

## Can a hot nodule disappear in thyroid scintigraphy without any therapies?

Aylin Akbulut, Fadimana Nur Aydinbelge, Murat Sadic, Gokhan Koca, Meliha Korkmaz

Department of Nuclear Medicine, Ministry of Health Ankara Training and Research Hospital, Ankara, Turkey

(Received 3 June 2016, Revised 20 June 2016, Accepted 22 June 2016)

### ABSTRACT

A 63-year-old woman presented with a history of hyperthyroidism symptoms over two years, referred for thyroid scintigraphy. In the hospital archives we have met her previous thyroid scintigraphy showing a hot nodule in the upper part of right thyroid lobe. However, her recent thyroid scintigraphy was showing only cold nodules but no hot nodule, giving an impression that she had some treatment to her hot nodule. Even though she was advised to medical treatment and also referred for radioactive  $^{131}\text{I}$  therapy, she refused all the treatment and she only had some branches of dill (*Anethum graveolens*) as home remedies whenever she had her symptoms, letting us to think, if it is the dill effect.

**Key words:** Anethum graveolens; Dill; Hyperthyroidism; Hot nodule; Thyroid scintigraphy

**Iran J Nucl Med 2017;25(Suppl 1):62-65**

Published: February, 2017

<http://irjnm.tums.ac.ir>

**Corresponding author:** Dr. Murat SADIC, Department of Nuclear Medicine, Ministry of Health Ankara Training and Research Hospital, Ulucanlar Street, 06560 Ankara, Turkey. E-mail: mdmuratsadic@gmail.com

## INTRODUCTION

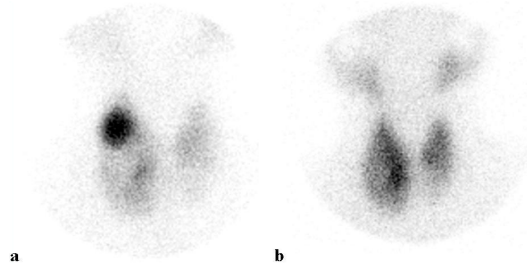
Thyroid nodules occur frequently in females, in elder persons, in people living in areas with iodine deficiency and in people exposed to radiation. According to many research, prevalence of the nodules were found; 2-6% with palpation, 19-35% with ultrasound, and 8-65% in autopsy data [1]. Patients with thyroid nodules may be asymptomatic or present in hyperthyroid or hypothyroid state. Thyroid scintigraphy with  $^{99m}\text{Tc}$  pertechnetate can provide information about the activity of the thyroid nodule. According to nodule activity (hot or cold) in scintigraphy clinical differential diagnosis and treatment approach can be determined. Hot nodules can be treated with medical treatment (antithyroid therapy), radioactive iodine (RAI) and/or surgery. Moreover, alcohol injection into the thyroid nodule or radiofrequency ablation can be other alternatives. Traditionally in some regions of Turkey dill (*Anethum graveolens*) is advised as home remedies for several reasons including hyperthyroidism. *Anethum graveolens* is an annual herb of Apiaceae family.

Regarding the literature, *Anethum graveolens* is commonly used for promoting digestion, it has antioxidant [2], antihyperlipidemic [3], antimicrobial [2, 4, 5] and mucosal protective [6] effects, it can be used as treatment of dysmenorrhea [7] and lactation problems and gastrointestinal problems [6, 8] and for promoting diuresis [9]. To the best of our knowledge, the effects of *Anethum graveolens* on the thyroid function has not been studied yet. In our case, we think that *Anethum graveolens* usage for a patient with active nodule in the thyroid scintigraphy is presented as initial in the literature.

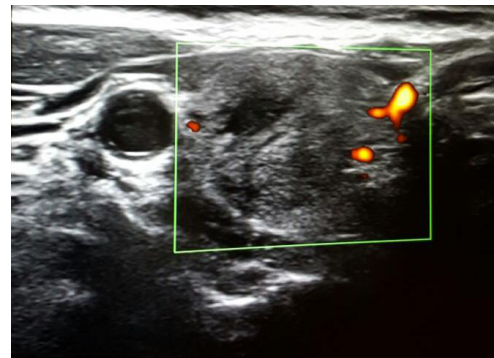
## CASE REPORT

A 63-year-old female referred to our hospital with complaints of occasionally recurrent sweating, palpitations, and tremors in hands and pain in joints since several years. At that time, the patient's lab results were TSH 0.20  $\mu\text{IU/ml}$ , sT3 3.05  $\text{pg/ml}$ , sT4 0.73  $\text{ng/ml}$ , Anti-TPO: 1.1  $\text{IU/mL}$ , Anti-TG-AB <0.9 (normal limits for TSH, sT3 and sT4, Anti-TPO, Anti-TG-AB as follows 0.34-5.6, 2.3-4.2, 0.58-1.25, 0-9, 0-4, respectively) and compatible with subclinical hyperthyroidism. Her thyroid US revealed isoechoic solid nodules consisting of microcalcification and cystic degeneration in the right lobe. Her thyroid scintigraphy with  $^{99m}\text{Tc}$ -pertechnetate demonstrated focally increased activity in the upper pole of right lobe with partial suppression in the extra nodular area (Figure 1a). In addition, her thyroid scintigraphy showed hypoactive area in the lower pole of left lobe and the result was consistent with active/hypoactive multinodular goiter.

Her fine needle aspiration biopsy was performed from the biggest cold nodule at the lower pole, only, which was concordant with benign follicular changes. After these findings, her physician recommended antithyroid therapy and RAI treatment but the patient refused to take any therapies including medication.



**Fig 1.** The patient's previous thyroid scintigraphy (2 years ago), showing a hot nodule in the upper pole of right lobe (a). The patient's recent thyroid scintigraphy, showing hypoactive areas in both thyroid lobes, however hot nodule area in the upper pole of right lobe is absent (b).



**Fig 2.** Current thyroid ultrasound of the patient concordant with previous US, showing two separate nodules in the upper pole of the right thyroid lobe, one of them is hypoechoic with 12x8 mm in size and the other one is isoechoic 19x16 mm in size.

Two years later the patient was again referred for thyroid scintigraphy to our department with the same symptoms. Her complaints continued time to time through this period but she claimed that they were decreased considerably. Other than using the proposed antithyroid drug treatment our patient ate 5-6 springs of *Anethum graveolens* 3 times per day during her complaints. Her laboratory results were as follows, TSH 0.07  $\mu\text{IU/ml}$ , sT3 3.75  $\text{pg/ml}$  and sT4 0.86, Anti-TPO: 1.2  $\text{IU/mL}$ , Anti-TG-AB <0.9 and according to the results, she still had subclinical hyperthyroidism. Present thyroid US showed two nodules at the upper pole of the right lobe, one of them was hypoechoic 12x8 mm and the other one was isoechoic 19x16 mm (Figure 2).

Also, at the lower pole, there was a nodule with cystic degeneration areas. Neither the nodules nor the thyroid gland itself had an increased pattern of vascularity. Current thyroid scintigraphy was showing significant hypoactive area in the middle-lower pole of right lobe and hypoactive area in the upper pole of left lobe. Interestingly, the active nodule area in the upper pole of right lobe, which was previously observed at the thyroid scintigraphy, was absent in the current thyroid scintigraphy (Figure 1b).

### DISCUSSION

*Anethum graveolens* is known as rich source of flavonoids, saponin, phenolic, tannins, terpene, ethyl acetate, coumarins and steroids [9, 10]. Moreover it contains quercetin and isoharmentin, which both have antioxidant activity and can decrease the effect of free radicals [9]. However it is not known how these can affect the hot nodule's trapping pertechnetate without any therapies.

On the other hand, there has been some cases reporting disparate imaging results between  $^{99m}\text{Tc}$  pertechnetate and  $^{131}\text{I}$  or  $^{123}\text{I}$  thyroid scintigraphies or  $^{99m}\text{Tc}$ -MIBI [11], in adenomatous hyperplasia, follicular adenoma, primary thyroid carcinoma, iodine-radiocontrast material, subacute and chronic thyroiditis, hurthle cell adenoma, thyroglossal duct cysts [12]. However in our case we have used the same radiopharmaceutical agent, as  $^{99m}\text{Tc}$ -pertechnetate; the patient did not have much change in her blood samples. In addition the fine needle aspiration biopsy results of our patient were concordant with benign follicular nodule with cystic degeneration. This fine needle aspiration biopsy and the US results also enabled us to rule out cystic / hemorrhagic degeneration of the same nodule or the malignant degeneration of the nodule which could have been a reason of disparate images.

*Anethum graveolens* is commonly used for promoting digestion and has many effects such as antioxidant [2], antihyperlipidemic [3], antimicrobial [2, 4, 5] and mucosal protective effects [6], treatment of dysmenorrhea [7], lactation problems and gastrointestinal problems [6, 8] and diuresis [9]. It has been shown by Bahramikia et al. that, the antioxidant effect of *Anethum graveolens* resulted the decrease of lipid peroxidation, in livers of rats, fed with high-fat diet [13]. Oshaghi et al. have presented the increase of catalase and thiol group's glutation levels in rats with liver damage, treated with high dose *Anethum graveolens* tablets demonstrating its antioxidant and hepatoprotective effects [2]. Heidarifar et al. has shown the analgesic effect of *Anethum graveolens* in primer dysmenorrhea [7]. The antibacterial activity of ethanol extract of *Anethum graveolens* against *P. mirabilis*, *S. aureus*, *B. Cereus* and *A. Faecalis* has been shown by Nair et

al. [5]. Sahib et al. presented a group of pediatric patients with diagnosis of giardiasis benefitting five days treatment from aqueous extract of *Anethum graveolens* [4].

### CONCLUSION

Without any medical treatment our patients' thyroid scintigraphy has lost the hot nodule feature in scintigraphy. However, persistence of hypoactive nodule areas and subclinical hyperthyroidism blood findings let us think that this may be an effect of *Anethum graveolens* on hot nodules. However, regarding the limited literature of *Anethum graveolens*, it is difficult to interpret this case. We believe that more studies on the effect of *Anethum graveolens* may further enlighten the pathway of our case.

### REFERENCES

1. Dean DS, Gharib H. Epidemiology of thyroid nodules. *Best Pract Res Clin Endocrinol Metab.* 2008 Dec;22(6):901-11.
2. Oshaghi EA, Khodadadi I, Tavilani H, Goodarzi MT. Effect of dill tablet (*Anethum graveolens* L) on antioxidant status and biochemical factors on carbon tetrachloride-induced liver damage on rat. *Int J Appl Basic Med Res.* 2016 Apr-Jun;6(2):111-4.
3. Yazdanparast R, Alavi M. Antihyperlipidaemic and antihypercholesterolaemic effects of *Anethum graveolens* leaves after the removal of furocoumarins. *Cytobios.* 2001;105(410):185-91.
4. Sahib AS, Mohammed IH, Sloo SA. Antigiardial effect of *Anethum graveolens* aqueous extract in children. *J Intercult Ethnopharmacol.* 2014 Jul-Sep;3(3):109-12.
5. Nair R, Chanda S. Antibacterial activities of some medicinal plants of the western region of India. *Turk J Biol.* 2007;31:231-6.
6. Hosseinzadeh H, Karimi GR, Ameri M. Effects of *Anethum graveolens* L. seed extracts on experimental gastric irritation models in mice. *BMC Pharmacol.* 2002 Dec 19;2:21.
7. Heidarifar R, Mehran N, Heidari A, Tehran HA, Koohbor M, Mansourabad MK. Effect of Dill (*Anethum graveolens*) on the severity of primary dysmenorrhea in compared with mefenamic acid: A randomized, double-blind trial. *J Res Med Sci.* 2014 Apr;19(4):326-30.
8. Gharib Naseri MK, Heidari A. Antispasmodic effect of *Anethum graveolens* fruit extract on rat ileum. *Int J Pharm.* 2007;3(3):260-4.
9. Jana S, Shekhawat GS. *Anethum graveolens*: An Indian traditional medicinal herb and spice. *Pharmacogn Rev.* 2010 Jul;4(8):179-84.
10. Bahramikia S, Yazdanparast R. Antioxidant and free radical scavenging activities of different fractions of *Anethum graveolens* leaves using in vitro models. *Pharmacol Online* 2008;2:219-33.
11. Koca G, Atilgan HI, Baskin A, Demirel K, Korkmaz M. Non-visualized Thyroid Gland by Tc-99m MIBI Scan

- with Normal Thyroid Scan. Nucl Med Mol Imaging. 2013 Sep;47(3):216-7.
12. Hung GU, Tsai SC, Kao CH, Lin WY, Wang SJ. Disparate results between I-131 and Tc-99m pertechnetate owing to administration of iodine-containing radiographic contrast material. Semin Nucl Med. 2000 Apr;30(2):147-8.
  13. Bahramikia S, Yazdanparast R. Improvement of liver antioxidant status in hypercholesterolemic rats treated with anethum graveolens extracts. Pharmacol online. 2007;3:119-32.