October 2014

ECHOLASER News

Thyroid Nodule Laser Ablations

Our experiences since the beginning (2006) up today

Pierpaolo De Feo MD pierpaolodefeo@gmail.com
Elisa Stefanetti MD elisastefanetti@libero.i
Giovanni Gambelunghe MD giovanni.gambelunghe@libero.it
Santa Maria della Misericordia Hospital, Perugia, Italy

Nodular thyroid disease is very frequent in iodine-deficient areas with peaks of prevalence close to 50% of the adult population. The natural history of multinodular goiter varies, being difficult to predict in patients the potential goiter growth and function. Usually, more than 20% of the solid nodules appear to increase in size over time. The therapeutic strategies for euthyroid patients are clinical surveillance, L-Thyroxine (L-T4) suppression therapy, percutaneous ethanol injection, and surgery. L-T4 therapy has little or no effect on nodule size[4]. Surgery is indicated in the following clinical situations: progressive growth of the entire goiter or individual nodules; compression of the trachea, esophagus, recurrent laryngeal nerve, or cervical veins; and significant aesthetic disfigurement. Over the last decade micro surgical approaches for thyroid nodule treatment have been proposed. In 2002 and 2004, Døssing H[5] and Pacella CM[6], respectively, introduced ultrasound-guided laser photocoagulation for the treatment of benign thyroid nodules. Since that time numerous studies have been published demonstrating the effectiveness of the method[3-15].

Our group of Perugia started to use the laser for thyroid nodules' ablation in 2006. We started our experience with a multisource laser device and treated 140 patients over three years[6]. The main problem of this initial experience was given by the elevated recurrence rate of nodule re-growth. We realized that, the energy delivery was sometimes insufficient to maintain a long-lasting reduction in volume of treated nodules. On the basis of the revision of our data, we found that a supply of at least 500 joules per ml of tissue nodular ensures a clear and lasting reduction of volume in the following years[12].

Since 2009, using the new laser equipment developed by Elesta, we improved our ablation technique, administering an adequate amount of energy to 289 thyroid nodules.

The data presented at GIT 2013 reported the median nodule reduction of 66% at 6 month follow-up in 197 patients (median volume 17 ml before the treatment). The methodology was that developed by Pacella with small but significant changes. The original method-

See You There:

17-20 October 2014
Paris, France
62th Annual Meeting JFR Journées Françaises de Radiologie
http://jfr.radiologie.fr

6-9 November 2014
Shanghai, China
10th Chinese Conference of Minimally Invasive Therapy in Oncology and the 1st Scientific Meeting of Asia-Pacific Association of Imaging-guided Therapy in Oncology
http://www.cmito.org/en/am/

30 November-5 December 2014
Chicago, Illinois, United States
McCormick Place
RSNA
http://www.rsna.org/

esaote

ology suggested the injection of anesthetic in the pericapsular thyroid space with detachment of the capsule itself from the surrounding tissue. In order to evaluate whether the local anesthetic procedure is useful and more effective in reducing the volume size of treated nodule and caused less side effects in comparison to the absence of any local anesthesia, we performed a retrospective analysis[14]. The results of this study demonstrated that the injection of local anesthetic is not useful in terms of nodule volume reduction and increases by about threefold the side effects occurring over the first hours after treatment[14]. Thus, we do not recommend local anesthesia before the treatment of thyroid nodules and we have no longer used the injection of anesthetic in the pericapsular thyroid space.

At present, our procedure is ambulatory with patients who are followed in the hospital bed for about four hours after completing the treatment. The ablation is well tolerated, as demonstrated by the statements of all patients who would be available to repeat the treatment, if required in the case of very large nodules. The percentage of failure of the laser ablation is actually decreased to about 6% of all treated nodules.

Finally, actually we are expanding our experience in the field of malignant ablation of neck lymph nodes. At present, we have tested the efficacy of laser ablation in a limited casuistic of three patients who had repetitive injury of neck lymph nodes from differentiated thyroid neoplasms, previously treated with surgery and radio iodine. In all three cases, after 12 months from the lymph nodes' laser ablation, the US scan, the thyroglobulin assay and the scintigraphy with I131 do not show persistence of malignancy. Thus, our preliminary data support the positive results of larger studies previously reported in this journal.

In conclusion we are satisfied by our experience with percutaneous laser ablation of thyroid nodules. The method is effective, well tolerated, cheap (compared with that surgical), easy to apply and it might be further improved in the next future.

Fig. 1 - Follow-up after two weeks from the treatment; note the demarcation of the necrosis

References

1. Døssing H, Bennedbaek FN, Karstrup S & Hegedüs L. **Benign solitary solid cold thyroid nodules: US-guided interstitial laser photocoagulation – initial experience**. Radiology 2002; 225(1):53-7.
2. Pacella CM, Bizzarri G, Spiezia S, Bianchini A, Guglielmi R, Crescenzi A, Pacella S, Toscano V & Papini E. **Thyroid tissue: US-guided percutaneous laser thermal ablation**. Radiology 2004; 232(1):272-280
3. Papini E, Guglielmi R, Bizzarri G & Pacella CM. **Ultrasound-guided laser thermal ablation for treatment of benign thyroid nodules**. Endocr Pract 2004; 10(3):276-283
4. Papini E, Guglielmi R, Bizzarri G, Graziano F, Bianchini A, Brufani C, Pacella S, Valle D & Pacella CM. **Treatment of benign cold thyroid nodules: a randomized clinical trial of percutaneous laser ablation versus levothyroxine therapy or follow-up**. Thyroid 2007; 17(3):229-235
5. Papini E, Bizzarri G & Pacella CM. **Percutaneous laser ablation of benign and malignant thyroid nodules**. Curr Opin Endocrinol Diabetes Obes 2008; 15(5):434-439
6. Gambelunghe G, Fatone C, Ranchelli A, Fanelli C, Lucidi P, Cavaliere A, Avenia N, D'Ajello M, Santeusanio S, De Feo P. **A randomized controller trial to evaluate the efficacy of ultrasound-guided laser photocoagulation for treatment of benign thyroid nodules**. J Endocrinol Invest 2006; 29(9): 23-26
7. Dossing H, Bennedbaek FN & Hegedüs L. **Effect of ultrasound-guided interstizial laser photocoagulation on benign solid cold thyroid nodules-a randomised study**. Eur J Endocrinol 2005; 152(3):341-345
8. Valcavi R, Riganti F, Bertani A, Formisano D & Pacella CM. **Percutaneous laser ablation of cold benign thyroid nodules: a 3-year follow-up study in 122 patients**. Thyroid 2010; 20 (11):1253-61
9. Cakir B, Topaloglu O, Gul K, Agac T, Aydin C, Dirikoc A, Gumus M, Yazicioglu K, Ersoy RU, Ugras S. **Effects of percutaneous laser ablation treatment in benign solitary thyroid nodules volume, thyroglobulin and anti-thyroglobulin levels, and cytopathology of nodule in 1 yr follow up**. J Endocrinol Invest 2006; 29:876-884
10. Barbaro D, Orsini P, Lapi P, Pasquini C, Tuco A, Righini A, Lemmi P. **Percutaneous laser ablation in the treatment of toxic and pre-toxic nodular goiter.** End Pract 2007; 13:30-36
11. Rotondi M, Amabile G, Leporati P, Di Filippo B, Chiovato L. **Repeated laser thermal ablation of a large functioning thyroid nodule restores euthyroidism and ameliorates constrictive symptoms**. J Clin Endocrinol Metab 2009; 94:382-383
12. Gambelunghe G, Bini V, Monacelli M, Avenia N, D'Ajello M, Coltella R, Nasini G and De Feo P. **Ultrasound-guided interstitial laser ablation for thyroid nodules is effective only at high total amounts of energy: results from a three-year- pilot study**. Surg Innov. 2013 Aug;20(4):345-50
13. Papini E, Rago T, Gambelunghe G, Valcavi R, Bizzarri G, Vitti P, De Feo P, Riganti F, Misischi I, Di S, Pacella C. **Long-term Efficacy of Ultrasound-guided Laser Ablation for Benign Solid Thyroid Nodules. Results of a Three-year Multicenter Prospective Randomized Trial**. J Clin Endocrinol Metab. 2014 Jul 22:jc20141826
14. Gambelunghe G, Bini V, Monacelli M, Avenia N, D'Ajello M, Colella R, De Feo P. **The administration of anesthetic in the thyroid pericapsular region increases the possibility of side effects during percutaneous laser photocoagulation of thyroid nodules**. Lasers Surg Med. 2013 Jan;45(1):34-7

ECHOLASER News

WELCOME to **Massimo Giusti** MD and **Silvia Oddo** MD that started to use Echolaser at the DIMI University of Genoa for the treatment of benign thyroid nodules

The first procedure was performed on Friday September 19th on two patients with benign thyroid nodule, without risk and complication

Massimo Giusti MD magius@unige.it
Silvia Oddo MD dottoressaoddo@gmail.com

About them

Massimo Giusti MD

Since 1986 Associate Professor of Endocrinology, University of Genoa Didactical activities at the University of Genoa. He started then minimally invasive Therapy on the Thyroid in 2012 with Radiofrequency and he is enlarging his experience with Laser ablations procedure.

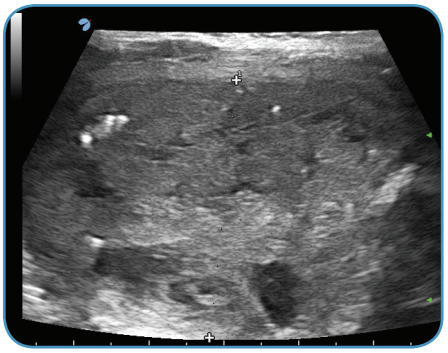
Silvia Oddo MD

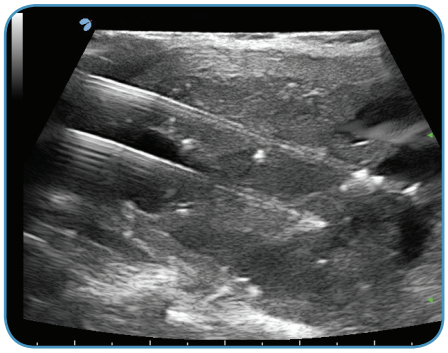
Is graduated with a Degree in Medicine at the University of Genoa, she is specializing at the 5th year in Endocrinology and Metabolic diseases. Since 2012 she has been working on a team that deals with Minimally Invasive Therapy.

About the two Patients

Case 1

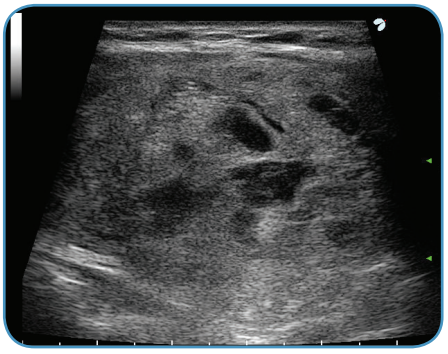
72 years old woman, single nodule of the right thyroid lobe of 49 ml. Normal thyroid function, negative autoimmunity.

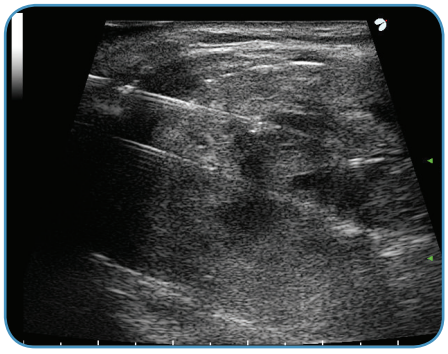




Case 2

58 years old woman, multinodular goiter with a prevalent nodule in the right thyroid nodule of 34 ml. Normal thyroid function, negative autoimmunity.





Massimo Giusti point of view:

Why, as an Endocrinologist, have you taken into consideration a non-surgical treatment of thyroid nodules?

The nodular goiter is a frequent finding in our geographical area and its finding increases with the advancing of population age. A malignant tumor of the thyroid is usually present in about 5% of thyroid nodules and the diffusion of diagnostic techniques and an increase in attention toward the thyroid diseases is causing an increase in the diagnosis of thyroid cancer. Since an increase of thyroidectomy for nodular malignant disease or suspected is expected, then it is essential to try to reduce surgery for benign diseases using non-surgical techniques. Minimally invasive techniques appear to be less expensive than a thyroidectomy and have only rare and mild adverse events, so that they can also be used in patients with contraindications to surgery for comorbidities. In addition, the cost of a session of ablations are well below the cost of both total and partial thyroidectomy.

What are your impressions after having performed the first procedures on a thyroid nodule?

Laser thyroid nodule ablation seems to be a safe alternative treatment for benign thyroid nodules, such as laser therapy. It seems to overcome the limits of medical therapy and to avoid unnecessary thyroid excision.

How important is the learning phase in Minimally Invasive Therapy?

In a practice procedure the learning phase is fundamental. I had the opportunity to have Professor Claudio Pacella as a Tutor.

Is it necessary to increase the Knowledge of Laser Therapy within all the Colleagues that help the patient to select the appropriate Thyroid Surgical Solutions?

Yes. This is why we are organizing on February 13th 2015 a One Day Local course at DIMI about: The Thyroid Nodule; comparison about the possible Therapeutic solutions. Target audience: Endocrinologists, radiologists, internists, and any other healthcare professional involved in the diagnosis and treatment of thyroid nodules. The main objectives of this course are to review the latest news in thyroid ultrasound diagnostic criteria and applications in presence of thyroid nodules and to teach tools to be used in daily clinical practice regarding the execution of all the possible therapeutic solutions including laser treatment for benign nodules.

ECHOLASER News

October 2014

Hervé Monpeyssen
hm-endocrino@wanadoo.fr

Echolaser Club Social Evening during ETA congress: It is confirmed Minimally Invasive therapy has high Interest for the Endocrinologists; Thank also to Echolaser Club

Dear Colleagues, dear Friends

It was a real pleasure for me to organize and meet all of you during the Echolaser meeting at ETA congress. The meeting was very positive and our discussion on the Minimally Invasive Therapy on the thyroid very useful.

I have been impressed about the technical and application innovations of the Minimally Invasive Techniques, Laser, Radiofrequency and Hifu, presented during the ETA Congress. All the MIT ablation procedures are done under real time monitoring of the Ultrasound imaging. With Therapy procedures the Quality of Ultrasound Imaging is very important. This in order to get the perfect indications, planning and realization of these procedures. Considering that the ETA US course was successful and that there have been several communications on the subject, it must be deduced that the "Thyroid Planet" understood the leading part of US. (I don't forget that in 2000 in Kyoto for ICE, the communications about US were probably less than five).

Following the "pioneers" we must consider that these treatments are highly beneficial to the patients and convenient for the Health Systems. Moreover, a practice is really good when a lot of colleagues realize it daily.

In agreement with some of you, I dare to say that we are writing a new page of the "History of Thyroidology".

The next step is the creation of an expert group within ETA.

I take the opportunity to thank you for your active participation and I hope to **See you soon, with pleasure, in Paris**.

Hervé Monpeyssen

Echolaser news are available at
www.elesta-echolaser.com it/rassegna-stampa/

Echolaser Club'contacts
Echolaserclub@esaote.com

ModiLite
http://modilite.info

Esaote S.p.A.
International Activities:
Via di Caciolle 15 50127 Florence, Italy
Tel. +39 055 4229 1 Fax +39 055 4229 208
www.esaote.com

ELESTA
Laser Driven by Ultrasound

Elesta s.r.l.
Via Baldanzese 17 50041 Calenzano, Italy
Tel. +39 055 8826807 Fax +39 055 7766698
www.elesta-echolaser.com