

Part IV.

Radiotherapy Planning and Computed Tomography

K. MORITA

A knowledge of the condition of the axial transverse section of the patient is necessary for the planning of radiation therapy. In the past, the transverse body contour has been measured using flexible lead wire or mechanical jigs. However, this method was not always appropriate or reliable. Nor was it helpful enough in determining the site and extent of deep-seated lesions in the body.

However, by means of axial transverse tomography, not only the contour of the cross section but also the position and size of the lesion could be obtained at the same time, so that accurate evaluation of dose distribution was made during treatment planning (Takahashi and Matsuda 1960; Takahashi 1965). The axial transverse tomogram was also useful for correct positioning of the patient as well as for selection of the appropriate direction of the X-ray beam. This made it possible to plan not only multiportal irradiation but also conformation radiotherapy. This method contributed greatly to the advance of radiation therapy treatment planning.

In recent years, however, with the increased availability and use of CT scanners, it has become possible to conduct more accurate treatment planning (Chernak et al. 1975; Jelden et al. 1976a, b; zum Winkel and Hermann 1977) than that possible by axial transverse tomography (Sternik et al. 1977). The reason for this is that the CT scanner now has greater potential for diagnosing the composition of tissues and lesions. The application of CT to radiotherapy is based on preparing an axial transverse section of the body with good contrast resolution and deciding the exact site and extent of the tumor and healthy tissues. It then becomes easier to evaluate the therapeutic effects to the tumor and the radiation injury to the surrounding healthy tissues.