Thallium-201 single photon emission computed tomography for the di...

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Thallium-201 single photon emission computed tomography for the differentiation of malignant versus non-malignant intracranial space-occupying lesions in developing countries

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Abstract

Background: Thallium-201 single-photon emission computed tomography (TI-SPECT) imaging has been used historically to distinguish malignant cerebral neoplasms from infectious etiologies.

Objectives: Our study aims to conduct a retrospective study, review existing literature, and perform meta-analysis on the use of TI-SPECT to differentiate malignant from non-malignant nervous system lesions when other advanced imaging modalities are not available, such as in resource-limited setting.

Methods: A retrospective study on the use of TI-SPECT in differentiating malignant versus non-malignant nervous system lesions was conducted in two tertiary hospitals in the Philippines. A systematic review of relevant studies regarding TI-SPECT for the central nervous system was also done. Meta-analysis was performed to generate pooled sensitivity and specificity.

Results: A total of 19 patients from 2 institutions were included in the analysis. Data from Philippine General Hospital showed a sensitivity of 83% (95% CI: 36%, 100%) and a specificity of 100% (95% CI: 16%, 100%), while St. Luke's Medical Center had a sensitivity of 100% (95% CI: 40%, 100%) and specificity of 100% (95% CI: 48%, 100%). Thirty-two (32) articles were qualitatively described and 24 datasets were subjected to meta-analysis. Pooled sensitivity and specificity were 89% (95% CI: 81%-94%) and 81% (95% CI: 73%-87%), respectively with an area under the curve (AUC) for diagnostic accuracy of 92%.

Conclusion: TI-SPECT imaging may be a potential diagnostic tool to discriminate malignant from non-malignant nervous system lesions when advanced imaging modalities such as PET/ MRI are not available. Due to the heterogeneity of the population in the studies included in both the quantitative and qualitative analyses, further studies are needed to validate these findings.

Keywords: Brain tumor; Malignancy; Nervous system; SPECT; Thallium.

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