CLINICAL SURGERY INTERNATIONAL

VOL 6

Surgery of the Thyroid and Parathyroid Glands

EDITED BY

EDWIN L. KAPLAN MD FACS

CLINICAL SURGERY INTERNATIONAL

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Preface

In recent years, many significant scientific advances have been made in the fields of thyroid and parathyroid diseases. Very frequently, these new basic findings have been translated into better diagnostic techniques and into safer and more effective therapy for patients with these disorders. This book is designed to keep the practicing surgeon or physician abreast of these latest developments and innovations.

To achieve these goals, I have invited an outstanding group of clinician-scientists from many parts of the world to participate in writing this book. The contributors include physicians, endocrinologists, nephrologists, oncologists and nuclear medicine specialists, as well as surgeons. All share a common interest and expertise in these fields.

I am very pleased with the results of their efforts, and I thank each author for his excellent contribution. The sum of their experience, I feel, represents the latest 'state of the art' in the treatment of patients with surgical diseases of the thyroid and parathyroid glands.

I would be remiss if I did not thank my former Mentors — Drs Jonathan Rhoads, Gerald Peskin and Claude Arnaud — for their inspiration and guidance.

Finally, I thank Ms Joey Czerwonka for her tireless assistance.

Chicago, 1983 E.L.K.

DEDICATION

I dedicate this book to my wife, Sara, to my children, Abe and Sharone, and to our parents, Dr Joseph and Beatrice Kaplan and Mrs Rachel Peled.

I am indebted to the members of *The Nathan and Francis Goldblatt Society for Cancer Research,* Chicago, Illinois, USA who have supported my research endeavors over the years.

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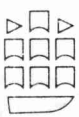

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1 *Preoperative evaluation of the solitary thyroid nodule*

P-O. GRANBERG, B. HAMBERGER, G. LUNDELL, T. LÖWHAGEN, and J-S. WILLEMS

Introduction

A solitary nodule is a discrete, clearly defined lump in the thyroid gland which is diagnosed by palpation. The surrounding thyroid tissue is usually normal but now and then diffuse enlargement of the gland can be found. On the basis of its appearance on the thyroid scintigram a nodule can be hot (increased radionuclide uptake), neutral or cold. Only some 5% of solitary nodules are hot and few of these cause hyperthyroidism. Hyperfunctioning nodules are predominantly observed in endemic goitre regions among elderly patients. A hot nodule is almost never malignant.

Approximately half of the nodules that appear to be solitary on palpation prove at surgery to be one of several nodules in a non-toxic colloid goitre. Furthermore, histopathological investigation of the solitary thyroid nodule most often reveals that it is part of a colloid goitre. The nodule can also be a localised chronic lymphocytic thyroiditis or a benign or a malignant tumour.

Solitary nodules are not uncommon and their frequency in adults have been estimated at 1–5% (Tunbridge et al 1975, Thompson et al 1978). Cold nodules are some seven to eight times more frequent than hot or neutral ones (Psarras et al 1972). Most patients with solitary nodules are asymptomatic and those who are investigated probably comprise a selected population. Solitary nodules occur three to four times more often in females than in males and most lumps examined occur in patients aged between 30–50 years.

Solitary nodules are rare in children. The incidence of thyroid cancer presenting as a solitary nodule in patients below 25 years of age is about 50%. In patients under 15 years of age this risk can be as high as 75% (Harness et al 1971). Although anaplastic thyroid cancer is rare it should always be suspected in patients over 60 years of age with rapidly growing nodules. The solitary nodule is more often malignant in males.

External radiation therapy to the neck region increases the risk of thyroid malignancy. Whether the latent period between the radiation exposure and the diagnosis of the tumour is influenced by age, remains controversial.

In patients with medullary thyroid carcinoma a family history can be of importance. Such patients should be screened for multiple endocrine neoplasia

(MEN 2), for it is essential to confirm the possible existence of a phaeochromocytoma before neck exploration.

Pain is rarely a sign of malignancy. Rapid growth of a nodule in younger patients is usually caused by a haemorrhage in a degenerative part of a colloid goitre. Pain is often associated with subacute thyroiditis. However, rapidly growing anaplastic giant cell carcinoma may also cause pain, and some of the patients with this type of malignancy can initially present with signs identical to those of subacute thyroiditis.

Hoarseness is usually observed in patients with advanced thyroid cancer but can sometimes also be caused by benign, large nodules compressing the recurrent laryngeal nerve.

The most common diagnostic issue of thyroid nodules concerns whether or not it is malignant. The aim of the present chapter is to present our management of these patients with special reference to the advantage of applying aspiration biopsy cytology (ABC).

Diagnostic procedures

Physical examination

Careful physical examination of the neck remains a fundamental procedure in evaluating the solitary thyroid nodule. The muscles of the neck must be relaxed during palpation. The harder and firmer the nodule, the greater the risk of malignancy. A soft and even a cystic lesion, however, can harbour a malignant tumour, whereas a rock-hard nodule may only be the expression of a degenerated and calcified colloid goitre.

Enlarged, firm and rubbery lymph nodes in the neck or fixation of the nodule to surrounding tissues increases the likelihood of malignancy. These nodes are usually positioned medial and/or lateral to the sternocleidomastoid muscles, but nodes can also be found in the supraclavicular fossa. Spread of tumour to the submandibular and the submental regions is seldom observed.

Laboratory tests

No blood tests are specific for the diagnosis of a malignant thyroid tumour except for raised serum calcitonin in medullary carcinoma. Elevated levels of serum thyroxine and/or tri-iodothyronine can be observed in patients with hot nodules.

Determination of the levels of thyroglobulin and of thyroid antibodies are of no practical value in the evaluation of a solitary nodule. The serum thyroglobulin level can be elevated in both benign and malignant thyroid disorders. However, thyroglobulin level is useful in monitoring residual or recurrent malignancies after total thyroidectomy.

Aspiration biopsy cytology (ABC)

Fine-needle aspiration biopsy allows sampling of microbiopsies which are smeared on glass slides for cytological diagnosis. The availability of the cytological diagnosis within minutes gives aspiration biopsy cytology a special place as a

preoperative method for investigation of all tumours and tumour-like conditions (Löwhagen et al 1981).

It is our impression that ABC is the method of choice in evaluating a palpable disorder in the thyroid. The method is routinely used in several medical centres all over the world (Walfish et al 1977, Miller at al 1981) but is looked upon with great scepticism in others. We want, therefore, to discuss this diagnostic tool in more detail, for we believe that many shortcomings of the method are due to technical failure.

Technique of fine-needle aspiration biopsy

Fine-needle aspiration biopsy is an office procedure not requiring anaesthesia, and is well accepted by patients. The equipment required (Fig. 1.1) consists of needles with an external diameter of 0.6–0.7 mm (24–22 gauge) attached to a 10 ml

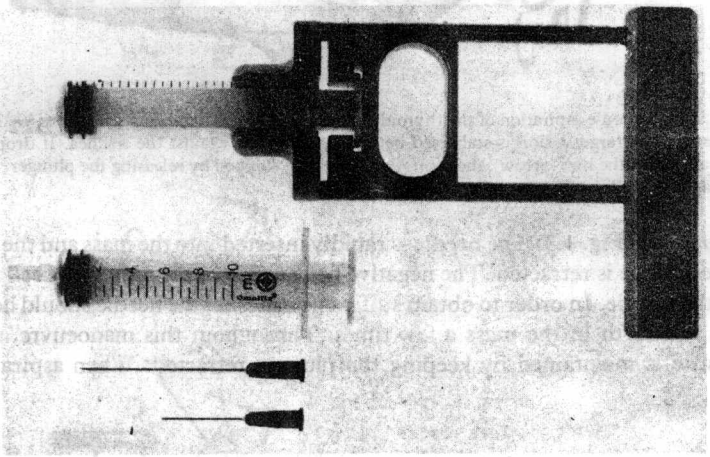

Fig. 1.1 Equipment for transcutaneous aspiration biopsy. CAMECO® syringe holder mounted with a 10 ml disposable syringe. Hypodermic needles of 0.6 and 0.7 mm external diameter. (Syringe holder manufactured by CAMECO, Box 5519, Täby, S-18305, Sweden. US retailer: Precision Dynamics, 3031 Thorndon Ave, Burbank, California 91504)

disposable syringe. A special handle (of the CAMECO® type) into which the syringe fits, permits a single-handed manoeuvrability and leaves the other hand free for stabilisation of the target lesion to be aspirated (Fig. 1.2).

Diagnostic results of ABC are basically determined by the quality of the cell samples. Every effort must therefore be made to optimise all steps of the technique in order to obtain satisfactory specimens.

Palpation of the thyroid gland prior to aspiration is best done with the patient supine, with a pillow supporting the neck. The physician should stand on the opposite side of the lobe to be aspirated. The skin over the site is cleaned with an antiseptic and the suspected tumour is then fixed in a position suitable for sampling.

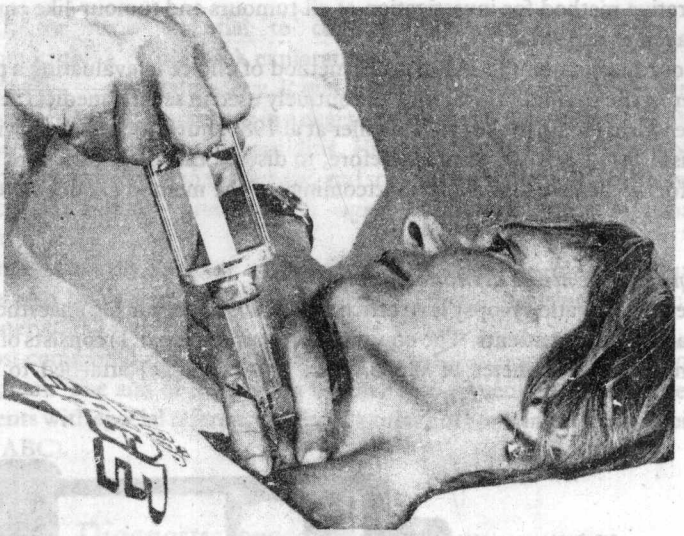

Fig. 1.2 Fine-needle aspiration of the thyroid, showing the single-hand grip with the CAMECO® apparatus. The target lesion is stabilised between two fingers against the trachea. If droplets of blood appear in the hub (arrow), the aspiration should be stopped by releasing the plunger. (From Löwhagen & Willems 1981)

Sampling (Fig. 1.3) The needle is rapidly inserted into the mass and the plunger of the syringe is retracted. The negative pressure causes aspiration of cell material into the needle. In order to obtain sufficient material, the needle should be moved back and forth in the mass a few times. Throughout this manoeuvre, negative pressure is maintained by keeping the plunger retracted. When aspiration has

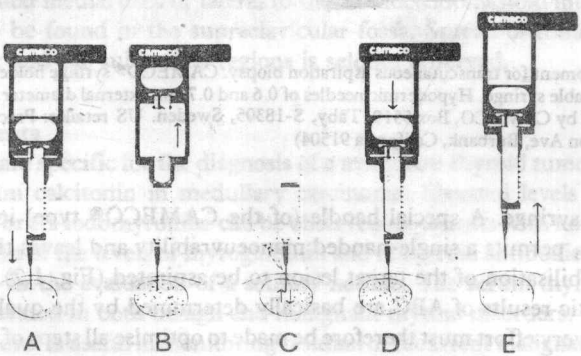

Fig. 1.3 Sampling procedure.
A. The needle introduced into the lesion with the plunger in the resting state
B. The plunger retracted, creating suction in the needle
C. Backward and forward movements under constant suction with the needle tip in the lesion, possibly directed at different areas. In general a few seconds of aspiration is sufficient
D. Before removing the needle the plunger must be released to prevent aspiration into the syringe
E. The needle is then withdrawn and detached from the syringe (From Löwhagen et al 1981)