EUS-guided Radiofrequency Ablation of Porcine Pancreas

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Background: Radiofrequency ablation (RFA) has become a widespread treatment option for primary or metastatic tumor of liver. However, there is limitation to approach pancreas by percutaneous method. EUS has emerged as an essential diagnostic and therapeutic tool in pancreatic disease. The purposes of this study are to evaluate in vivo feasibility, efficacy and safety of EUS-guided RFA on porcine pancreas.

Materials and Methods: Ex vivo RFA was performed using bovine liver to find out the optimal length of electrode, optimal duration and power of RFA. Then in vivo EUS-guided RFA was performed on the pancreas using 40 kg adult mini-pigs. A 18-gauge RFA electrode with 1 cm in length and a VIVA RF system (STARmed, Korea) were used. One week after RFA, laparotomy was done and ablated areas and possible complications were evaluated.

Results: EUS-guided RFA was technically successful in 10 pigs. The RFA electrode was visible on the EUS view and electrode needle was deployed or retracted without difficulty. Pancreatic tissue ablation was achieved within 6 minutes with 50 Watts of power. There was no immediate complication. Laparotomy revealed a discrete, well-defined round ablation of pancreas measuring about 20mm in diameter and without injury to surrounding pancreas parenchyma or adjacent organs. Ablated lesion was demarcated from normal parenchyme by fibrous wall. However, some omental adhesions were observed.

Conclusion: EUS-guided RFA of porcine pancreas was technically feasible and effective ablation was accomplished without causing serious complication. EUS-guided RFA may have therapeutic potential for human pancreatic tumors.

Key Words: Endoscopic ultrasonography, Radiofrequency ablation, Porcine pancreas