

Parametric Evaluation for the Optimization of Gastric Emptying Protocols Used in Health Care Institutions

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Abstract : The aim of this research was to assess the factors contributing to the need for optimisation of the gastric emptying protocols in nuclear medicine and molecular imaging (SNMMI) procedures. The objective is to suggest whether optimisation is possible and provide supporting evidence for the current imaging protocols of gastric emptying examination used in nuclear medicine. The research involved the use of some selected patients with 30 dynamic series for the image processing using ImageJ, and by so doing, the calculated half-time, retention fraction to the 60 x1 minute, 5 minute and 10-minute protocol, and other sampling intervals were obtained. Results from the study IDs for the gastric emptying clearance half-time were classified into normal, abnormal fast, and abnormal slow categories. In the normal category, which represents 50% of the total gastric emptying image IDs processed, their clearance half-time was within the range of 49.5 to 86.6 minutes of the mean counts. Also, under the abnormal fast category, their clearance half-time fell between 21 to 43.3 minutes of the mean counts, representing 30% of the total gastric emptying image IDs processed, and the abnormal slow category had clearance half-time within the range of 138.6 to 138.6 minutes of the mean counts, representing 20%. The results indicated that the calculated retention fraction values from the 1, 5, and 10-minute sampling curves and the measured values of gastric emptying retention fraction from sampling curves of the study IDs had a normal retention fraction of <60% and decreased exponentially with an increase in time and it was evident with low percentages of retention fraction ratios of < 10% after the 4 hours. Thus, this study does not change categories suggesting that these values could feasibly be used instead of having to acquire actual images. Findings from the study suggest that the current gastric emptying protocol can be optimized by acquiring fewer images. The study recommended that the gastric emptying studies should be performed with imaging at a minimum of 0, 1, 2, and 4 hours after meal ingestion.

Keywords : gastric emptying, retention fraction, clearance halftime, optimisation, protocol

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