

Proton beam therapy for hepatocellular carcinoma

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We have treated over 600 cases with hepatocellular carcinoma (HCC) by proton beam irradiation since 1985, and we have reported on the good local tumor control (86.9%) of this therapy (Clin Cancer Res 2005;11:3799-3805). Many of these cases had recurrent HCC and other treatment options were not indicated for a variety of reasons including poor liver function. In addition, we have reported on the excellent efficacy (median survival of 2.3 years) of proton beam therapy in HCC cases with portal venous tumor thrombus (PVTT) (Cancer 2005;104:794-801). AIM: In order to clarify the role of proton beam therapy for HCC, we analyzed the long-term efficacy of proton beam for naive HCC cases.

METHODS: Long-term prognosis of 114 naive HCC cases [male 83, female 31; HCV 88, HBV 8, alcohol 2, others 16; Child-Pugh A 82, B 24, C 8; max. tumor size 41.2 (10-135) mm; tumor number 1.28 (1-4); irradiation dose; 73.9 (55-92.4) Gy; fractions 19 (10-35)] were analyzed.

RESULTS: Mean followed up period was 43.4 months (2-155). The proton therapy was chosen as the first therapy for HCC either because the patients preferred (other therapies also had indication)(54 cases) or because other therapies were impossible due to other complications (25 cases), tumors locations (15 cases), or impaired liver function (14 cases). All patients could complete the course of proton therapy without any serious side effects or complications. Local recurrence rates were 6.3% at 1 year and 8.5% at 2 year. Survival rates of all patients were 76%, 49%, and 24% at 3, 5, 10 years, respectively, while the rates of Child A patients were 82%, 64%, and 33% at 3, 5, 10 years, respectively. Survival rates of 33 cases with HCC of 5 cm or larger (73%, 45%, and 34%, at 3, 5, 10 years, respectively) did not significantly differ from those of 81 cases with HCC less than 5cm (77%, 61%, and 22%, at 3, 5, 10 years, respectively). The 25 cases, who could not receive operation due to serious complications in heart, lung or kidney, also showed good prognosis (78%, 62%, and 27% at 3, 5, 10 years, respectively).

CONCLUSIONS: The proton beam therapy demonstrated excellent efficacy and safety and provided the naive HCC patients with excellent long-term prognosis. It is especially useful in treating those patients whose health condition does not allow surgery or who wants to be treated with less invasive therapy.