

## **Ethanol Ablation of Benign Thyroid Nodule**

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Large benign thyroid nodules may cause cosmetic problems or pressure symptoms in the neck. Ethanol ablation (EA) is recommended as the first-line treatment method for cystic and predominantly cystic nodules. Radiofrequency ablation can be recommended as the next step in cases with incomplete resolved symptoms or recurrence following EA. The efficacy of EA for management of cystic or predominantly cystic nodules has been well documented. In a cystic thyroid nodule, EA can achieve a volume reduction of 85~95%. However, in a predominantly cystic thyroid nodule, the volume reduction rate varies from 60% to 90%. The efficacy of EA may vary depending on the experience of the operator and the method. In this lecture, I wanted to explain the indication and techniques for the EA of benign thyroid nodule. It is important to characterize the thyroid nodule and evaluate the surrounding critical structures through a pre-EA ultrasonographic (US) examination. The size, proportion of solid component, vascularity, and internal contents of the cystic component should be carefully evaluated on US for planning of EA. Spinal and syringe needles are the most commonly used needles for EA and the gauge of the needle could be 16-20 gauge according to the viscosity of the cystic content. Local anesthetic (1~2% lidocaine) is usually injected at the skin puncture site and sometimes at perithyroidal space. A trans-isthmus approach via normal parenchyma is strongly recommended to prevent ethanol leakage and a change in the position of the needle tip when the patient swallows or talks. As much internal fluid is aspirated as possible and residual debris or colloids are removed by saline irrigation. High viscosity fluid of colloid cysts may be difficult to aspirate and several studies (i.e. normal saline irrigation) on the evacuation of viscous cystic thyroid nodules have used. The amount of ethanol injected depends on the amount of aspirated material in the nodule. It has been recommended to use ethanol approximately 50% of the aspirate volume, but using a small amount of about 10-20% of the aspirate volume could be effective. And it is more effective to inject ethanol several times than to injected only once. Direct injection of ethanol into the solid portion of the nodule could also increase the effect of EA, especially for predominantly cystic nodules and the well-treated solid portion might show hypoechogenicity. Ethanol injection with or without aspiration may be used depending on the operator's preference. But, several studies have suggested that complete removal of ethanol at the end of the procedure is preferable because longer ethanol retention times may increase patient inconvenience and complications due to possible leakage of ethanol. If the patient complains of pain during injection, the operator should stop the injection and check for perithyroidal leakage. Perithyroidal leakage is less likely if the needle tip is well located at the center of the lesion and excessive ethanol is not injected. If excessive amounts of ethanol are used, it may be helpful to re-aspirate the injected ethanol for pain relief. EA should be the first option for the treatment of cystic and predominantly cystic nodules that are recurred after simple aspiration and is a safe and effective procedure.