

Clinical outcome of percutaneous ethanol injection therapy using a multi-pronged injection needle for hepatocellular carcinoma

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Purpose The minimally invasive nature and convenience of percutaneous ethanol infusion therapy (PEIT) for the local treatment of hepatic cancer continues to be utilized. Further, there have been reports of PEIT being the selected treatment modality in patients in whom the occurrence of complications due to thermal coagulation may be of concern. In our department, we introduced an adjustable multi-pronged injection needle (Quadra-Fuse*, Rex Medical, Conshohocken, PA.) that appears to provide a more effective and less invasive treatment than the currently available PEIT needles. We report our clinical results using the multi-pronged injection needle during PEIT for hepatic cancer since April 2005.

Methods The needle size utilized was 18G and the length 20cm. From the center of the needle cannula, 3 adjustable (27g) needle tines can be deployed at an angle from the shaft, but in the direction of the distal tip in stepwise fashion (array). Each of the retractable tines has two through-holes (four fluid exits) for a total of 12 points of simultaneous infusion of chemical, fluid or drug agents. We received IRB approval and used the multi-pronged injection needle to deliver PEIT therapy for hepatic cancer.

Results This study included 20 hepatic cancer nodules (size range 2cm-7cm) in 17 patients. The number of treatment sessions with the multi-pronged injection needle was only one in 19 nodules and twice in those remaining nodules. An average of 42.1 ± 23.8 cc of ethanol was injected for each treatment. From the results of the dynamic CT, a TE4 level (classification of the direct effect of the hepatic cancer treatment) was achieved. No complications causing any clinical sequela were noted during the post-procedural follow-up period (1-46 months), and local recurrence was observed in only 5 cases. Further, additional TACE, PEIT and RFA treatments were performed for noted recurrence.

Discussion

When using the multi-pronged injection needle, first deploy the needle tines to the distal portion of the lesion within the confines of the tumor and inject at each setting (largest to smallest (1cm)), retract the plunger, rotate the needle axis 60 degrees and then redeploy the needle tines. Due to the tip of the needle passing through the membrane and septum, it is possible to better create a more uniform ethanol injection in comparison to current PEIT needles. Further, it is expected that there will be greater improvement in the local control of the cancer with this treatment method, and we believe it will be effective in patients in whom there is concern for complications associated with large hepatocellular carcinomas or thermal coagulation therapy.

Conclusion

With the use of the multi-pronged injection needle, depending upon the patient, a more effective local PEIT treatment of the cancer can be achieved. Furthermore, it is believed that this will be a more efficient and minimally invasive therapeutic modality.