

## Percutaneous Intratumoral Injection of Holmium-166 Microaggregate for the Treatment of Small Hepatocellular Carcinoma

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To evaluate the effect of radioactive radionuclide, Holmium-166 injection as a new method for the treatment of hepatic tumors, and also to compare with percutaneous ethanol injection.

Holmium-166 is a radioactive particle that emits 94% beta ray ( $E_{max}$  : 1.84 MeV, physical half-life : 26.9 hrs) and 4% gamma for the optimal gamma imaging. Prior to percutaneous injection to tumor, Ho-166 was prepared as microaggregate form with 20-30 micron particle size and suspended within one milliliter ethanol. Fifteen patients who had single nodule of hepatocellular carcinoma with the range of 1.5cm-3cm in diameter were treated by this new method. Under ultrasound guidance, 1ml ethanol were injected to tumor center in order to eliminate the probable intratumoral shunt and ethanol suspended Ho-166 microaggregates were followed. The total dose of Ho-166 was ranged from 10mCi to 20mCi per single injection, depending on the size. Immediate and 24 hours after injection, gamma camera scanning were performed. Three of fifteen nodules under went resection of tumor two weeks after the single treatment. The remained were evaluated with CT and US monthly during the period of one year and two months.

Injected Ho-166 microaggregates in all cases were well localized within tumor nodule and no extratumoral or extrahepatic uptake on gamma camera scan. 2 of 3 resected specimens showed total necrosis and one 95%. The remained 12 nodules were all decreased in size without further growth. All tumor nodules were changed to be echogenic on US and low density on CT.

Percutaneous injection of Holmium-166 microaggregates is a new method for the treatment of small hepatoma and is expected to replace percutaneous ethanol injection method. It might be applied to treatment of small metastatic tumor of liver.