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[Recent developments in radiotherapy of hepatocellular carcinoma]

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With the accumulation of clinical experiences, the efficacy of radiotherapy has been recognized in management scheme for HCC. While hepatologists are beginning to show less reluctance for applying radiotherapy to the treatment of HCC, it is necessary that the hepatologists be informed of the rapid developments in technical strategy for radiation oncology. Recent advances in several technologies have opened a new era in radiation oncology. Modern imaging technologies can provide a 3-dimensional model of patient's anatomy, and this allows radiation oncologists to identify accurate tumor volumes as well as the tumors' relationship with the adjacent normal tissues. Moreover, the development of the computer-controlled multileaf collimator systems now enables physicians to perform precise beam shaping and to modulate the radiation dose distribution. A combination of these systems, 3-DCRT, is rapidly replacing the more conventional 2-D radiotherapy. 3-DCRT has evolved into a more sophisticated technology, intensity modulated radiotherapy (IMRT). In IMRT, with the powerful computer-aided optimization process, the radiation dose can be delivered to the target using highly complex isodose profiles. This new technology has been further developed into IGRT, which combines the CT-images scanning system and radiation equipments into one hardware package, and this system is currently ready for clinical application. In parallel with the radiation technologies described above, the strategy of stereotactic radiation has evolved from the conventional linear accelerator-based system to a gamma knife, and more recently, to a cyberknife. These systems are primarily based on the concept of radiosurgery. Currently, various radiation technologies have been adopted for the radiotherapy of HCC. In this article, each strategy will be discussed as well as the indications for radiotherapy and the radiation-related complications.

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