Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 12 [8] July 2023 : 219-222
©2023 Academy for Environment and Life Sciences, India
Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD

ORIGINAL ARTICLE **OPEN ACCESS**

A Study on USG - Guided Percutaneous Ethanol Ablation for Benign Thyroid Nodules at Tertiary Care Centre of North Maharashtra

Harish Baburao Pawar[1], Sushant Bhadane[2], Meenal Mohgaonkar[3], Amol Jagdale[4], Devendra Kulkarni.[5]

[1]MD Radio-Diagnosis, Senior Resident, Department of Radiodiagnosis and Imaging,
S.M.B.T Institute of Medical Sciences and Research Centre, Dhamangaon, Nashik, Maharashtra, India
[2]MD Radio-Diagnosis, Professor & HOD, Department of radio-diagnosis And Imaging,
S.M.B.T Institute of Medical Sciences and Research Centre, Dhamangaon, Nashik, Maharashtra, India.
[3]MD Radio-Diagnosis, Dean, Department of Radio-Diagnosis and Imaging,
S.M.B.T Institute of Medical Sciences and Research Centre, Dhamangaon, Nashik, Maharashtra, India.
[4]MD Radio-Diagnosis, Professor, Department of radio-diagnosis and Imaging,
S.M.B.T Institute of Medical Sciences and Research Centre, Dhamangaon, Nashik, Maharashtra, India.
[5]MD Radio-Diagnosis, Assistant Professor, Department Of Radio-Diagnosis and Imaging,
S.M.B.T Institute of Medical Sciences and Research Centre, Dhamangaon, Nashik, Maharashtra, India.
Corresponding Author: DR. HARISH BABURAO PAWAR, Email- pawarhb01@gmail.com

ABSTRACT

Aim of this study is to evaluate the efficacy, safety, and patient outcomes of ultrasound-guided percutaneous ethanol ablation for benign thyroid nodules within the Indian population. By assessing the response to this minimally invasive procedure, we can provide valuable insights into its applicability and benefits at tertiary care Centre of North Maharashtra. The authors have studied 40 patients with complaints of thyroid swelling. All patients underwent ethanol ablation and High-resolution sonography (HR-USG) pre and post procedure for result analysis. Among 40 patients, between age group of 28 to 65 years, with signs and symptoms of thyroid swelling, we found that volume reduction rate 92% in the study population. With the present study, the authors can conclude that Ethanol ablation is effective treatment option for Solitary Cystic Thyroid Nodule with an efficacy of 92% in our study with minimum complications.

Keywords : *Thyroid, Ethanol Ablation, Chemical Ablation, solitary thyroid nodule, Solitary Cystic Thyroid Nod*

Received 01 .06.2023 Revised 20.06.2023 Accepted 09.07.2023

INTRODUCTION

Thyroid nodules are common lesions in the parenchyma of thyroid gland which reported prevalence up to 68% in general population [1].Goiter and the associated thyroid nodules result in cosmetic disfigurement, and rarely compressive symptoms and needs interventions , options available are surgery, radiofrequency ablation and percutaneous ethanol ablation (PEA)[2].Among treatment modalities ultrasound guided percutaneous ethanol ablation has gained significant attention due to its efficacy, safety cost effectiveness [3].

In percutaneous ethanol ablation procedure direct injection of ethanol is injected in thyroid nodule under ultrasound guidance, which causes cellular destruction subsequent volume reduction, this result in significant reduction in nodule size and its associated symptoms [4]. Different studies have shown positive outcome following ultrasound guided percutaneous ethanol ablation for benign thyroid nodules, factors related with outcome are genetic variations, iodine intake and dietary habits [5].

The aim of this study is to evaluate the efficacy, safety, and patient outcomes of ultrasound-guided percutaneous ethanol ablation for benign thyroid nodules within the Indian population. By assessing the response to this minimally invasive procedure in an Indian cohort, we can provide valuable insights into its applicability and benefits at tertiary care Centre of North Maharashtra

MATERIAL AND METHODS

Sample sizes of 40 patients were selected. Inclusion criteria: Patients with symptomatic benign thyroid nodules, having nodule related pressure symptoms, cosmetic problems referred for ethanol ablation in our radio-diagnosis department, SMBT IMSRC. Exclusion criteria: Patients those are undergone any previous surgery, chemical / thermal ablation procedure for target lesion, Patient those are undergoing/ under gone medical treatment for the targeted lesion, Patients who are not willing to follow up for given period of time, Nodules which are malignant.

Pre -procedural part included Clinical History, USG, Cytology, Pathology works up is done (6). Following investigations were performed:

Ultrasonogram of thyroid:

It is useful to know whether a nodule is cystic or solid and will often detect other impalpable nodules, can be used for guided aspiration of cysts and used for follow- up of nodules.

BIOCHEMICAL ASSESSMENT Serum T3 T4 and TSH:

In a hyper functioning nodule T3 and T4 will be high whereas TSH will be low.

Most patients with thyroid nodules are euthyroid.

Risk of malignancy in a toxic nodule is negligible.

Tissue Diagnosis:

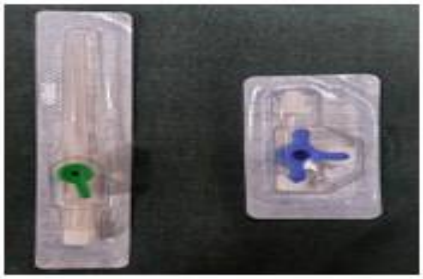
Fine Needle Aspiration Cytology (FNAC):

FNAC is the gold standard investigation for evaluation of solitary nodule and should be done for all cases (25).

PROCEDURE MATERIAL

1. Ethanol

2. 20g intracath , 3-way cannula



3.Inter locking syringes

4. sterile gloves, 2% lignocaine, sterile bulb, tincture iodine etc.

Procedure for Ultrasound-Guided Percutaneous Ethanol Ablation:

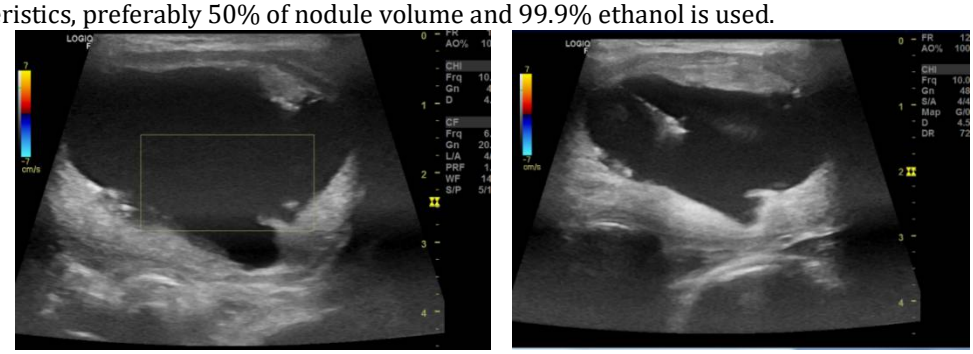
Patient Preparation - Pre-procedural patient preparation, including obtaining informed consent and conducting a thorough evaluation of the thyroid nodule using ultrasound imaging.

Anesthesia – 2% lignocaine local anesthesia or conscious sedation to ensure patient comfort during the procedure.

Ethanol Injection Technique

1. Needle Placement - Ultrasound-guided needle placement technique for accurate targeting of the thyroid nodule is done through isthmus part preferably.
2. Ethanol Injection - volume and concentration of ethanol used for injection, based on the nodule size and

characteristics, preferably 50% of nodule volume and 99.9% ethanol is used.



Post-procedure Care: Observation for potential complications like:

1. Pain or Discomfort.
2. Skin Injury:
3. Voice Changes or Hoarseness:
4. Hemorrhage:
5. Nodule Rupture:
6. Hypothyroidism:
7. Infection

RESULTS

In our study group population is ranging from 28 to 65 years mostly from 3rd to 4th decade and predominantly female population (Table 1& 2). Thyroid nodules are common with a large number occurring in women of childbearing age, thyroid nodule growth is typically gradual and most nodules detected during pregnancy were likely present before conception. Pregnant females often have greater contact with medical providers leading to initial detection of thyroid nodules during pregnancy as per the Giordano J et. Al. CRC Press, (2021), 50-54/ [7], And results match with our study.

Table 1: Age and gender distribution of study population:

	Frequency (n)	Percentage (%)
< 30 years	**4**	**10%**
30 -40 years	**18**	**45%**
>40 – 50 years	**10**	**25%**
>50 years	**8**	**20%**
Total	**40**	**100%**

Table 2: Gender distribution of study population:

	Frequency (n)	Percentage (%)
Male	**4**	**10%**
Female	**36**	**90%**
Total	**40**	**100%**

Table 3: Comparison of mean nodular volume at pre-procedural, 1month follow -up and 3 months follow -up respectively

	Mean	SD	Repeated Anova F test	P value, Significance
Pre -procedural	4.87	3.81	F = 27.840	P< 0.001**
1 month follow -up	1.75	0.95		
3 month follow -up	1.31	0.84		
Tukey's post hoc test to find pairwise comparison				
Group	Comparison Group		Mean Difference	p value, Significance
Pre-procedural vs	1 month follow -up		3.11	p<0.001**
	3 month follow -up		3.55	p< 0.001**
1 month follow -up vs	3 month follow -up		0.446	p =0.667(ns)

p>0.05 – no statistically significant difference ****p<0.001 – highly significant difference**

DISCUSSION

The prevalence of thyroid malignancy increases with age and peaks at a slightly earlier age in women than men as per Sharbidre KG et. al. [8], which is matching with our study. Age <20 or > 60 years is increased

risk factor as per Xie,C *et al* [9], which is correlating to results of our study. Complications: only 2 patients have complication which was headache and pain immediately after procedure and was resolved subsequently after 2 hours which was absolutely no complications at the end of overall study (Table 3).
Factors that can contribute to variations in efficacy rates include:
Nodule Characteristics: Studies may include patients with different types and sizes of cystic thyroid nodules. Efficacy rates can differ based on the initial characteristics of the nodules being treated.
Treatment Protocols: Variations in the technique, dosage, and number of ethanol ablation sessions used in different studies can impact the reported efficacy rates. Different studies may employ different protocols, leading to differences in outcomes. Patient Selection: Studies may include patients with varying degrees of nodule-related symptoms, as well as different comorbidities. The baseline health and characteristics of the patient population can influence the observed efficacy rates.
Follow-up Duration: The duration of follow-up after the ethanol ablation procedure can vary among studies. Longer follow-up periods may provide more comprehensive data on efficacy rates and potential recurrence.
In a predominantly cystic nodule, the rate of volume reduction varies from 60% to 90% [10], in our study results it is 90% which is consistent with two studies and most of the cases with purely cystic nodules it is Response rate of PEI for purely cystic nodule was 100.0% [11], which is consistent with the 3 and subsequent follow-up studies as per our study it is 92% after 3 months of follow-up and volume reduction of 85–95% as per [12], which is matching with the study results.

CONCLUSION

Ethanol ablation is effective for treatment of Solitary Cystic Thyroid Nodule with an efficacy of 92% in our study. Benign cystic nodules has more prevalence among females in pregnancy and between 3rd to 4th decades of life. At the end of study this study has no complication rate and safe.

REFERENCES

1. Jeong, W.K., Baek, et al.: (2009). Radiofrequency ablation of benign thyroid nodules: safety and imaging follow-up in 236 patients. Eur Radiol. 18:1244-1250.
2. Ernest L. Mazzaferri , Richard T: Kloos, (2008). Current Approaches to Primary Therapy for Papillary and Follicular Thyroid Cancer, The Journal of Clinical Endocrinology & Metabolism, Volume 86, Issue 4. 1:1447-1463.
3. Papini, E., Pacella, C.M., ... Hegedus, L., (2014): The advent of ultrasound-guided ablation techniques in nodular thyroid disease: Towards a patient-tailored approach. Best Practice and Research: Clinical Endocrinology and Metabolism.
4. Shin JH, Baek JH, Chung J, et al.: Jeon SJ, Jung SL, Kim DW, Kim EK, Kwak JY, Lee CY, Lee HJ, Lee JH, Lee JH, Lee KH, Park SW, Sung JY, (2016). Korean Society of Thyroid Radiology (KSThR) and Korean Society of Radiology. Ultrasonography Diagnosis and Imaging-Based Management of Thyroid Nodules: Revised Korean Society of Thyroid Radiology Consensus Statement and Recommendations. Korean J Radiol. 17:370- 395.
5. Velayutham K, Selvan SS, Unnikrishnan AG: (2015). Prevalence of thyroid dysfunction among young females in a South Indian population. Indian journal of endocrinology and metabolism. 19:781. 10.4103/2230- 8210.167546.
6. Popoveniuc G, Jonklaas J: (2021). Thyroid nodules. Medical Clinics of North America. 96:329-49. 10.1016/j.mcna.2012.02.002
7. Lee SY, Pearce EN: (2022). Assessment and treatment of thyroid disorders in pregnancy and the postpartum period . Nature Reviews Endocrinology. 18:158-71. 10.1038/s41574-021-00604-z
8. Bennedbæk FN, Karstrup S, Hegedüs L: (1997). Percutaneous ethanol injection therapy in the treatment of thyroid and parathyroid diseases. European journal of endocrinology. 136:240-50. 10.1530/eje.0.1360240.
9. Xie C, Cox P, Taylor N, LaPorte S: (2016). Ultrasonography of thyroid nodules: a pictorial review. Insights into 6 of 7 imaging. 2016, 7:77-86. 10.1007/s13244-015-0446-5.
10. Bennedbæk FN, Hegedüs L: (2001). Treatment of recurrent thyroid cysts with ethanol: a randomized double-blind controlled trial. The. Journal of Clinical Endocrinology & Metabolism. 88:5773-7. 10.1210/jc.2003- 031000.
11. Barghouthi N, Perini J, (2021). Editors: Endocrine Diseases in Pregnancy and the Postpartum Period. CRC Press, 202130.
12. Hahn, S.Y., Shin: J.H., Na, D.G., Ha, E.J., Ahn, H.S., Lim, H.K., Lee, J.H., Park, J.S., Kim, J.H., Sung, J.Y. and Lee, J.H. (2018). Ethanol Ablation of the Thyroid Nodules: 2018 Consensus Statement by the Korean Society of Thyroid Radiology. 20192018, 20:609-620. 10.4103/2230-8210.167546

CITATION OF THIS ARTICLE

Harish Baburao Pawar, Sushant Bhadane, Meenal Mohgaonkar, Amol Jagdale, *Devendra Kulkarni:* Astudyonusg - Guided Percutaneous Ethanol Ablation for Benign Thyroid Nodules at Tertiary Care Centre Of North Maharashtra. Bull. Env.Pharmacol. Life Sci., Vol 12[8] July 2023: 219-222.