Supplementary 2: General Conditions for Best Outcomes: A Synopsis

Clinical preprocedural evaluations are necessary to identify patients who are at greater risk of complications (i.e., patients with a history or pattern of bleeding diathesis) and formulate a strategy for radiofrequency ablation (RFA). The patient should be informed about the progress of the procedure and all of its potential complications before RFA.[44]

Collecting a medical history related to hemorrhage risk and diseases affecting coagulation is important. Patients who are taking drugs associated with risk of bleeding should be advised to stop those drugs before RFA.

Laboratory tests, especially blood coagulation battery and thyroid function tests, are necessary for further assessment.

Careful ultrasound (US) examination, along with good knowledge of US-based thyroid and neck anatomy, is essential for preventing severe complications during RFA. It is also helpful to use an appropriate needle size and to formulate a surgical plan before RFA.[39] The US features of nerves may vary depending on the location and size of the nerve, the equipment used, and even the use of fluid aspiration. Therefore, nerve protection should be considered before and during the procedure. Most importantly, the thyroid nodule should be diagnosed as benign via at least two biopsies. It is recommended to be cautious when treating nodules with malignant US features, even if benign results are obtained on cytology and/or biopsy.[44]

At the beginning of RFA, a venous line should be installed before the procedure for drug delivery. During the procedure, continuous and carefully monitored US-guided tracing of the entire electrode is mandatory.

The surgeon should have enough experience with US-guided interventional procedures. During RFA, a "trans-isthmic approach" and a "moving shot technique" should be used if possible, because these techniques are safe and useful.[14,46,47] When the electrode tip is in close proximity to an important structure, such as a nerve or the trachea, the physician can switch off the power or withdraw the electrode tip as soon as possible.[44] In addition, hydrodissection between the nodule and dangerous triangle has been introduced as a safe technique for preventing thermal damage to the nerve. The virtual navigation and fusion imaging system could be helpful in reducing complications, as this system allows for the precise location of the electrode tip without gas forming disturbances, especially during the ablation of nodules that are close to sensitive structures.[24]

Further observation or admission is essential post-RFA. It is recommended that patients should be followed-up at 1–2, 6, and 12 months post-RFA, as well as every 6–12 months thereafter, depending on the characteristics of the treated nodules. Routine observation for several hours in an outpatient setting could detect complications early and allow for the implementation of measures to prevent progression. During follow-up, US examination and thyroid function tests are recommended as the basic examinations.[44] When patients feel discomfort and when any abnormalities are detected by US, re-assessment and analysis of the possible causes are needed.