Year 2016 n°2
October

ECHO LASER News

See You There:

From 9th to 10th of November 2016
In Rome, Italy, at Ergife Palace Hotel
Advanced Thyroid Course, 2nd AACE Italian Chapter meeting

From 10th to 13th of November 2016
In Rome, Italy, at Ergife Palace Hotel **15th AME National Congress, Joint Meeting with AACE Italian Chapter**

From 27th to 28th of January 2017
in Naples, Italy, at Cardarelli Hospital
First Percutaneous Laser Ablation Network (PLAN) educational initiative on laser ablation for liver tumors

esaote

An extract

Laser ablation with or without chemoembolization for unresectable neuroendocrine liver metastases: a pilot study

International Journal of Endocrine Oncology May 2016 ,Vol. 3, No. 2, Pages 97-107, DOI 10.2217/ije.15.34

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Practice points

- Laser energy, like radiofrequency (RF) and microwave energy, induces electromagnetic heating to raise the temperature of tissues to lethal levels. It is a fast, precise and relatively tissue-insensitive technique, and can be delivered very easily and safely with simultaneous technique to obtain large areas of coagulation.
- The laser technique use very thin applicators considerably smaller (<1 mm) than radiofrequency ablation electrodes and microwave ablation antenna. In case of lesions ≥ 3 cm the laser ablation (LA) shows the same efficacy and safety profile than RF with a shorter (up to 4–6 min) treatment time per session.
- Usually, one to two fibers with or without pullback technique are used to treat nodule up to 1.5–2.5 cm in diameter and four fibers with fiber tips arranged in a square configuration to treat nodules from 2.5 to 4.0 cm. With pullback technique is possible to treat nodule greater than 4 cm.
- Thanks to fine applicators, unlike RF, laser light technology is safer and more suitable for ablating lesions in high-risk sites or in location that are difficult to reach. It is possible to obtain complete ablation in high percentage of cases (up to 93%) without using special technical devices to protect adjacent structures.
- The possibility to use multiple fine needles allows to obtain ablation area different in size, enabling to treat lesions different in size or multiple small lesions in the same session sparing the normal surrounding parenchyma.
- LA technique can become the ablative technique of choice in patients with multiple or recurrent small lesions of variable size ranging from 5–6 mm to 3–4 cm in diameter. Therefore, patients with disseminated liver metastases of variable size from neuroendocrine tumors can be treated at different times with intention to reduce tumor burden and ameliorate local or general symptoms. In addition the laser technique can be repeated several times safely over a period of years.

- In case of paucilesional disease multimodality locoregional ischemic treatments alternating catheter-based technique (i.e., radioembolization, ethiodized oil-based or drug-eluting bead [DEB], bland embolization) and laser thermal ablation can be performed even at multiple treatment sessions.
- LA, thanks to the recent introduction in clinical practice of a novel guide system that facilitates both the parallel insertion of multiple thin needles and their positioning in geometrical configurations to maximize the ablative effect, is more effective in achieving large volumes of necrosis and then effectively treat with safety lesions of 5–6 cm in diameter at any location without using sequential combined treatment.
- Unresectable solitary large metastatic lesion can be successfully ablated with LA followed by chemoembolization. LA reduce the initial volume of the large lesion and then the TACE can act more effectively on the smaller volume of residual tissue.
- LA with or without chemoembolization induce a marked and durable control either of functional and mass symptoms.

Aim

To evaluate the effectiveness of laser ablation (LA) with or without selective transarterial chemoembolization in patients with large, isolated or oligonodular unresectable neuroendocrine liver matastases.

Materials & methods

Ten patients (mean age: 53.6 years ± 14.1; range: 24–79) with neuroendocrine tumors (NETs) and 13 liver matastases (mean diameter: 4.3 ± 2.8 cm; range: 1.5–12) underwent LA alone (n = 9) or LA followed by selective transarterial chemoembolization (n = 3).

Results

Complete response was obtained in six patients with LA alone and in two patients with combined treatment. The 5-year overall survival rates from the initial diagnosis and post-treatment were 80 and 50%, respectively.

Conclusion

This treatment modality may provide effective control of tumor burden and general symptoms improvement in patients with limited but unresectable disease.

Keywords

chemoembolization, laser ablation, liver metastases, neuroendocrine tumors.

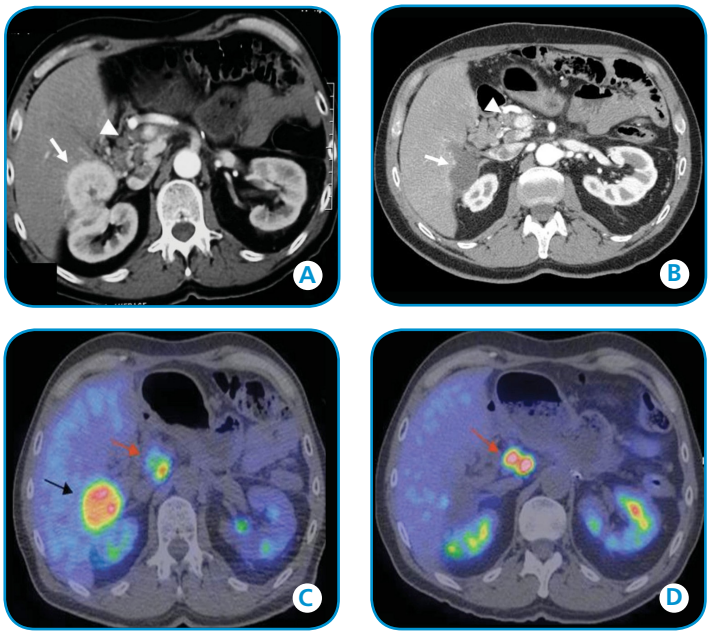

Figure 1. Representative case of a metastatic lesion treated with laser ablation alone during peptide receptor radionuclide therapy therapy for extrahepatic metastases.

Images from a 54-year-old man with a solitary metastatic liver lesion of 5.0-cm-diameter. (**A**) An arterial-phase CT image obtained before LA shows a hyperattenuating 5.0-cm-diameter metastatic lesion located in the fifth liver segment beneath the capsule (white arrow) and lymph nodes in liver hilum (white arrowhead). (**B**) An arterial-phase CT image 24 h after LA shows a hypoattenuating area in segment 5 due to complete ablation of the lesion without foci of enhancement within or at the periphery of coagulation zone (white arrow) while lymph nodes are still present in the liver hilum (white arrowhead). (**C**) 68Ga-DOTATOC PET/CT obtained one month after (**A**) shows high uptake of the labeled somatostatin analog in the same metastatic area as in (**A**) (black arrow) and lymph nodes in liver hilum (red arrow). (**D**) 68Ga-DOTATOC PET/CT 1 month after (**B**) shows high uptake of the labeled somatostatin analog in metastatic lymph nodes in liver hilum and 'cold' area in fifth liver segment as in (**B**). Courtesy of Annibale Versari, MD, Nuclear Medicine – PET Center, IRCCS-Arcispedale S.Maria Nuova Hospital, Reggio Emilia, Italy).

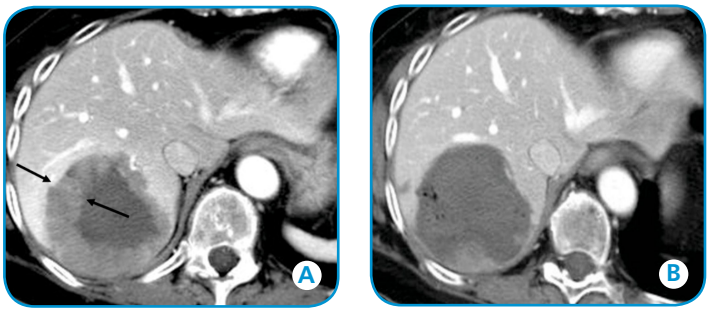

Figure 2. Representative case of large metastatic lesion treated with combined treatment (laser ablation followed by selective transarterial chemoembolization).

Images from a 63-year-old woman with a solitary metastatic lesion larger than 5.0 cm. (**A**) An arterial-phase CT image obtained 24 h after laser ablation session shows a hyperattenuating 7.0-cm-diameter metastatic lesion located in the seventh liver segment with a central homogeneous hypoattenuating area due to coagulation zone clearly distinguishable from a band of peripheral enhancing tissue (arrows), which indicates residual still-viable tumor. (**B**) An arterial-phase CT image obtained 24 h after selective transarterial chemoembolization during the arterial-phase shows complete ablation of the large metastatic lesion with lack of enhancement within or at the periphery of large hypoattenuating coagulation zone.

Treatment of Metastatic Lymph Nodes in the Neck from Papillary Thyroid Carcinoma with Percutaneous Laser Ablation

Cardiovasc Intervent Radiol. 2016 Jul;39(7):1023-30. doi: 10.1007/s00270-016-1313-6. Epub 2016 Feb 24.

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Abstract

Purpose
To assess the effectiveness of percutaneous laser ablation (PLA) of cervical lymph node metastases from papillary thyroid carcinoma.

Materials and Methods
24 patients (62.3 ± 13.2 year; range 32-80) previously treated with thyroidectomy, neck dissection, and radioiodine ablation underwent ultrasound-guided PLA of 46 (18)FDG-PET/CT-positive metachronous nodal metastases. All patients were at high surgical risk or refused surgery and were unsuitable for additional radioiodine ablation. A 300 μm quartz fiber and a continuous-wave Nd-YAG laser operating at 1064 nm were used. Technical success, rate of complications, rate of serological conversion, and local control at follow-up were derived. Fisher's exact test and Mann-Whitney U test were used and Kaplan-Meier curve calculated.

Results
Technical success was obtained in all 46 lymph nodes (100 %). There were no major complications. Thyroglobulin levels decreased from 8.40 ± 9.25 ng/ml before treatment to 2.73 ± 4.0 ng/ml after treatment (p = 0.011), with serological conversion in 11/24 (45.8 %) patients. Overall, local control was obtained in 40/46 (86.9 %) lymph nodes over 30 ± 11 month follow-up, with no residual disease seen at imaging in 19/24 (79.1 %) patients. Local control was achieved in 40/46 (86.9 %) lymph nodes at 1 year and in all of the 25 nodes (100 %) followed for 3 years. Estimated mean time to progression was 38.6 ± 2.7 m.

Conclusion
Ultrasound-guided PLA is a feasible, safe, and effective therapy for the treatment of cervical lymph node metastases from papillary thyroid carcinoma.

Keywords
Laser; Neoplasm metastasis; Percutaneous ablation; Positron emission tomography; Thyroid neoplasm.

News from China

We are pleased to present Prof. Tian-An Jiang, Director of the Ultrasonic Medicine Department, Deputy director of Hepatobiliary and Pancreatic Intervention Center of the First affiliated hospital of Zhejiang university. We report part of his activity in two works: one, already published, about the percutaneous laser ablation of hyperfunctioning Parathyroid Adenoma; the second about a case study of a patient with a liver lesion treated with endoscopic laser technique.

Percutaneous Ultrasound-Guided Laser Ablation with Contrast-Enhanced Ultrasonography for Hyperfunctioning Parathyroid Adenoma: A Preliminary Case Series

Int J Endocrinol. 2015;2015:673604. doi: 10.1155/2015/673604. Epub 2015 Dec 16.

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Abstract

The study was to evaluate the safety and effectiveness of ultrasound-guided percutaneous laser ablation (pLA) as a nonsurgical treatment for primary parathyroid adenoma. Surgery was contraindicated in, or refused by, the included patients. No lesion enhancement on contrast-enhanced ultrasound immediately after pLA was considered "complete ablation." Nodule size, serum calcium, and parathyroid hormone level were compared before and after pLA. Complete ablation was achieved in all 21 patients with 1 (n = 20) or 2 (n = 1) sessions. Nodule volume decreased from 0.93 ± 0.58 mL at baseline to 0.53 ± 0.38 and 0.48 ± 0.34 mL at 6 and 12 months after pLA ($P < 0.05$). At 1 day, 6 months, and 12 months after pLA, serum PTH decreased from 15.23 ± 3.00 pmol/L at baseline to 7.41 ± 2.79, 6.95 ± 1.78, and 6.90 ± 1.46 pmol/L, serum calcium decreased from 3.77 ± 0.77 mmol/L at baseline to 2.50 ± 0.72, 2.41 ± 0.37, and 2.28 ± 0.26 mmol/L, respectively ($P < 0.05$). At 12 months, treatment success (normalization of PTH and serum calcium) was achieved in 81%. No serious complications were observed. Ultrasound-guided pLA with contrast-enhanced ultrasound is a viable alternative to surgery for primary parathyroid adenoma.

Laser Ablation Treatment parameter

The LA procedure was performed with an output power of 3.0W delivered for 3–10min depending on lesion volume. The mean total energy delivery, calculated as laser power (3W) multiplied by duration of exposure, was 1739 ± 394 J (range, 540–2502 J).

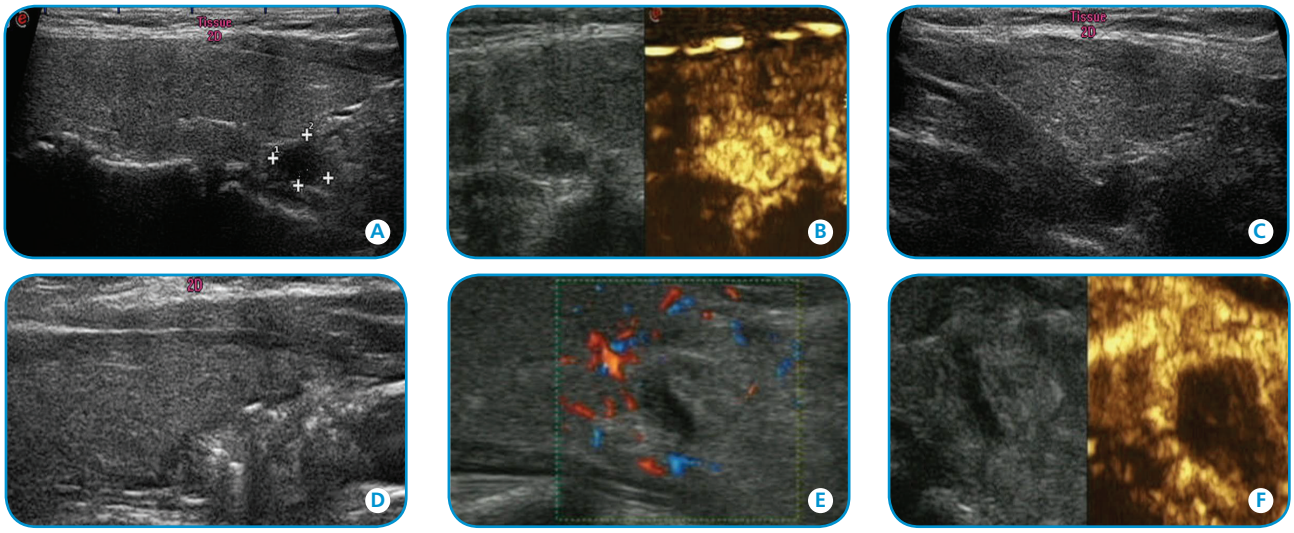


Figure 1. Representative ultrasonography images from one patient, a 45-year-old woman with parathyroid adenoma and hyperparathyroidism, illustrating the LA procedure.

(**A**) Longitudinal section of the right neck revealed a 0.21mL enlarged parathyroid gland (arrow and cursors) situated posterior to the inferior portion of the right lobe of the thyroid gland. (**B**) Preablation CEUS demonstrated hyperenhancement of the parathyroid lesion. (**C**) Ultrasonography image showing a 21-gauge needle inserted into the parathyroid; the arrows point to the needle tip. (**D**) During the LA procedure, the tissue around the fiber tip became hyperechoic (arrows) under US monitoring, and the hyperechoic area gradually enlarged until the nodule became filled with hyperechogenicity.This LA process was repeated throughout the parathyroid gland until most of gland had been ablated. (**E**) The color Doppler image obtained 1 hour after ablation showed no flow signal in the ablated area (arrows). (**F**) After the procedure had been completed, CEUS showed no enhancement of the ablated area by the contrast agent (arrow).

Endoscopic ultrasonography guided Nd:YAG laser ablation of left liver cancers with super long laser fiber: one case report

Tian-An Jiang, Fen Chen, Guo Tian, Zhuang Deng, Haiwei Bao, Qiyu Zhao

Objective

To evaluate the effectiveness of EUS-guided Nd:YAG laser ablation of left liver cancers.

Methods

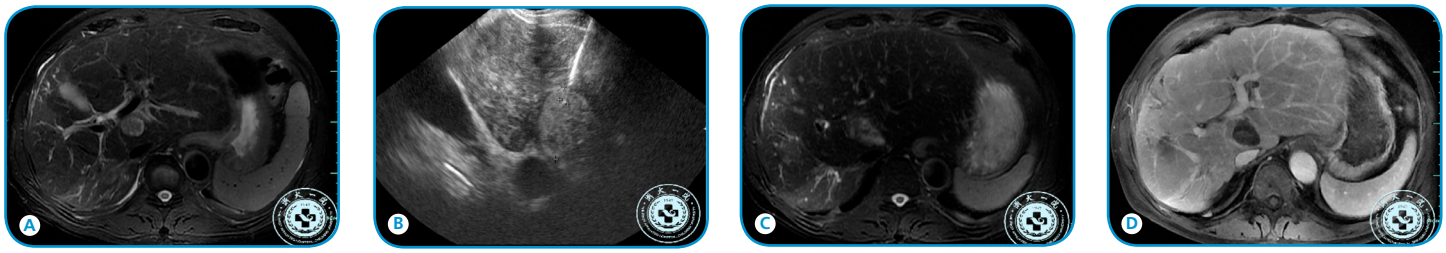
Preoperative MR showed a tumor of 2.3*2.5 cm in size in left liver (**Figure A**). A curved linear array echoendoscope was inserted orally. With the echoendoscope, the deep lesions in left liver were easily visualized from the cardia of stomach, and punctured with a 22-gauge aspiration needle. Then the needle core was withdrawn and the super long laser fiber (3 meters total length) was inserted into needle sheath outside of the pin end within 1 cm. The nidus was ablated by a Nd:YAG laser fiber with a wavelength of 1064nm, which has an output power of 5W for 1800J (Echolaser X4, ESAOTE, Italy). The ablation was not stopped untill hyperechoic area overlaying the entire lesions (**Figure B**).

Results

EUS-guided Nd:YAG laser ablation of left liver cancers were successfully completed. He had a good postoperative condition with no complications. In four-month follow-up, MR indicated that the lesion had complete response (**Figure C and D**).

Conclusions

EUS-guided LA could be a technically effective method in selected patients with left liver tumors. In the future, the safety of this technique need to be confirmed in the larger and prospective trials.



"Aggiornamenti in Senologia" Congress, Naples - September 15-16, 2016

The "Aggiornamenti in Senologia" congress, in which Elesta took part as a sponsor, represented a general update in the breast medicine field. The matters treated ranged from the prevention techniques to the last findings in the diagnostic field and the different possible approaches to breast lesions.

One of the most interesting session was on Thursday morning, when Dr. J. Nori presented the results of his clinical study about the percutaneous laser thermal ablation of breast cancer. After a brief introduction in which Dr. Nori gave a review about the different techniques used to approach breast lesions, he presented the results of his study, started two years ago at Careggi Hospital (Florence, Italy).

The study is currently ongoing and to date has seen the enrolment of about 30 patients with ductal carcinoma in-situ. The treatment is performed in the operating room under local anaesthesia and lasts about 30 minutes, during which the lesion is thermally ablated using laser energy, that can reach the tissue through an optical fiber.

During a two years follow-up all the lesions with a diameter <1.5 cm, controlled using different imaging exams, did not present relapse and all the patients resulted disease-free. No complications were registered.

The presentation arouses a great deal of interest because the results of the study seems to suggest that the percutaneous laser ablation could be a valuable approach for this type of lesions.

"Corso Pratico In Endocrinologia e Diabetologia", Livorno - 14-15 October 2016

(the annual course organized by Dr. Barbaro, Director of Endocrinology Section, ASL 6 Livorno) Participants: 40 physicians

Barbaro (Spedali Riuniti - Livorno), Boni (Azienda Ospedaliera Universitaria Pisana – Pisa), Vitti (Cisanello Hospital - Pisa)

S. Pierotti, Managing Director of Elesta, that attended the Course, reported that one oral session was devoted entirely to thermo ablative techniques of thyroid benign nodule: PLA by C. M. Pacella, Rome; RF by M. De Andrea, Torino; HIFU by P. Trimboli, Lugano. The communications regarding PLA and RF did not reveal any particular problems in the use of the procedures and the results are comparable in terms of treatment duration, nodule volume reduction over time and side effects but RF technique requires a very well experienced doctor in order to obtain good results. Trimboli, reported that the HIFU system is still in experimental stage especially for nodules with a diameter >4cm. Moreover Trimboli listed the HIFU limitations: no nodules next to trachea/skin/carotid; no nodules next to the posterior side of the lobe; no intra-nodular macro calcifications; no alteration of the skin anterior to thyroid; no disease preventing neck hyperextension. During the discussion, emerged the difference, in terms of cost of the disposables, of 50% in less in favour of the PLA.

Papini, Albano Laziale, reported studies on the thermal ablation treatment of micro carcinoma and said that these techniques is in line with the latest trends in not immediately operate the small malignant nodule. Moreover Papini and Pacella explained studies about percutaneous laser ablation of metastatic lymph nodes of the neck and the good results in inoperable patients.

An interesting data emerged from the presentation ("Citologia e ruolo della biologia molecolare") of Basolo, Pisa University: in a prospective study of 37067 cytological analysis of thyroid nodules from 2009 to 2011, **74% of 3156 patients sent to the surgery results having a benign nodule after histology**.

The September session of the International School of Thyroid Ultrasonography and Ultrasound-Assisted Procedures Advanced Course arouses a great interest with doctors coming from all over the world

The last Advanced Course of the International School of Thyroid Ultrasonography and Ultrasound-Assisted Procedures, "Focus on US-guided diagnostic procedures and laser treatment of thyroid lesions" took place on the 29th and 30th of September in Albano Laziale (Rome, Italy) at the Department of Endocrinology and Metabolism and the Department of Diagnostic Imaging and Interventional Radiology of the Regina Apostolorum Hospital.

The main objectives of this annual live educational course are to review the latest news in thyroid ultrasound diagnostic criteria and applications in presence of thyroid nodules and to teach tools for use in daily clinical practice regarding the execution of diagnostic and laser treatment for benign nodules.

The School is fully dedicated to the Ultrasound-Assisted Procedure and Minimally Invasive Therapy to the Thyroid Nodules. The School centre and relevant program are associated to the American Association of Clinical Endocrinologists – AACE (www.aace.com/publications/guidelines) providing state-of-the-art educational opportunities for healthcare professionals.

The course has also been improved thanks to an "hands-on" session, that was introduced during the edition that took place in April 2016 and aroused a great deal of interest in all the attendees. During this session the doctors can interact with a phantom and have the opportunity to test their skills during a practical experience.

Moreover the participants could obtain, under request, a 3-day stage period at Interventional Procedure Unit during year 2017.

Scientific Organisers are:

Dr. G. Bizzarri,
Chief of Department of Diagnostic Imaging and Interventional Radiology, at Regina Apostolorum Hospital , Albano Laziale, Rome, Italy

Prof. E. Papini,
Chief of Department of Endocrinology and Metabolism, at Regina Apostolorum Hospital , Albano Laziale, Rome, Italy

Registration for the course of April 2017 are already underway.

ECHOLASER News

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Sold out for the "International Course of Thyroid Ultrasonography and minimally invasive procedure" in Pisa

Sold out for the **International Course of Thyroid Ultrasonography and minimally invasive procedure titled "Advanced practical thyroid ultrasound course: Focus on US guided Fine Needle Aspiration, percutaneous ethanol injection and laser treatment of thyroid nodules"** that took place at the University of Pisa, Endocrine Unit # 1, Department of Clinical and Experimental Medicine (Pisa, Italy), on 7th and 8th of October 2016.

The main objectives of this course were to review the latest news in thyroid interventional diagnostic criteria and applications in the presence of thyroid nodules and to offer tools to use in daily clinical practice when executing interventional procedures on the neck.

This live educational course put at learners' disposal up-to-date knowledge on thyroid ultrasonography and its novel applications such as ultrasound guided Fine Needle Aspiration, percutaneous ethanol injection and laser treatment for benign nodules.

Three practical sessions arouse great interest and gave participants the opportunity to perform ultrasound guided FNA, percutaneous ethanol injection and laser ablation on substitute subject or other models.

Chairs were:

Dr.ssa Teresa Rago
Endocrine Unit # 1, Department of Internal Medicine, University of Pisa, Pisa, Italy

Prof. Paolo Vitti
Endocrine Unit # 1, Department of Clinical and Experimental Medicine, University of Pisa, Pisa, Italy

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