

O) Bones and Joints

Clinical Value of Bone Scanning of Spinal Fusion with ^{85}Sr and $^{87\text{m}}\text{Sr}$

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We performed bone scanning with ^{85}Sr -chloride or $^{87\text{m}}\text{Sr}$ -citrate in forty-seven patients who had undergone anterior interbody fusion of the lumbar spine, for the purpose of observing whether fusion was successful or not. We gave patients ^{85}Sr (1 $\mu\text{Ci/Kg}$) or $^{87\text{m}}\text{Sr}$ (1–2 mCi) injection intravenously and scanned 48 hours or 2–3 hours after the injection, with scinticamera.

Results are as follows.

1. Both of ^{85}Sr and $^{87\text{m}}\text{Sr}$ accumulated broadly in the grafting area and its surroundings at 5–6 weeks after operation. Roentgenogram also showed active bone formation.

2. Strontium accumulated only at the grafting area which was well circumscribed from its

surroundings, at 6–12 months after operation.

3. Strontium accumulated there tended to decrease in course of time, over one year after operation.

4. But Strontium continued to accumulate more in non-union area than in union area at 1–2 years after operation.

5. Scans made with $^{87\text{m}}\text{Sr}$ are, in general, indistinguishable from those made with ^{85}Sr , except that the ^{85}Sr scan will also reveal areas of increased blood flow. Because of short physical half-life of $^{87\text{m}}\text{Sr}$, it permits administration of large amounts of radioactivity (on the order of mCi) and recurrent scans.

On Scintiscanning of Osteomyelitis

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In our department, now we would like to report on the diagnostic value and determining its progress of cure of 226 cases in periosteomyelitis by application of scanning, because the disease we encounter most frequently such disease our clinic.

As the kind of radioisotope, we used ^{85}Sr at the beginning of 1965, but we have used $^{87\text{m}}\text{Sr}$

since February 1970. When we examine the uptake in the disease and the healthy side after the intravenous injection of $^{87\text{m}}\text{Sr}$ and follow it up chronologically, we will notice that the plateau is reached in about 30 minutes after the injection. This would enable us to begin scanning in about one hour after the intravenous injection of $^{87\text{m}}\text{Sr}$.

As a routine, we first conduct profile scanning

and then area scanning later, and in the case of the disease of extremities, we always compared the diseased side with the healthy side.

The photoscintigram has been analyzed by computing system using rescanning device since 1971. The data can be used for Medical Analyzing Device, such a "SCINTIPAC", get a quantity of the uptake of radioisotope in isocounting rate curve, isocounting rate distribution map and 3-dimensional display, and further, to the some

areas of bone in the cases of osteomyelitis.

According to the data of the quantitative information, therefore, it may also be possible to make a diagnosis and finding on the process of disease.

As a conclusion, the application of scintiscanning for periosteomyelitis is one of the best method to know the findings on the location of foci and to known degree of clinical healing, in addition to X-ray and clinical findings.

Studies of Arthritis by Scintiscanning and Analysis of Build-Up Curve

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Technetium ($^{99m}\text{TcO}_4^-$) scintigraphy of knee joints of 30 patients showed abnormal localization of isotope. Scintiscanning were done 30 minutes after the intravenous administration of 1.5 mCi of ^{99}Tc -pertechnetate.

Scans of normal knee joints were negative and scans of rheumatoid arthritis, osteoarthritis, pyoarthritis and synovitis simplex were positive.

$T_{1/2}$ of Build-up curve of normal joints were 0.263, and of osteoarthritis were 0.265.

These abnormal scintigraphy showed activity of localization and followed up treatment. Therefore, $T_{1/2}$ of Build-up curve and scintigraphy could not showed differential diagnosis of joints diseases. But scintigraphy is one of important examination.