

and  $^{32}\text{P}$  was followed to Edland's method. Testosterone propionate 100 mg was administered intramuscularly for fifteen days and since the sixth day of the injection of testosterone was administered  $^{32}\text{P}$  1.5 mCi intravenously for seven days. Whole bone image with  $^{32}\text{mTc}$ -diphosphonate (10 mCi- 15 mCi) was scanned at 3 to 4 hours of the post-injection by the r-Camera and was re-examined 2 week, 4 to 6 week and 3 month after the initiation of  $^{32}\text{P}$  administration.

The relief of pain was very good in all of patients. The appearance of the improvement of pain began at 3rd to 4th day at most promptly and became definitively and continuously on 4th to 6th week since the initiation of  $^{32}\text{P}$ -administration.

The bone marrow suppression and other uncomfortable effect due to  $^{32}\text{P}$  were not experienced in all patients.

The change of the bone image compared with the pretreatment and the post-treatment was very interesting. The abnormal accumulation of the radiopharmaceutical in metastatic bone lesions

was documented in all of patients. This finding tended to be more marked in the image of the post-treatment about on the second week and then it tended to be decreased or diminished in the localized lesions on 4th to 6th week, when it is that the definitive and continuous relief of pain was set up.

We are thinking the following indication of this therapy.

- 1) patients have long had severe and intolerable bone pain in the diffuse metastatic involvements.
- 2) The pretreatment whole bone image with  $^{99\text{m}}\text{Tc}$ -tagged radioagents reveals the marked increased accumulation in the multiple metastatic lesion.
- 3) The prostatic cancer and the breast cancer may be theoretically more preferable, but other cancer can possibly be treated, if they have the condition that is clinically shown without the soft tissues metastase and with the above categories.

### **Bone Scintigraphic Finding Following Radiotherapy in Massive Doses of Osteosarcoma**

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Since 1969, we, in our department, have treated osteosarcoma mainly with long-term radiation therapy in massive doses and have found it significantly effective in prolonging patient's life as compared with conventional therapeutic methods. In a study undertaken as a follow-up to the healing process of the primary lesion of osteosarcoma so treated, bone scanning and angiography were

performed before and after radiotherapy and scintigrams and angiograms thus obtained were reviewed by way of comparison.

Since 1969, long-term radiation therapy in massive doses has so far been given to 19 cases of osteosarcoma. The total dose in this series ranged from 7920 rad to 24200 rad, averaging 13687 rad. Bone scans were made invariably with Tc-

phosphate.

A comparison of scintigrams and angiograms involving 3 representative cases showed that there was an area of marked RI concentration coinciding with the primary lesion (radioactivity apparently greater than on the healthy side) on pretreatment scanning, while subsequent repeat scans demonstrated RI accumulation in the same area to be greatly reduced with radiation therapy.

On angiography, hypervascularity and pooling were found decreased after radiotherapy in 2 of 3 cases, while in the remaining one case these changes were still recognizable even 10 months after completion of radiotherapy. This finding, therefore, may be interpreted as suggesting that a decrease in RI accumulation caused by irradiation does not necessarily correlate with blood flow through soft tissues.

### Scintigraphic Findings of Rheumatoid Arthritis

#### —With Special Reference to the Course of the Disease Before and After Synovectomy—

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We reported in our previous study that scanning of Joints with  $^{99m}\text{Tc}$ -pertechnetate can give a correct estimate for the inflammatory activity in affected joints and thus provide a useful means of evaluating disease activity and of assessing therapeutic effects. In the present study, joint scanning was made in a series of 40 cases of rheumatoid arthritis receiving synovectomy in an attempt to follow up the course of disease before and after the operation. The findings thus obtained were investigated for their relationship with clinical findings and synovial tissue specimens taken at operation were examined to define the pathological basis for positive changes on scintigram.

#### Method

Cases involved in this study were all those of classical or definite RA at stages I through IV according to the classification system of the American Rheumatologic Association.

With a scinticamera set at affected joints and following the intravenous injection of 10 mCi  $^{99m}\text{Tc}$ -pertechnetate, RI concentration curves were obtained and then analysed. After RI concentration reached a plateau, scintigrams of affected joints were also made.

#### Results

- (1) A markedly increased RI concentration was noted in all of joints that showed a strong inflammatory activity prior to Operation.
- (2) Repeat scans made after synovectomy showed the radio-activity in the lesion to be substantially reduced in 68% of cases studied.
- (3) In cases where the surgery failed to bring about an improvement of clinical symptoms or in those in which repeat scans showed RI concentration in the affected locality to be conversely increased postoperatively, the persistence of proliferation of synovial tissue was demonstrated at re-operation.