

The Basic Study on the ^{18}F Bone Scintigram with Positron-Camera

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The purpose of this study was the evaluation of the positron-scintigram with Na^{18}F . A positron-camera used in this study consisted of a image detector and a focal detector. A large field angle type gamma camera with collimator was used as an image detector and a multicrystal type detector as a focal detector.

Na^{18}F saline water for injection was produced using the $^{16}\text{O}(\alpha, \text{pn})^{18}\text{F}$ reaction with a cyclotron of National Institute of Radiological Sciences (NIRS—Chiba Isochronous Cyclotron). Radioactive purity of ^{18}F liquid proved to be more than 99.5%. An anesthetized rabbit was fixed in the field of the positron-camera. The focal plane of the positron-camera was settled at the vertebral bones of the rabbit. Three mCi of Na^{18}F was taken for about for hours after administration.

For the ninety minutes after administration, Na^{18}F activity was distributed over the whole body, so we could not get adequate scintigram of the bones. Two hours after administration, radioactivity of ^{18}F showed a high accumulation in the bones, and cleared from the soft tissues and the kidneys. Seeing scintigrams of this time, we could count vertebral bones and distinguish each longitudinal bone of rabbit.

We concluded that ^{18}F scintigram with positron-camera showed a good accumulation of radioactivity in bone with a good resolution. We needed about two hours to get adequate bone scintigrams after Na^{18}F injection. At the clinical use, the waiting time for measuring after administration will be shortened.