

BASAL GANGLIA SCANS IN THE HUMAN

Gregorio Skromne-Kadlubik, José F. Díaz, and Cesar Celis

Universidad Nacional Autónoma de México, Ciudad Universitaria, Mexico, D.F. Mexico

Using a ^{64}Cu complex, we obtained human basal ganglia scans in three normal volunteers and in one patient with Wilson's disease with an oral dose of 1 mCi. The method with this new radioactive compound was simple and safe and the results were very encouraging.

The metabolism of the basal ganglia is unique in a number of ways. The copper content of most of them is particularly high (1); and in Wilson's disease there is severe degeneration of the lenticular nucleus. In the light of these circumstances we decided to determine if a new radioactive compound of ^{64}Cu could be useful for basal ganglia scans. In experimental animal studies reported elsewhere (2-4), we proved that this hypothesis was correct. We present our experience in humans in this preliminary note.

MATERIALS AND METHODS

We used a copper complex with ^{64}Cu with the following characteristics: $t_{1/2} = 12.8$ hr; $B = 0.57$

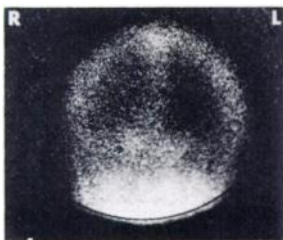


FIG. 1. Normal basal ganglia human scan in anterior projection.



FIG. 2. Anatomic projection of human basal ganglia (as in Fig. 1).

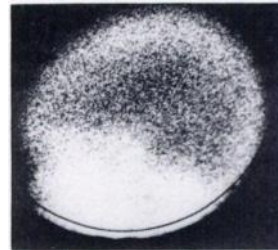


FIG. 3. Normal basal ganglia human scan in left lateral projection.



FIG. 4. Anatomic projection of human basal ganglia (as in Fig. 3).

MeV; positron = 0.66 MeV; gamma = 1.34 MeV; $K = \text{capture}$; and two electromagnetic quanta of 0.51 MeV (5). The preparation of this complex is described elsewhere (4).

We used 1 mCi of ^{64}Cu complex orally and obtained studies 2 hr later with a scintillation camera in three normal volunteers and in one patient with Wilson's disease. The four individuals were observed clinically and by laboratory tests for 2 months after the scan.

RESULTS

Figures 1-4 show the first scan of basal ganglia in the human. They show the anterior and left lateral projections of normal basal ganglia and their correlation to the anatomic position of lenticular nucleus (putamen and globus pallidum) and caudate nu-

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For reprints contact: Gregorio Skromne-Kadlubik, Laboratorio Radionuclidos, Facultad Medicina, AP Postal 70250, Ciudad Universitaria, Mexico ZP 20 D.F.

cleus. In the patient with Wilson's disease there was no visualization of these structures (and for this reason we do not include the figures).

DISCUSSION

The use of simple ^{64}Cu was proposed by others for hepatic and cerebral scans (6) and its quantification in blood or plasma is used in the diagnosis of Wilson's disease (6). All these studies show that ^{64}Cu is nontoxic in proper doses. However, in these studies there was no indication that basal ganglia concentrate copper in a special manner. This property of concentrated copper was useful for the introduction of a ^{64}Cu complex given orally and the visualization of the basal ganglia. This new diagnostic method opens great possibilities in clinical medicine. For the first time an inaccessible anatomic region of the brain can be seen by a simple and safe method. We are actually studying the normal scan images in order to recognize variations in the different basal ganglia pathologic conditions (Parkinson's disease, Chorea, etc.). The results obtained to date are very encouraging; the method is simple and safe and can be very useful in clinical medicine.

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