Radiofrequency ablation with hydrodissection of benign thyroid nodules: experience of a tertiary referral centre

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Background:

In recent decades, radiofrequency ablation (RFA) has emerged as a less invasive treatment alternative to surgery and is now included in Asian, European and American guidelines [1, 2, 3].

Hydrodissection technique is a safety measure to prevent injury to critical structures adjacent to the thyroid during RFA. It is recommended as a standard technique in guideline [1] and has been practised in our centre.

Objectives:

To evaluate the safety and efficacy of RFA with hydrodissection of benign thyroid nodules in Queen Elizabeth Hospital.

Materials and Methods:

This is a retrospective single-centre study of 38 patients who underwent RFA with hydrodissection of 38 FNAC-confirmed benign thyroid nodules between November 2022 and March 2025.

Reduction in volume of thyroid nodules measured by sonography, cosmetic and symptomatic improvement documented at clinic follow-up, and complications following ablation were assessed.

Ellipsoid volume of a thyroid nodule was calculated using the following formula [4]:

Volume (ml) = [width in cm
x depth (anteroposterior) in cm
x length (craniocaudal) in cm] x 0.525

Volume reduction percentage was calculated by:

(Baseline volume – Post RFA volume) /
Baseline volume x 100%

Paired samples t-test was applied to compare the pre- and post-RFA thyroid nodule volume changes.

Technique

Hydrodissection involves injection of fluid around the thyroid capsule, creating a safe distance between the thyroid and critical cervical structures and prevent thermal propagation.

Under ultrasound guidance, hydrodissection of the skin, carotid sheath and danger triangle (site of recurrent laryngeal nerve) is performed with 1% lignocaine and 5% dextrose solution before RFA of the thyroid nodule.

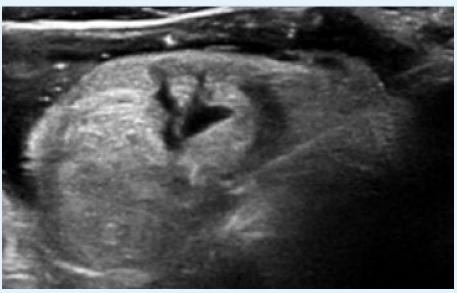

Fig 1. Hydrodissection needle in situ, injecting fluid around danger triangle.

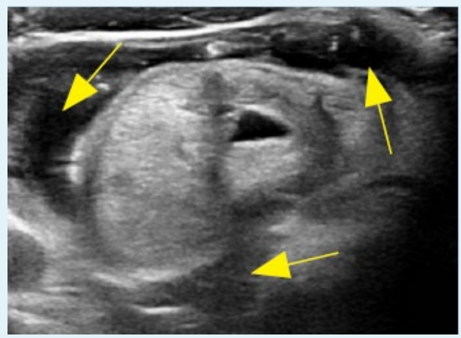

Fig 2. Layer of injected fluid (yellow arrows) separating thyroid gland and adjacent critical structures.

After hydrodissection, RFA is performed with moving-shot technique.

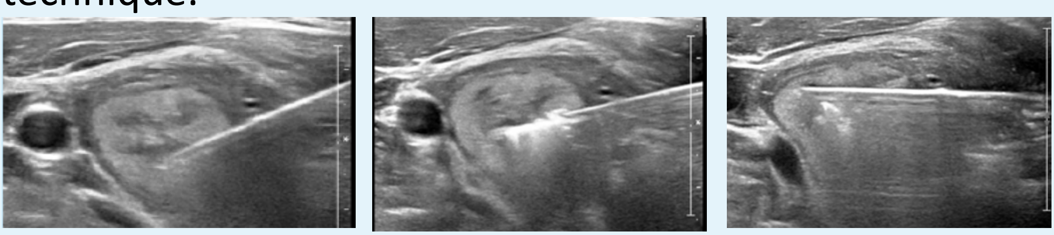

Fig 3,4,5. RFA with moving-shot technique from deep to superficial part of the nodule.

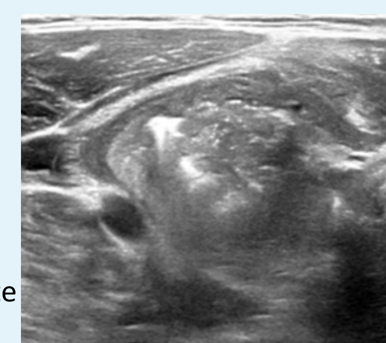

Fig 6. Post RFA image confirmed adequate coverage of ablation zone in the nodule.

Results

Efficacy:

22 out of 38 patients (22 nodules) were included in the analysis.
16 out of 38 patients (16 nodules) were excluded.
Reasons for exclusion are:

1) Patients have been scheduled for sonography 1 year post-RFA but not yet attended
2) Measurement records were incomplete
3) Procedures were abandoned

Median follow-up period 365.5 days

Nodule volume reduction

- Statistically significant reduction in volume of the nodules was achieved (P = 0.047)
- Median reduction in volume of nodules: 38.2%

Cosmetic and symptomatic improvement

- 14 out of 22 patients (63.6%) reported subjective shrinkage of nodules
- 4 patients (18.2%) reported symptom relief

Results

Safety:

38 patients (38 nodules) were included. Hydrodissection was performed before RFA of all the nodules. Minor complications were observed:

Mild capsular hematoma

2 patients (5.3%) had mild asymptomatic capsular hematoma after RFA. In both cases, ablation of feeding arteries to the nodules was performed before ablation of the nodules (ie. artery-first approach was adopted).

Transient hoarseness

1 patient (2.6%) was noted to have hoarseness of voice during RFA. Cold 5% dextrose solution was injected to the danger triangle as treatment. The patient's voice improved before she left IR suite and was reported to have returned to baseline during assessment at clinic on day 26 post-RFA.

Conclusion

RFA with hydrodissection is a safe and efficacious treatment for predominantly solid benign thyroid nodules. Such technique should be considered as an alternative for patients who cannot or do not wish to undergo surgery for predominantly solid benign thyroid nodules.

References

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