Evaluate aspects of sonographic cervical lymph nodes and thyroid bed recurrences after complete thyroidectomy for thyroid malignancies

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Aims and objectives

Malignant thyroid tumors have increased in incidence, particularly by improving methods of detecting image. By its uncertain behavior, there are controversies regarding the surgical approach and follow-up after surgery.

Thyroid nodules appear in up to 50% of the population older than 50 years of age. Although only 5% of these thyroid nodules are malignant, it is still necessary to carefully screen benign nodules to determine which should be subjected to more rigorous diagnostic investigation.¹

Differentiated malignant thyroid tumors have good prognosis, unlike medullary and anaplastic carcinomas. However, 5 - 40% of patients have persistent or recurrent disease, most often in the lymph nodes or the central compartment side ipsilateral but also in the remaining thyroid tissue or contralateral lymph nodes.²

Recurrence and persistence of thyroid tumors in low-risk patients are rare, and the follow-up of these patients still controversial.³ Are considered to evaluate the risk of recurrence:

- Low risk: complete resection, well encapsulated tumor without extra-thyroid invasion, without local or distant metastases, absence of aggressive histologic type, absence of vascular invasion;

- Intermediate risk: extrathyroid microscopic invasion, metastatic lymph nodes, ¹³¹I uptake outside the thyroid bed and aggressive histology (carcinoma tall cell, insular, columnar), or vascular invasion and;

- High risk: macroscopic tumor invasion, incomplete tumor resection and distant metastases.⁴

Papillary thyroid carcinoma has a high propensity for invasion of cervical lymph nodes, the incidence ranges from 30 to 90%, being higher in systematic surgery with excision of the cervical lymph nodes. Medullary carcinoma (50%) and anaplastic carcinoma (40%) also have a high tendency to invade lymph nodes, while the less common follicular carcinomas (10%).

The sonographic features of cervical metastatic carcinoma of the thyroid nodules are similar to tumors of the head and neck and include round shape, loss of nodal hilum, peripheral vasculature, necrosis and signs of invasion. Besides these features, lymph nodes of papillary carcinoma present calcifications (50-69%), increased echogenicity (87%) and cystic areas (20%). Sometimes, this latter feature may be the sole dominant factor in certain metastatic nodules, which are shown fully cystic. Nodes of papillary carcinoma are often small, with accuracy of ultrasonography 89%.⁵,⁶
Occult lymph nodes are common (40%) even in patients with small papillary thyroid carcinoma (<1.5cm). However, most involve subclinical micrometastases (<2mm). A French study recently reported that lymph node metastasis are common even in small papillary carcinomas (<2cm, T1) without suspicion of lymphadenopathy on preoperative ultrasonography. The authors report that 45% of plants and 47% of the lateral lymph nodes have occult metastases when compared to the central prophylactic cervical dissection.\textsuperscript{7} Other articles report 60-90% of microscopic or macroscopic lymph node metastasis in patients with papillary carcinoma.\textsuperscript{8}

Ultrasound assessment of neck lymphadenopathy can be difficult as sometimes the same pattern is seen both in inflamatory (specific or not) and neoplastic diseases (lymphoproliferative or metastatic).\textsuperscript{9}

Although differentiated thyroid cancer is typical an indolent disease with a high rate of cure, recurrence is common (15-30% of patients), even in early-stage disease. These high rates of recurrence have resulted in the widespread adoption of intensive posttherapy surveillance algorithms. Normally we combine with serial serum thyroglobulin measurements and cervical ultrasonography (US).\textsuperscript{10}

The aim of this study was to evaluate the sonographic aspects of cervical lymph nodes and store in recurrences after complete thyroidectomy for thyroid malignant thyroid tumors. The study was prospective, being evaluated 95 patients submitted to total thyroidectomy with or without cervical emptying from the outpatient clinic of the Department of Head and Neck Surgery HCFMUSP. The evaluation was performed through cervical ultrasonography.
Methods and materials

We studied 95 patients who had or would have undergone total thyroidectomy with or without neck dissection, prospectively. The research was conducted at the Hospital das Clinicas (HC) University of São Paulo. Institutional review board approval was obtained for this study.

Sonographic images of the cervical lymph nodes of patients in this study were obtained from B-mode and color Doppler amplitude. The performance of the test was standardized as follows: patient supine with a roll under the shoulders and neck in hyperextension of approximately 45°. The devices were pre-adjusted for thyroid ultrasound. The transducer unit was lightly resting on the skin without pressuring her to not interfere in the evaluation of the vascularity of the parenchyma due to compression of the vessels.

In the presence of cervical lymph nodes, they were classified according to location (according to the levels I through VI), number (if grouped or isolated), form, size, echotexture / echogenicity, central echogenic hilum, cortex, necrosis and / or internal bleeding, contours (extracapsular spread) and presence of calcifications and standard vascularity.

We had confirmed the suspect's nodes with ultrasound guide fine needle aspiration biopsy (FNAB) and the same serum and lymph node thyroglobulin and calcitonin, as the type of tumor.

The pathology reports were analyzed to determine the incidence of metastatic disease at each level of the neck. We also had information on postsurgical and postradioactive iodine serum thyroglobulin levels, neck control, follow up, and current disease status.
Fig. 1: US (transverse view) shows heterogeneous and hypoechoic elongated lymph node metastases with microcalcifications in left lateral neck (level IV).

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Fig. 2: US (transverse view) shows heterogeneous and hypoechoic elongated lymph node metastases in left lateral neck (level IV).

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Results

Ninety five patients were indentified: 77 women (81%) and 18 men (19%). The mean age in this study was 45 years, and among the recurrent patients was 45 years.

Among these patients, 75 patients had Papillary Cancer (79%), 12 patients Medular Cancer (12,6%) and 8 patients Folicular Cancer (8,4%).

The rate of recurrence in cervical lymph nodes after thyroidectomy for thyroid cancer was 10%. The most significant features on ultrasonography gray-scale on metastatic diseases were shape, microcalcifications and hemorrhagic necrosis and in Doppler ultrasound aspect was peripheral and irregular vascularization.

Vascularization in malignant lymph nodes may result from angiogenic factor tumor cell, or may decrease as a result of involvement or compression by tumor tissue. Thus, capsular lymph vessels are recruited to the vascular supply of the tumor, resulting in peripheral vascularization and segments vessels distributed, or even combination of the two patterns.

We analyzed 95 patients before and after total thyroidectomy with lateral dissection. Of these patients, 16% had recurrence in cervical lymph nodes.

There was no statistical difference in sonographic findings between recurrent tumors and nonrecurrent lesions (P>0.05).
**Fig. 3:** US (transverse view) shows heterogeneous and hypoecholic elongated lymph node metastases with cystic change (necrosis) in right lateral neck.

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Fig. 4: US (transverse view) shows heterogeneous and hyperechoic elongated lymph node metastases with focal cystic change in lateral neck.

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Fig. 5: US (transverse view) shows heterogeneous and hypoechoic elongated lymph node metastases with cystic change (necrosis) in left lateral neck.

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Fig. 6: Color Doppler image shows irregular intranodular vascularization in lymph node metastase in left lateral neck (level IV)

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**Fig. 7:** Color Doppler image shows irregular intranodular vascularization in lymph node metastase in right lateral neck (level IV)

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**Fig. 8:** Color Doppler image shows irregular intranodular vascularization in lymph node metastase in right lateral neck (level IV)

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**Fig. 10:** Schematic lateral oblique neck showing the anatomical location of the main groups of lymph nodes of the neck.

**Fig. 9:** Color Doppler image shows irregular intranodular vascularization, focal cystic change (necrosis) in lymph node metastase in right lateral neck (level II)

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Conclusion

We concluded that the presence of these aspects in ultrasound's follow-up of cervical lymph nodes requires an effective investigation with US-FNAB.
Personal information

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References


