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Imaging Cardiac Sympathetic Innervation with MIBG: Linear Conversion of the Heart-to-Mediastinum Ratio between Different Collimators

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Ziel/Aim:

The heart-to-mediastinum (H/M) ratio is a commonly used parameter to measure cardiac I-123 metaiodobenzylguanidine (MIBG) uptake. Since the H/M ratio is substantially influenced by the collimator type, we investigated whether an empirical linear conversion of H/M ratios between camera systems with low-energy (LE) and medium-energy (ME) collimator is possible.

Methodik/Methods:

We included 18 patients with parkinsonism who were referred to one of the two participating molecular imaging facilities for the evaluation of cardiac sympathetic innervation by MIBG scintigraphy. Two consecutive planar image datasets were acquired with LE and ME collimators at 4h after MIBG administration. Linear regression analyses were performed to describe the association between the H/M ratios gained with both collimator settings, and the accuracy of a linear transfer of the H/M ratio between collimators and across centers was assessed using a leave-one-out procedure.

Ergebnisse/Results:

H/M ratios acquired with LE and ME collimators showed a strong linear relationship both within each imaging facility ($R^2 = 0.99$, $p < 0.001$ and $R^2 = 0.90$, $p < 0.001$) and across centers ($H/M-LE = 0.41 * H/M-ME + 0.63$, $R^2 = 0.97$, $p < 0.001$). A linear conversion of H/M ratios between collimators and across centers was estimated to be very accurate (mean absolute error: 0.05 ± 0.04 ; mean relative absolute error: $3.2 \pm 2.6\%$).

Schlussfolgerungen/Conclusions:

The present study demonstrates that a simple linear conversion of H/M ratios acquired with different collimators is possible with high accuracy. This should greatly facilitate exchange of normative data between settings and pooling of data from different institutions.