

Application of elastography in assessment of different benign thyroid lesions in children and adolescents.

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Introduction:

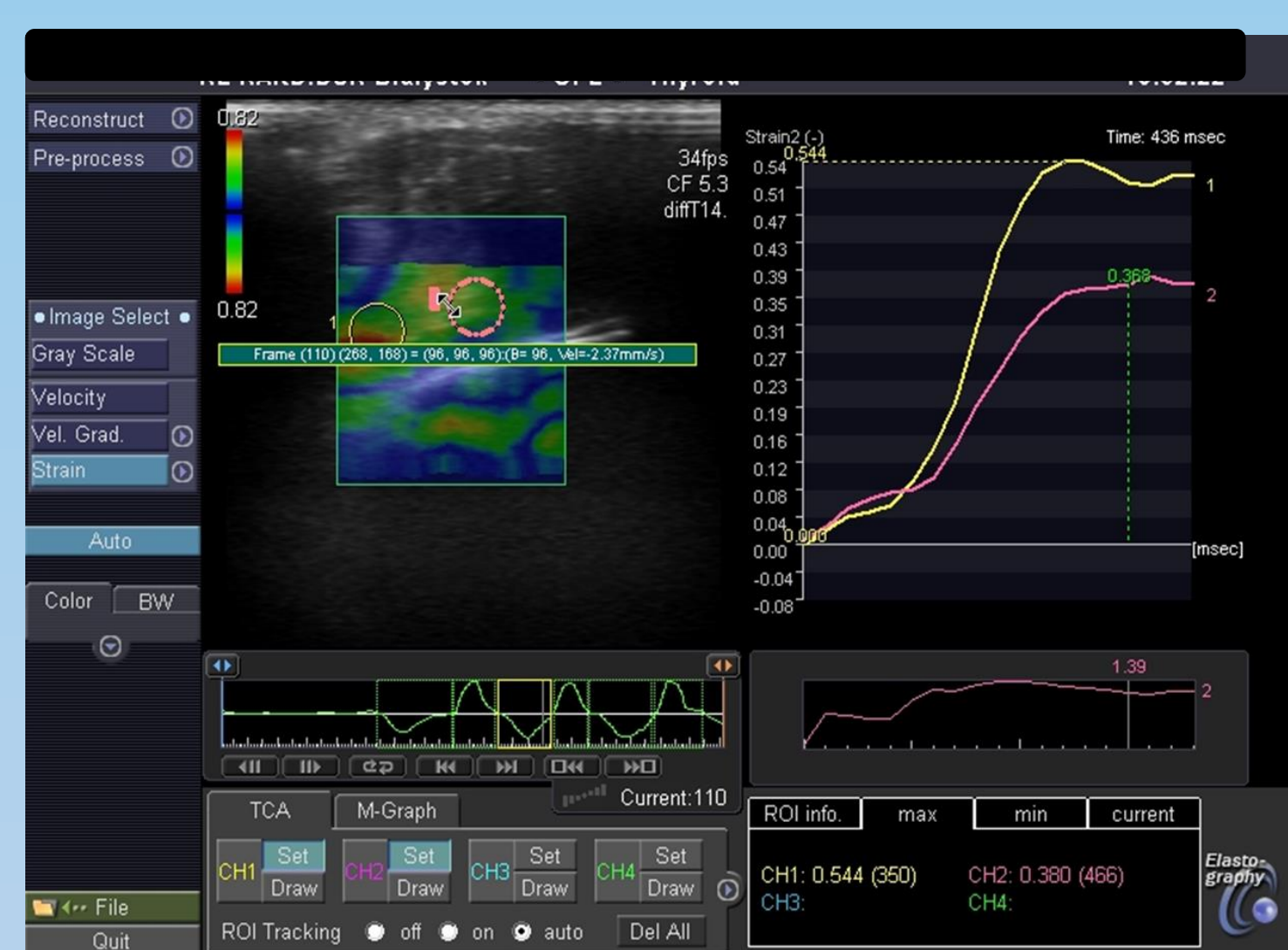
Elastography is a noninvasive imaging technique based on estimation of the tissue flexibility. There are two methods of elastography: Static Elastography and Shear Wave Elastography. Scale of deformation under pressure is presented as a colourful map – elastogram, where red colour signify soft tissues, green colour signify middle tough tissues and blue colour signify tough tissues. The result of examination may be presented as ROI1/ROI2 index. In adult patients decreased flexibility is characteristic for malignant lesions (except follicular thyroid carcinoma) and benign lesions are flexible in elastography [1,2,3].

Aim of the study:

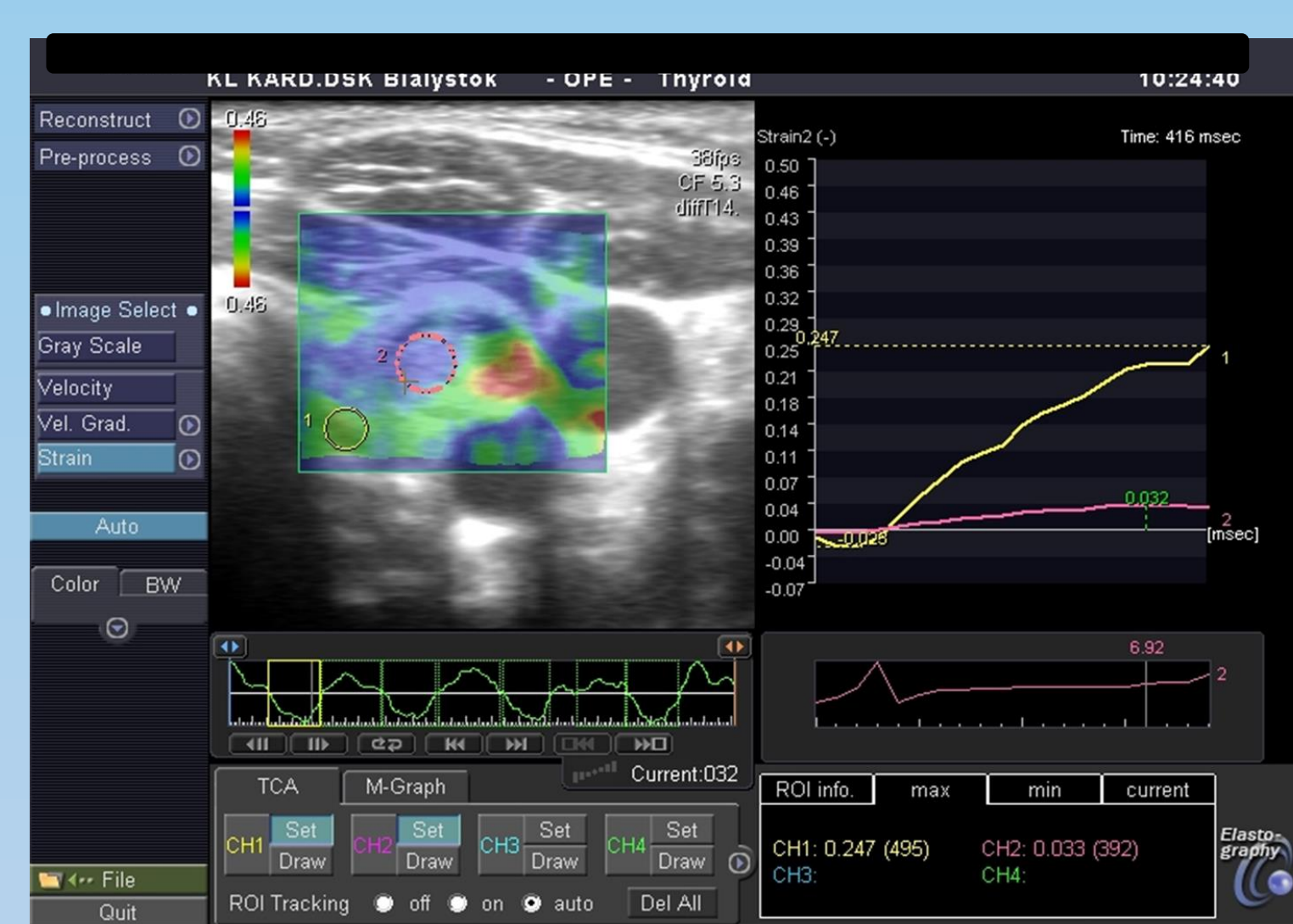
The aim of our study was to evaluate the deformation in elastography of different benign lesions.

Materials and methods:

In a prospective study between February 2013 and December 2017 112 lesions in thyroid were examined. We compared ROI1/ROI2 index with results of fine needle aspiration cytology (FNAC) to determine any correlations. Elastography parameters were acquired with Toshiba Aplio MX SSA-780A system and analyzed while comparing of the stiffness of ROI 1 (of healthy tissue) to ROI 2 (of the nodule).



Soft thyroid nodule in elastography, ROI1/ROI2 1,39



Hard thyroid nodule in elastography, ROI1/ROI2 6,92

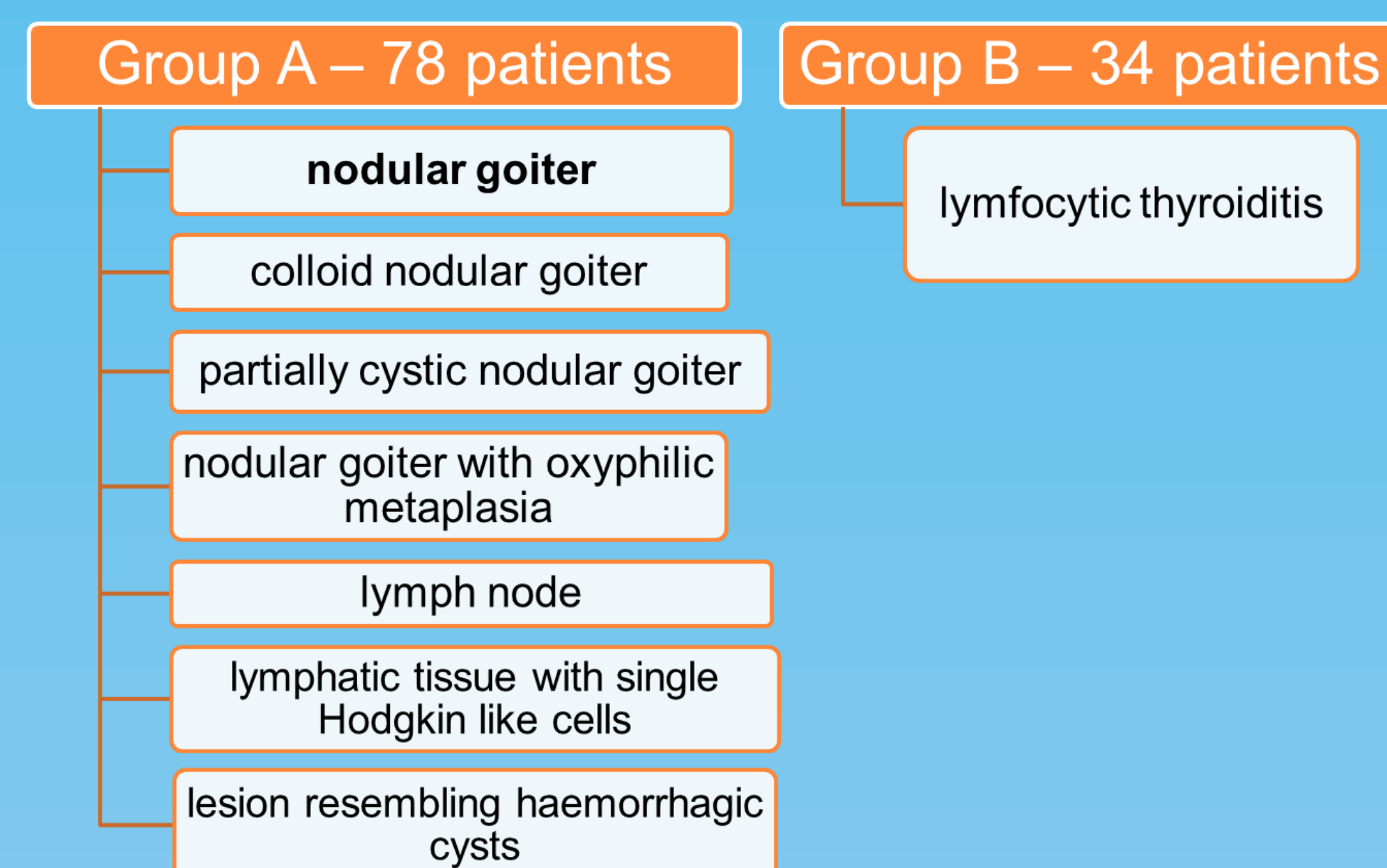
Diagrams of the deformation:

ROI for healthy tissue

ROI for the nodule

Results:

All 112 patients were benign in cytological examination. In 34 patients with lymphocytic thyroiditis ROI1/ROI2 index was 2,47 with SD 1,42. In 78 patients with nodular goiter, colloid nodular goiter, nodular goiter with oxyphilic metaplasia, partially cystic nodular goiter, lymph node, lymphatic tissue with single Hodgkin like cells, lesion resembling haemorrhagic cysts ROI1/ROI2 index was 3,55 with SD 2,99 and it was statistically significant higher than in patients with lymphocytic inflammation ($p = 0,048$).



	Mean – group A	SD – group A	Mean – Group B	SD – group B	P
Age	15,4189	2,3987	15,05556	2,93690	0,490643
Size 1	7,8675	5,1632	6,52000	2,25884	0,171751
Size2	5,6143	3,6336	4,86667	1,88539	0,287049
Strain ratio	3,5488	2,9930	2,47000	1,42300	0,047778
TSH	2,2543	1,3631	3,42726	2,47763	0,008049
ft4	1,4611	0,6521	1,45364	0,21695	0,971394

Conclusions:

Our results suggest that all benign thyroid lesions in children were usually soft in elastography. Moreover the lymphocytic thyroiditis in children seems to be more soft than the nodular goiter.

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