software, SPECT images were co-registered with a low-dose CT acquired on a separate system (Discovery 670NMCT, GE Healthcare). Attenuation corrected (AC) and non-corrected (NC) images were reconstructed using an iterative algorithm. All datasets were read by 2 blinded observers to obtain summed stress (SSS), rest (SRS) and difference scores (SDS). Accuracy was measured in 35 patients who had undergone invasive angiography within 6 months, using a stenosis threshold of 70%. Normalcy was compared in the remaining 16 patients who had a low pre-test likelihood (<5%) of CAD.

RESULTS

SSS and SRS were significantly higher in NC images (7.9±6.88 vs 12.4±8.9 and 5.49±6.76 vs 9.54±9.61, p<0.05), while SDS did not differ significantly. According to angiography, 31 patients had significant CAD in 60 vascular territories. AC did not improve accuracy for global SSS>4 (83% vs 86%, p=NS) nor for LAD and LCX vascular territories (LAD: 71% vs 66%, LCX: 71% vs 69%, p=NS). Conversely, accuracy was improved in RCA territory (86% vs 63%, p<0.05). There was evidence of improved specificity both overall (100% vs 67%, p<0.05) and in each individual territory (LAD: 67% vs 50%, LCX: 72% vs 50%, RCA: 88% vs 25%, p<0.05). Normalcy (SSS<4) was 100% for AC and 62.5% for NC images, respectively (p<0.05).

CONCLUSION

Attenuation correction with a co-registered external CT is feasible using CZT cameras and improves diagnostic accuracy mostly by improving specificity over uncorrected images.