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Brief Note

Percutaneous Ethanol Injection Therapy (PEIT) for Liver Cancer

— Experimental Study on Rat Hepatoma —

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Key words : PEIT — rat hepatoma — histological change

For hepatocellular carcinoma (HCC) therapy, transcatheter arterial embolization (TAE) and intraarterial infusion therapy of anticancer drugs are widely used at present. As a new method for the treatment of liver cancer, US-guided percutaneous ethanol injection therapy (PEIT) has been reported to be a useful method for nonresectable liver cancer.[1–4] Pure ethanol is known to induce coagulative necrosis of the tumor tissue by dehydrative fixation. We examined histological changes caused by PEIT in rat hepatoma induced by 3'-methyl-4-dimethylaminoazobenzene (3'-Me-DAB).

Eleven Wistar male rats, each weighing 170 g, were fed 0.06% 3'-Me-DAB and all rats developed hepatoma six months after feeding. These rats were divided into a control (2 rats) and a PEIT group (9 rats). The PEIT rats, in groups of 3, received PEIT once, three times and five times every other day. Repeated injection of 0.2 ml of absolute ethanol was done at the same location in the liver tumor using a 26G needle percutaneously. All rats were sacrificed ten days after injection. All tumors were extirpated and examined by light-microscopic observation.

Fig. 1A shows the tumor cells of a normal control. Fig. 1B to 1D show the effect of PEIT at different times of injection. After one PEIT treatment (Fig. 1B), tumor cells had strongly degenerated and had fallen into coagulative necrosis. At the site of injection, the tumor structure became amorphous and was completely lost. In addition, congestion and thrombus formation were noted in the tumor vessels (arrow). After three PEIT treatments (Fig. 1C), cancer cells had degenerated and mild fibrosis (arrow) had appeared around the necrotized area. After five PEIT treatments (Fig. 1D), the cell structure was completely destroyed and marked cell infiltration was noted.

Based on the results of the above experiment, it is considered that ethanol can induce complete necrosis of tumor cells even with one injection. Repeated ethanol injections at the same location in the tumor did not have much more of a necrosis effect than one injection. Sugiura *et al.*[5] reported that 0.5 ml of ethanol could induce tumor necrosis of 1 cm in diameter. Although we did not examine the exact extent of necrosis by 0.2 ml of ethanol injection, it was expected that repeated injections to different sites of the tumor would possibly induce complete tumor necrosis.

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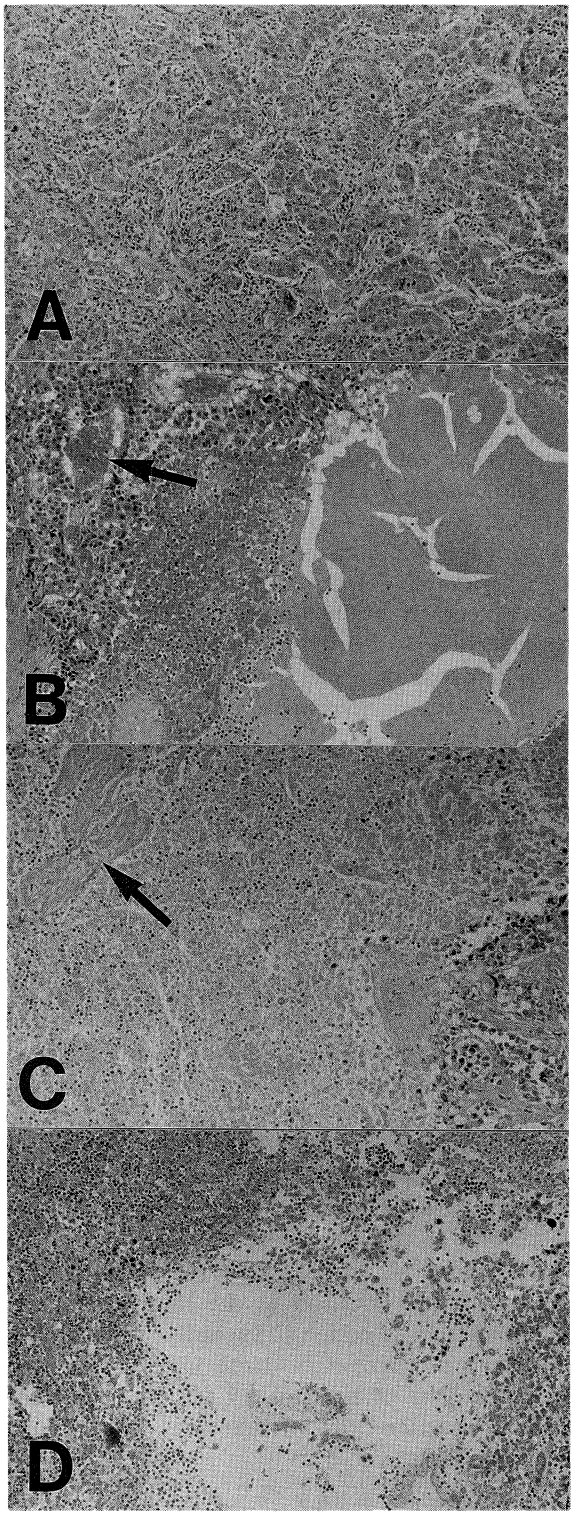

Fig. 1. Histological changes due to PEIT on a 3'-Me-DAB induced rat hepatoma (H-E, ×200)
A : control B : PEIT, once
C : PEIT, three times D : PEIT, five times

The cell cytotoxicity of ethanol seemed to be so immediate and expansive that intracapsular invasion of tumor cells, which was hard to control by TAE, might well be controlled by PEIT.[2,4,6]

As ethanol has the effect of thrombus formation in tumor vessels,[2,4] PEIT could have an embolization effect as well as a direct coagulation effect.

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