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EVALUATION OF THE PATIENT MONITORING IN
POSITRON EMISSION TOMOGRAPHY. S.Watanuki,
T.Ido,M.Ito*, T.Matsuzawa*, Cyclotron and
Radioisotope Center and The Institute
for Tuberculosis and Cancer*, Tohoku
University, Sendai.

The value of the dynamic studies is
obvious in radioisotope imaging, but
problem is it requires a long scan time.
Since patient often moves during scans, its
influence on an attenuation correction for
emission scans, and reconstructed images
have significant errors. The effects of
movement in emission scans were investi-
gated using phantom studies. It was found
that >40% errors in the image can be
introduced by 2.0cm shift in phantom
direction. But amount of errors is affected
duration of movement during scan. It was
found that the errors were less than 10% when the time of movement was 10% of the
scan time. So means to watch patient should
be used. We introduced the patient monitor
using commercially available video sensor
and LED put on patient’s head. Reliability of
the monitor was tested at brain
studies. Deviation can be kept within the
range of 2-3mm. The patient monitor seems
to be useful to catch the deviation quickly
and get images of high reliability.

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AXIAL RESOLUTION AND THE VALUE OF
INTERPOLATING SCAN IN MULTISLICE POSITRON
COMPUTED TOMOGRAPHY. M.Senda,
Y.Yonekura, N.Tamaki, T.Fujita, K.Murata,
N.Hayashi, J.Konishi, K.Torizuka,
Y.Tanaka, M.Komori and K.Minato. Kyoto
University Medical School, Kyoto.

We have calculated the aperture
function of a positron computed tomograph (PCT) by computer simulation and evaluated
the axial resolution of a multislice PCT,
Postilologica III both theoretically and
experimentally. The axial point spread function (PSF) was approximately a
triangle at or near the center of the
field and the sensitivity decreased significantly as the source moved away from
the image plane. Accordingly activities
in the intermediate region between an
in-plane and the adjacent cross-plane may
not be virtually measured in either slice. In experiments using a myocardial phantom,
the “inferior wall” actually disappeared
or a small myocardial defect could not be
detected when dropped into the gap between
slices. In clinical myocardial scan with
N-13 ammonia in a normal volunteer, a
false positive defect appeared in the
dererior wall. These results have
suggested that the invisible regions
between slices are clinically significant
if the object is thin enough in z-axis.
In order to fill up the gap between
slices, it is valuable to move the patient
half the slice interval in z-axis and
perform an "interpolating scan".

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ARTIFACTS AND DISTORTIONS IN SAGITTAL
TOMOGRAMS RECONSTRUCTED FROM MULTISLICE
TRANSAXIAL COMPUTED TOMOGRAMS.
M.Senda, Y.Yonekura, N.Tamaki, J.Konishi,
K.Torizuka, Y.Tanaka, M.Komori and
K.Minato. Kyoto University Medical
School, Kyoto.

Sagittal or oblique-angle tomograms can be
reconstructed three-dimensionally from
multislice transaxial tomograms either in
SPECT or PCT. However, those rebinned
images may have artifacts and distortions
when the resolution and the sampling
interval in z-axis differ from those in x-
or y-axis in the original images. We have
evaluated these effects with computer
simulation assuming linear relationship
between the activities in the objects and
the pixel values in the images. If
statistical noise is disregarded, the value at pixel(ijk) is expressed as

\[ F(x,y,z) = \int \int \int F(x',y',z') dF(x',y',z') \]

where F(x,y,z) denotes the distribution of
radioactivities and \( F(x,y,z) \) is the
density of the density field defined
as the value at pixel(i,j,k) when a point source
of unit activity exists at (x,y,z).
The point (x,y,z) corresponds to the
center of pixel(i,j,k). We have adopted
as spherical shell simulating the left
ventricular wall. We have used
measured values as the parameters of PSF.
The results of our simulation have
suggested that in PCT coarser sampling in z-axis than in xy-axes causes striped
artifacts in rebinned images.

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PERFORMANCE EVALUATION OF POSITRON CT DEVICE
"SHIMADZU SET 130W".
Y.Kuwabara, Y.Ichiya, M.Wada, Z.Ayabe,
M.Katsuragi and K.Matsusura.Kyushu University,
Fukuoka.

The performances of positron CT device
"Shimadzu SET 130W" were evaluated. It has
three detector rings and five slices can be
obtained simultaneously. Each ring has 160
BGO detectors (13.4 x 25 x 30 mm). The
collimator systems for brain consist of SNA
and RNA (high resolution).
The results were followed.

1. Spacial resolution in the center of the
image field
   a) radial FWHM (mm)
      direct plane inter plane
      SNA 8.2 8.2
      RNA 6.6 6.5
   b) tangential FWHM (mm)
      direct plane inter plane
      SNA 8.6 8.2
      RNA 6.2 6.2

2. Slice thickness in the center of the
image field (FWHM, mm)
   direct plane inter plane direct plane
   SNA 13.1 13.0 14.6
   RNA 5.4 5.3

3. Sensitivity (kcps/μCi/ml)
   direct plane inter plane direct plane
   SNA 44 87 53
   RNA 29 58 34