

Identification of the Factors Affecting on the Retention of ^{99m}Tc-DMSA in Syringes among Paediatric Population

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Abstract

^{99m}Tc-DMSA is a common paediatric renal study, where radiopharmaceutical is introduced intravenously using disposable syringes. Radiopharmaceuticals retain on disposable syringes, causing under-dosing, impacting on imaging quality. The present study aimed in specifying the factors affecting on retention of ^{99m}Tc-DMSA in disposable syringes. A sample of 212 paediatric patients under 15 years of age, underwent the ^{99m}Tc-DMSA renal scintigraphy investigation, from 17th of November 2022 to 28th of February 2023 were subjected. CAPINTEC radiation dose calibrators were used to measure the pre and post radiation doses of the used disposable syringes. Six different types of 1 ml/1 cc disposable syringes (Type-1 to 6) and 1 ml insulin syringe (Type-7) were used. All relevant data pertaining to this study were accumulated. The data were analysed using Welch's ANOVA test, Mann-Whitney U test and Spearman's Rank Order Correlation statistical tests using SPSS version 26 software with $p < 0.05$ indicating a level of significance. Results indicated a statistically significant correlation between retention dose and radiopharmaceutical dilution. No significant difference in retention with patients' gender and patient's positions during the radiopharmaceutical administration. Significant differences in retention dose among syringe types, injected sites, and radiopharmaceutical labelling and administering personals were indicated. Syringe Type-1 is less suitable with its highest retention dose. Type-7 is the best with the lowest retention dose. In conclusion, the retention of ^{99m}Tc-DMSA in disposable syringes is affected by the radiopharmaceutical dilution, types of the syringes, injected sites and radiopharmaceutical labelling and administering personel. Retention is not affected by pre-dose, patient's weight, gender, and patient's position.

Keywords: *Retention, ^{99m}Tc-DMSA, Disposable syringes, Paediatric population*