

PERCUTANEOUS LASER ABLATION OF BENIGN THYROID NODULES

Y. Alexandrov

Y. Patrunov

S. Pamputis

Correspondence:

Yuri Aleksandrov, Department of Surgery of Yaroslavl State Medical University,

Russia, 150000, Yaroslavl, Revolutionnaya, 5 Tel.: +7(4852) 30-56-41 Fax: +7(4852) 72-91-42 Email: yka2000@mail.ru

Yaroslavl State Medical University, Yaroslavl, Russia

INTRODUCTION

Percutaneous laser ablation (PLA) of thyroid lesions now has many supporters. It is the alternative to the conservative management of patients with nodular goiter. Since medical laser equipment has become widely available, this procedure, initially only performed in a research setting, has been introduced into daily clinical practice.

PURPOSE

To detect sonographic and color Doppler peculiarities of thyroid nodules influencing the efficacy and follow-up principles of percutaneous laser ablation (PLA).

MATERIALS and METHODS

Three hundred forty-five thyroid nodules were treated with 1-3 PLA sessions and subsequently sonographically examined every three months within one year. Apparatus: a diode surgical laser device "Lamy" (LLC "Opttehnika", Russia) (pic.1). Modes: wavelength - 1020 nm, radiation power - 2.5 W, optical fiber - 400 μ m in diameter. Indication for PLA was increase sizes of nodules. All nodes were benign according to FNAB.

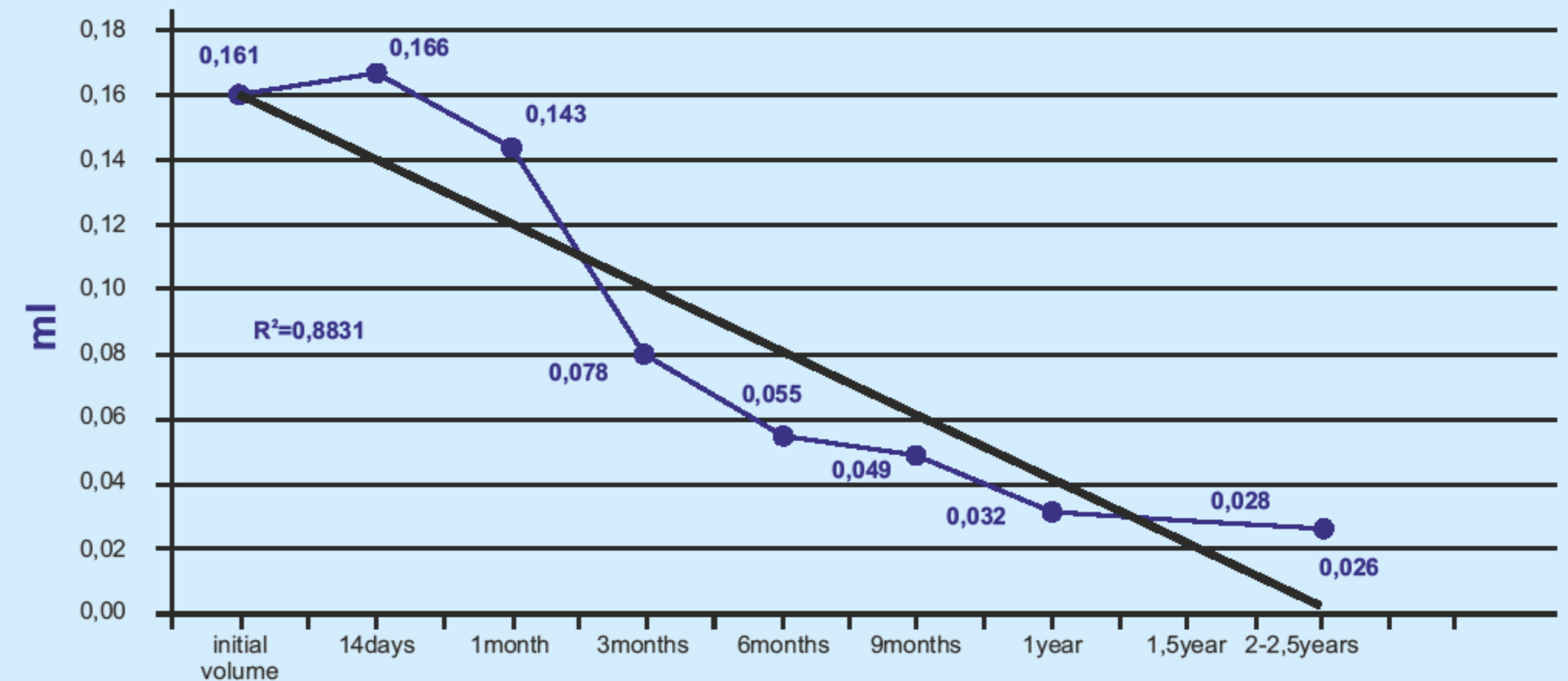


Pic.1. The diode surgical laser device "Lamy".

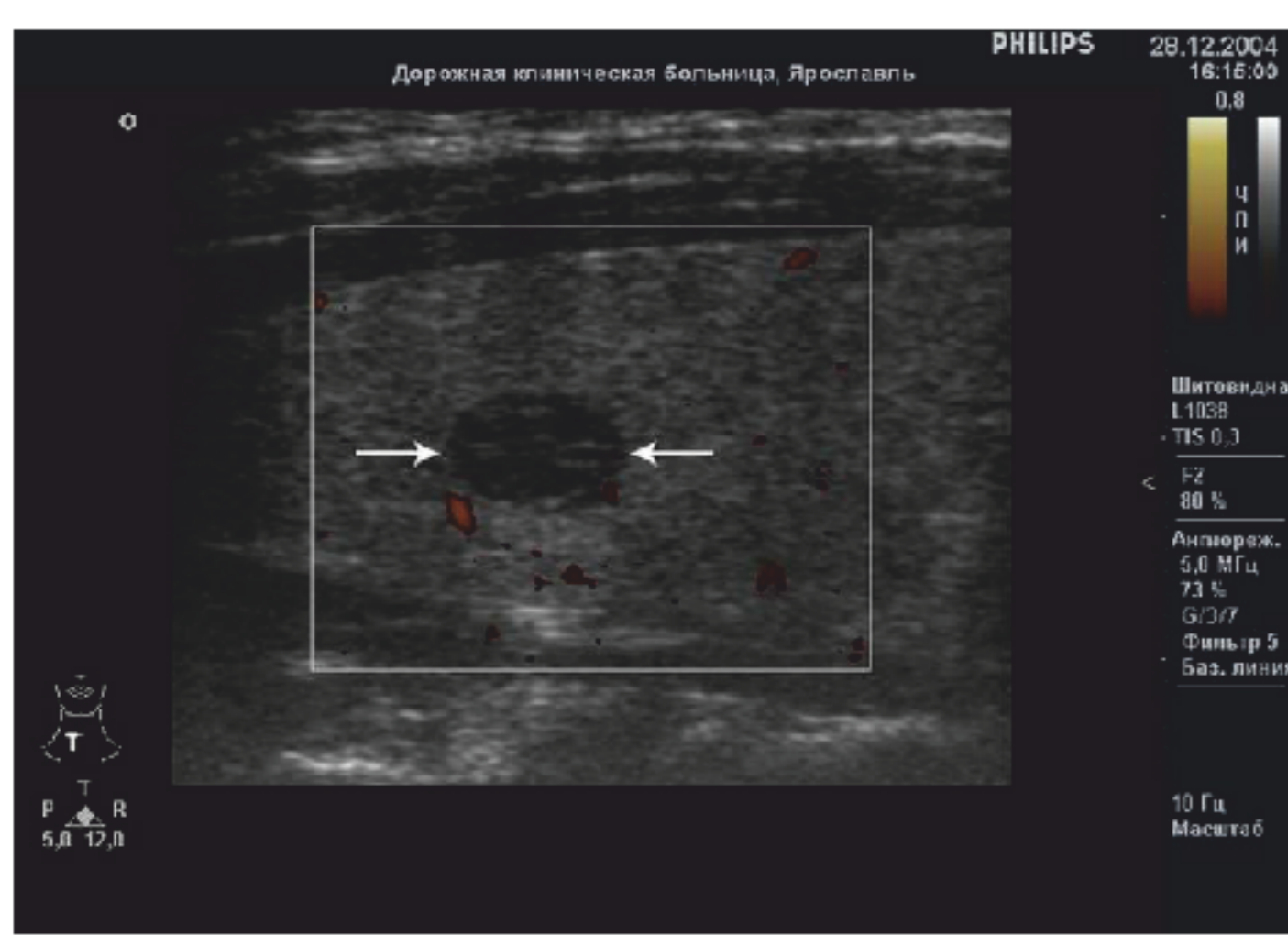
RESULTS

The efficacy of PLA is mainly determined by nodule size, structure and vascularity. The best results after PLA were achieved in solitary solid nodules 20 mm or smaller with low vascularity of peripheral or combined pattern (pic.2). Effectiveness depended on the size of the nodules. Big nodules and hypervascular nodules needed more PLA sessions with increased laser power supply. The nodules with calcification, avascular regions of extremely high or low US-density and big fluid collections showed poor volume regression. Nodules having high density according to US elastography worse decreased. Homogenous surrounding tissue US-pattern allows faster nodule volume decrease comparatively to autoimmune thyroiditis. In 72% nodules reduced their volume more than to two times and 24% disappeared (pic.3a,3b). Avascular and hypoechoic nodules in four week period after PLA show further volume regression; persisting vascularization suggests a second PLA session (pic.4a,4b,4c,4d). Nodules decreased in size. This was connected with a rebuttal of scar tissue, formed in the area of laser exposure (pic.5a,5b).

Pic.2. Nodule sizes reduction after PLA.



Pic.3. The change in the nodule size three months after PLA.

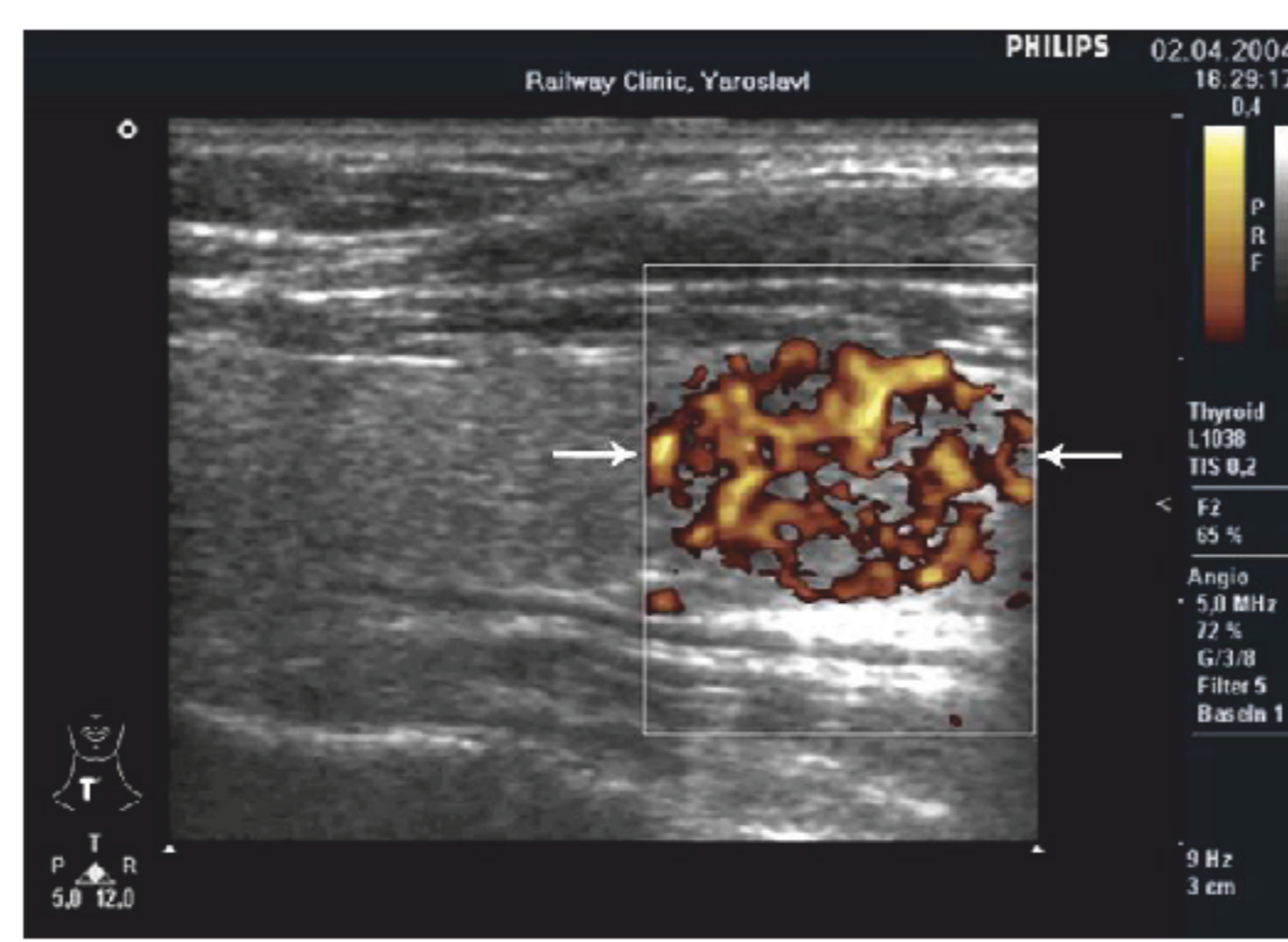


Pic.3a

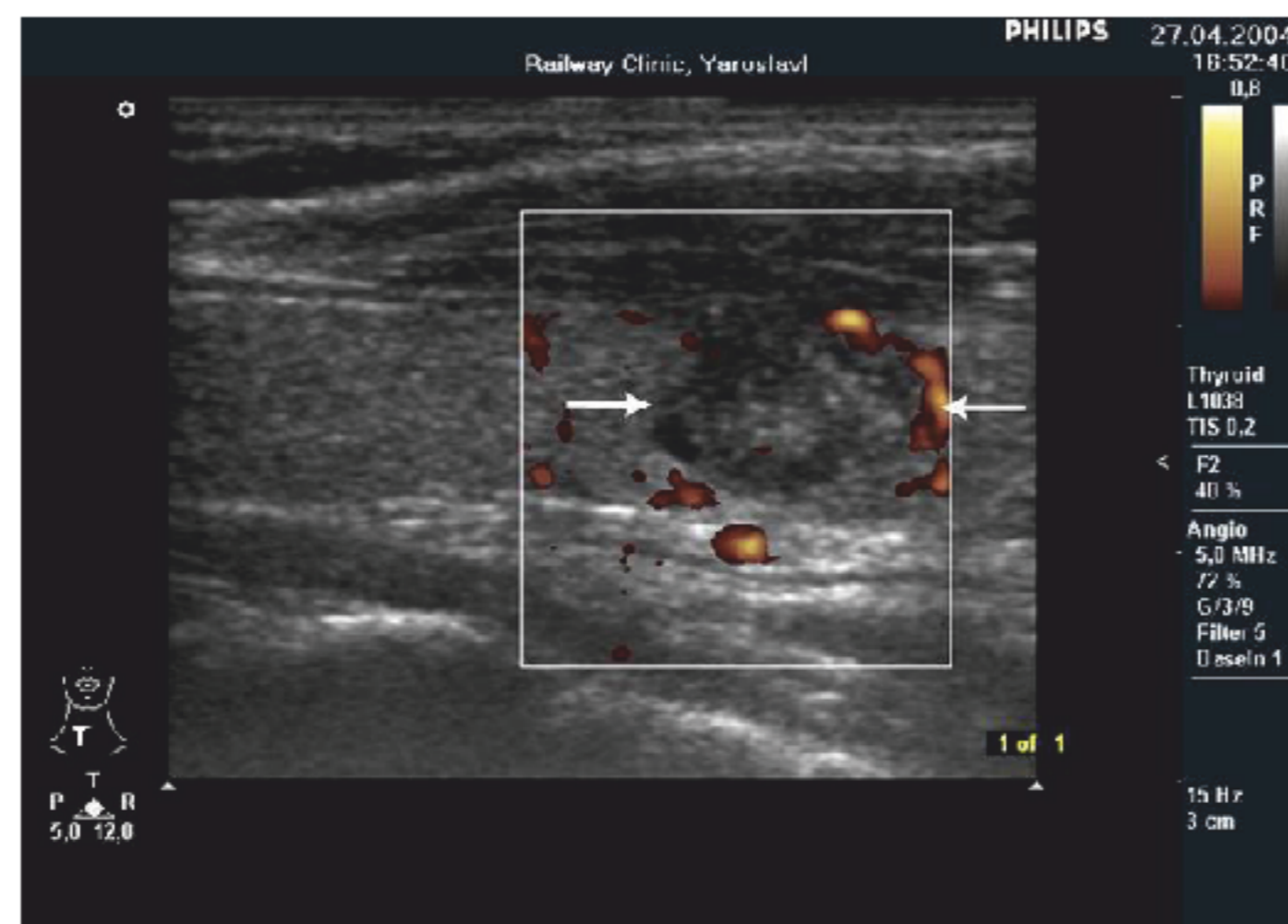


Pic.3b

Pic.4. Nodule vascularity change after PLA.



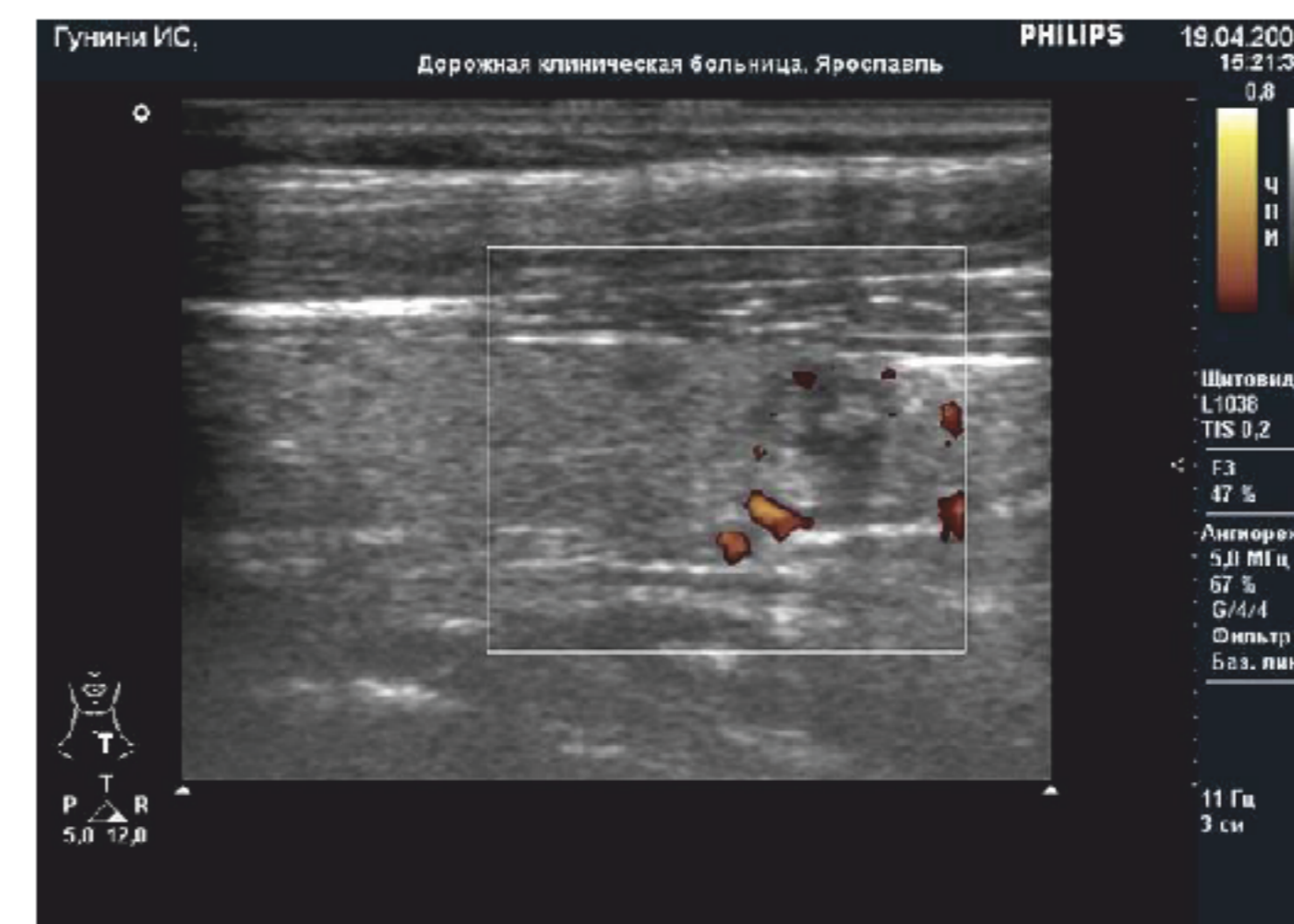
Pic.4a



Pic.4b

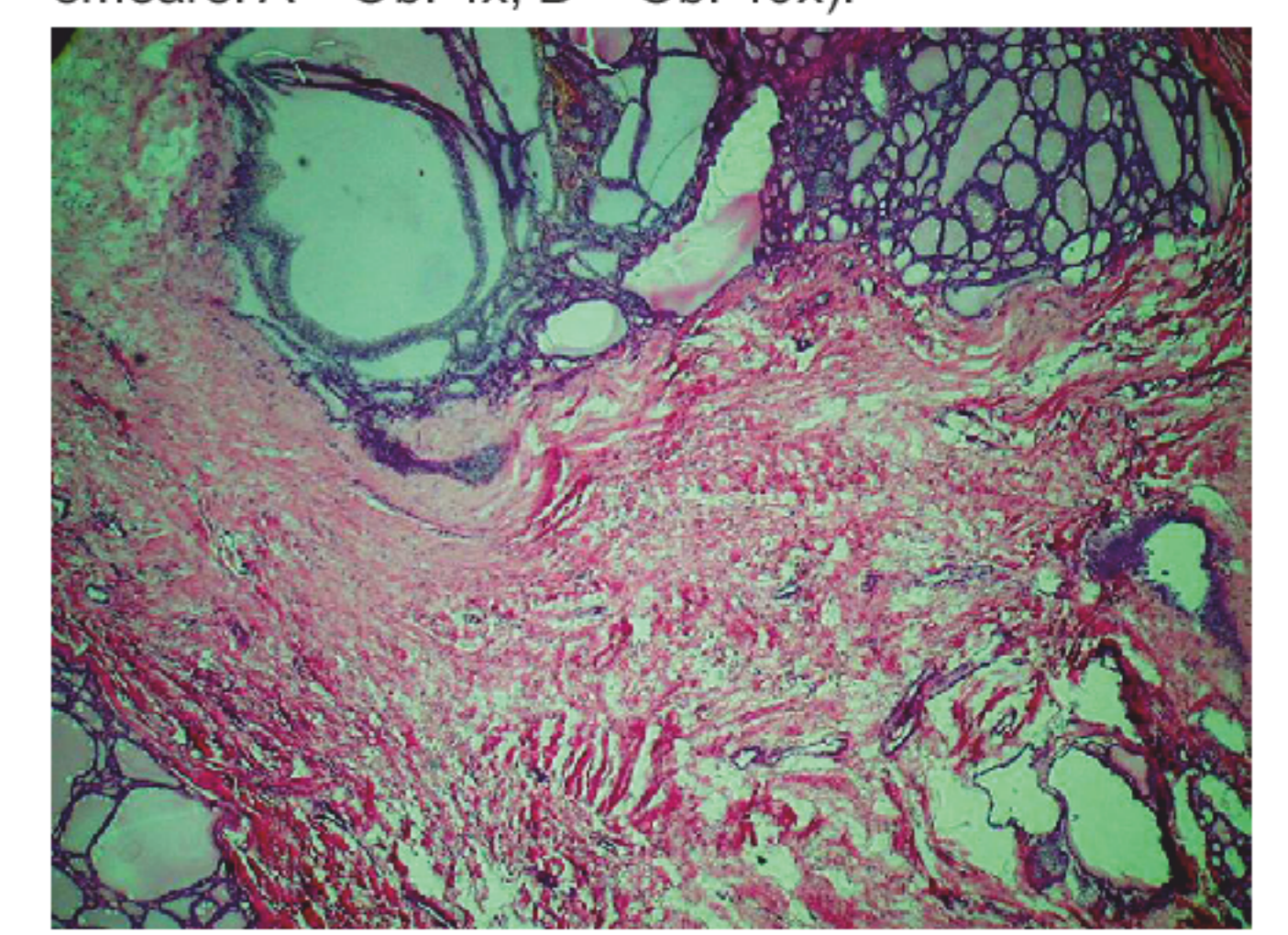


Pic.4c

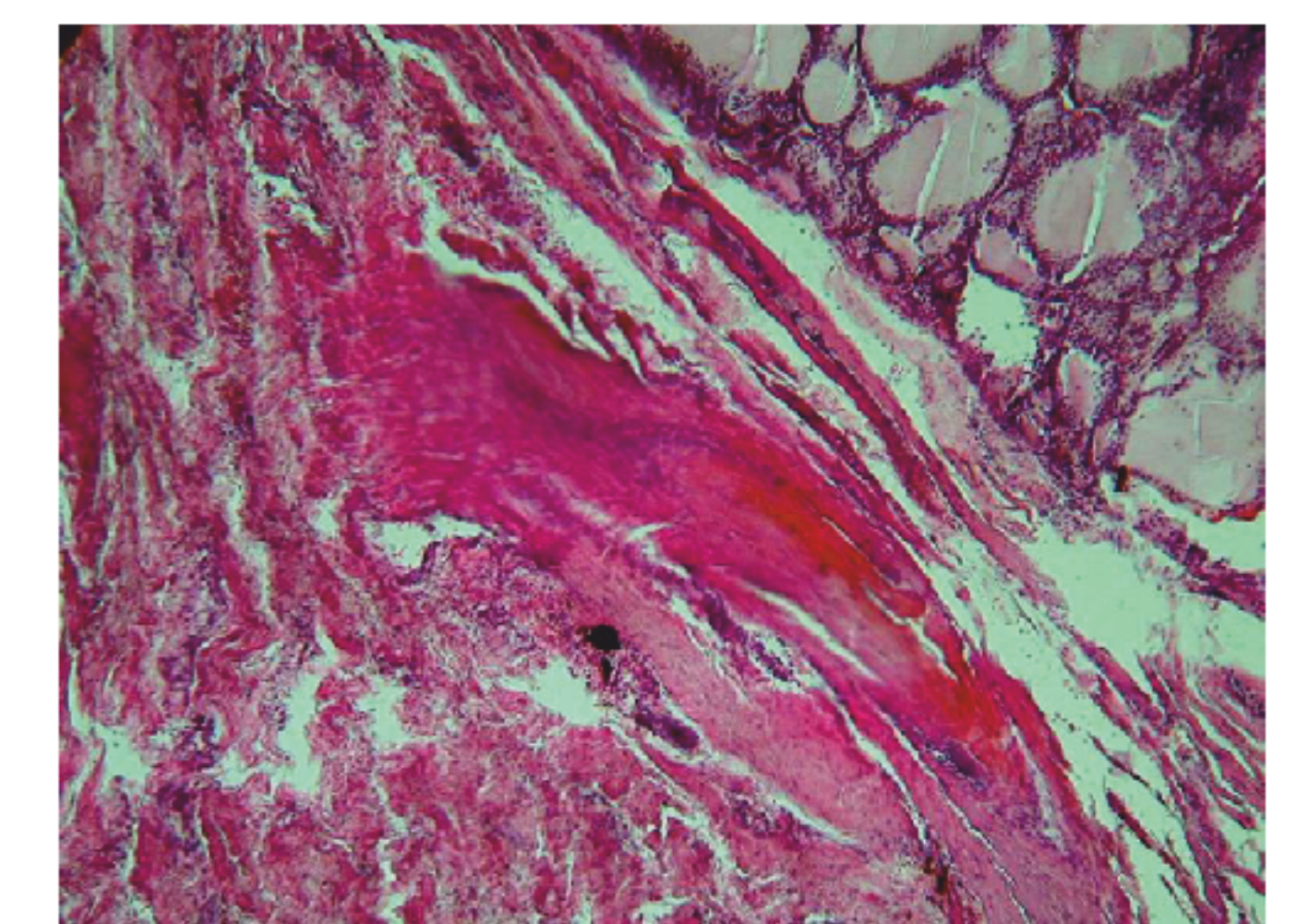


Pic.4d

Pic.5. Thyroid nodule (10 months after laser ablation): diffuse fibrosis between thyroid follicles. (hematoxylin and eosin stained smears. A - Ob. 4x, B - Ob. 40x).



Pic.5a



Pic.5b

CONCLUSION

US-guided PLA is effective in benign thyroid nodules and may be alternative to conservative methods. Grey-scale and color Doppler sonography is the leading follow-up modality for patients after PLA. The best period of control for effectiveness of treatment was ninth month after PLA.

