

## Study of the Influence of Patient Hydration in Bone Scintigraphy

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**Introduction:** The bone scintigraphy is a diagnosis method noninvasive and sensitive in detecting early bone lesions, constituting about 35% of all tests performed in the Service of Nuclear Medicine, of the Hospital of Santo Antonio, in the city of Porto, where the following study took place. One of the important technical details in preparing the patient for this examination is the hydration following the administration of the radiopharmaceutical. The aim of this study focused on assessing the value of hydration on the quality of the image in a bone scintigraphy.

**Material and Methods:** It was selected patients with an indication to perform bone scintigraphy. The sample consisted of 55 patients was divided into three groups according to the type of hydration: group 1 with insufficient hydration; group 2 with hydration after administration of the radiopharmaceutical; group 3 with hydration before and after administration of radiopharmaceutical. At each patient were administered 740 to 925 MBq of <sup>99m</sup>Tc-HDP. Between 2.5 to 3 hours after administration of the radiopharmaceutical, were performed images of whole body, with specific instrumentation and acquisition parameters: 2 detectors with wide field of view; collimator of low energy and high resolution, with parallel holes; energy window of 20%, centered on the photopic of 140 keV; matrix of 256x1024; and scanning speed of 10 cm/min. In each image were delineated regions of interest in the diaphysis of the femur of the left leg, on the soft tissue of right lower limb and externally to the right knee (background). It was carried out the calculation of the ratio of counts bone/soft tissue, bone/background and soft tissue/background. After processing the images, it took place a statistical treatment of the ratio of counts bone/soft tissue in three groups. It took place a test of hypotheses for the difference between means in independent samples ( $H_0 \mu_x \leq \mu_y$ ;  $t < t_{\text{critic}}$ ;  $\alpha = 0,05$ ). Finally was held the chi-square ( $\chi^2 [d.f] < \chi^2$ ,  $\alpha = 0.05$ ) to investigate in each group, the dependence of the indices bone/soft tissue and gender of patients.

**Results:** For the testing of hypotheses, the average index bone/soft tissue in three groups ( $\mu_1 = 2.8859$ ,  $3.3864 = \mu_2$ ,  $\mu_3 = 3.4264$ ) are significantly different. For comparison of means of groups 1 and 2, for t equal to 1.6935,  $H_0$  is not rejected, between groups 2 and 3 are not rejected  $H_0$  for t equal to 1.6775, between groups 1 and 3 are not rejected  $H_0$  for t equal to 1.706. According to the method of chi-square indices bone/soft tissue are independent of the gender of the patient to a  $\chi^2$  (df) of 0.5985, where  $H_0$  is not rejected.

**Conclusions:**The t test for difference between means confirmed that the higher the index the greater the hydration bone/soft tissue, so an increase in hydration before administration of the radiopharmaceutical improves image quality. As for the possible interference of gender in bone/soft tissue ratio, it was found that the difference of the indices in the three groups is not due to gender of patients. It was not possible to infer about the effect of age on indices bone/soft tissue.

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