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Quantitative estimation of the renal tubular function with ^{99m}Tc - MAG3: comparative software approach using two methods in a pediatric population

Author Block: M. J. Carapinha^{1,2,3}, R. Silva¹, F. Silva¹, S. Figueiredo^{1,3}, L. Vieira^{1,3};

¹Escola Superior de Tecnologia da Saúde de Lisboa, Lisboa, PORTUGAL, ²Escola Nacional de Saúde Pública, Universidade Nova de Lisboa, Lisboa, PORTUGAL, ³H&TRC - Health & Technology Research Center, ESTeSL - Escola Superior de Tecnologia da Saúde, Instituto Politécnico de Lisboa, Lisboa, PORTUGAL.

Abstract:

Aim/Introduction: The ability to quantify function by Effective Renal Plasma Flow (ERPF) using camera based Technetium-99m mercaptoacetyltriglycine (^{99m}Tc -MAG3) clearance methods is an accurate and time-saving technique as compared with the standard laboratory tests. Often providing information not possible with the conventional radiological modalities, this quantitative assessment can be determined by a linear formula - Modified Gates Method (MGat) - or a quadratic approach - Modified Schlegel Method (MSch). The aim of this work was to evaluate the effect of the MGat and MSch methods on the absolute value of ERPF in ^{99m}Tc -MAG3 dynamic renography.

Materials and Methods: A retrospective study with a non-probabilistic sample of twenty one children (9.5 ± 3.1 years; 32.1 ± 10.7 kg) referred for diuretic (12.8 ± 4.8 mg of furosemide) ^{99m}Tc -MAG3 (120.0 ± 27.5 MBq) renogram was used. Data were available in Xeleris GETM workstation database at Lisbon School of Health Technology (ESTeSL) and were processed using Renal Analysis application. To obtain the ERPF (mL/min) parameter by the MSch and MGat methods, all the studies were manually processed by the same operator considering the following regions of interest (ROI): left kidney (LK), right kidney (RK), peri-renal background (BKG), aorta artery (AA) and injection site (IS). Additionally, right and left kidney Area (A), uptake (Up) and $T_{1/2}$ quantitative parameters were assessed for each method. To evaluate the significance and association between the variables, the Shapiro-Wilk, Wilcoxon and Spearman correlation tests were used, considering $\alpha=0.05$. **Results:** Paired samples Wilcoxon test found significant differences in ERPF MGat and MSch ($p<0.01$); RKA MGat and MSch ($p<0.05$); LKA MGat and MSch ($p<0.05$). Contrarily, there were not significant differences for Uptake ($p>0.05$) and for $T_{1/2}$ parameter ($p>0.05$), considering L and R kidneys, when MGat and MSch methods were applied, though higher significance values were found in Up parameter. **Conclusion:** Results suggest that the applied method may possibly influence the obtained ERPF absolute value. MGat and MSch methods originate different ERPF and A values, despite similar metrics for the Up and $T_{1/2}$ parameters. The effect of location of the kidneys (L-R) seems to slightly affect method association criteria for all the parameters with more impact in the LK values. **References:** none

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Author Disclosure Information:

M.J. Carapinha: None.

Topic (Complete): 13.2 Dynamic Renal Scintigraphy

Disclosures (Complete):

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