

# Hypertrophic scar – associated ultrasound aspects after thyroidectomy

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## ABSTRACT

Scar is part of wound healing and hypertrophic aspects as well as keloids are pathological formation of a scar. Their appearance is seen post-operative, post-trauma and the consequences are more than cosmetic depending on location, for instance at joints functional impotence is associated. A scar formation involves activation of matrix enzymes, matrix response, local inflammation and fibroblast intervention as well as local cytokines and growth factors action. Our purpose is to introduce to cases of females who developed hypertrophic scars after thyroidectomy in addition to local swelling as revealed by neck ultrasound. The paper is two cases series report. The hormonal assays and ultrasound aspects are provided. A 30-year female with Basedow disease had one month after thyroidectomy TRAb of 2.4 U/l while TSH was 1 of under daily 100 µg of levothyroxine. The subject presented a post-operative hypertrophic scar in addition to the following ultrasound aspect: right area with an inhomogeneous structure of 1/1.2/4 cm, left area of 1.4/1.7/4 cm, with multiple images with posterior echo and intense local edema. This is a 44-year female referred for total thyroidectomy (for large goiter). The subject did not develop any peri-operative complication. The histological report showed chronic autoimmune thyroiditis background of focal type in addition to nodules of colloid and cystic adenomatosis with hyperplastic epithelium. One month later TSH was normal under levothyroxine. The subject presented a post-operative hypertrophic scar in addition to ultrasound aspect of edema in association with inflammatory lymph nodes at lateral cervical level of 0.6/0.2 cm maximum diameter. It is still a matter of debate to classify the high risk patients for developing post-thyroidectomy scars.

**Keywords:** hypertrophic scar, keloids, thyroidectomy

**Abbreviations:** FreeT4 = thyroxine, TSH = thyroid stimulating hormone, TRAb = TSH receptor antibody

## INTRODUCTION

Scar is part of wound healing and hypertrophic aspects as well as keloids are pathological formation of a scar (1). Their appearance is seen post-operative, post-trauma and the consequences are

more than cosmetic depending on location, for instance at joints functional impotence is associated (1). Hypertrophic scars are distinct from keloids which are more severe (1). Hypertrophic aspects are more frequent after burns or skin trauma (1). A scar formation involves activation of matrix en-

zymes, matrix response, local inflammation and fibroblast intervention as well as local cytokines and growth factors action (1). Scar itself is a negative consequence of a skin aggression due to high temperature, trauma, cuts, regardless that may be iatrogenic (related to a surgical act) (2). Hypertrophic pattern is due to fibroblasts/myofibroblasts contraction and increased matrix deposits and collagen formation (2). This type of skin response is actually a fibro-proliferative condition of the derma (3). A part from inflammation mediators and local growth factors, recently peptide have been proven to play an active role even a therapeutic one as activator of normal fibroblast response (3). Local fibrosis causing aesthetic and functional damage increases the economic burden (4). Anarchic activation of matrix metalloproteinases is a contributor to hypertrophic scar, too (5).

### AIM

Our purpose is to introduce to cases of females who developed hypertrophic scars after thyroidectomy in addition to local swelling as revealed by neck ultrasound.

### METHOD

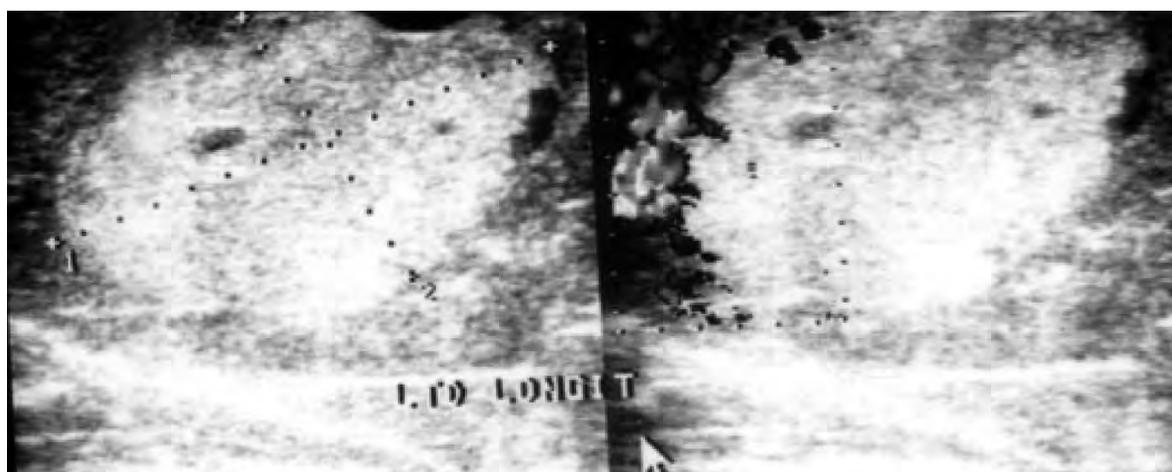
The paper is two cases series report. The hormonal assays and ultrasound aspects are provided.

### CASE DATA

#### Case 1

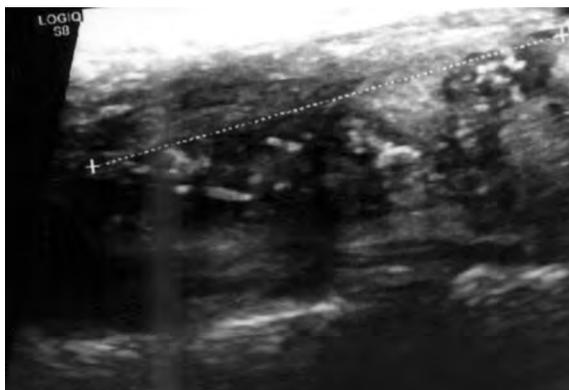
This is a 30 – year old non-smoking female coming from non-endemic area. The family medical history is negative. She has Basedow - Graves’

disease since last 7 years and she has been treated with anti-thyroid drug (thiamazol of different doses). On admission, the clinical evaluation is suggestive for hyperthyroidism and a large, mobile goiter is detected. TSH (thyroid stimulating hormone) is 0.05  $\mu$ UI/ml (normal values between 0.5 and 4.5  $\mu$ UI/ml) and FreeT4 (thyroxine) is 19.5 pmol/l (normal limits between 17 and 19 pmol/l) under daily 5 mg of thiamazol. The thyroid autoimmunity shows a TRAb (TSH receptor antibody) of 18 U/l (normal levels < 1 U/l). The eye examination showed right/left eye proptosis of 16/15.5 mm (millimeter). Thyroid ultrasound reveals: right lobe of 3.9/2.8/6.5 cm, a left lobe of 3.1/2.9/6 cm (centimeter). Right lobe has a 3 cm hypoechoic nodule (Figure 1). After normalization of thyroid function due to increased dose of thiamazol, the patient was referred for total thyroidectomy. No complications were developed around the surgical act. Histological report confirmed classical

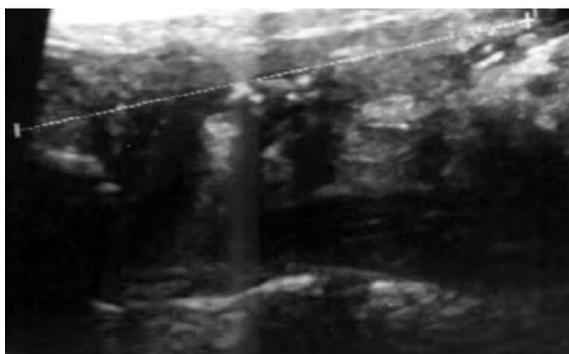


**FIGURE 1.** Thyroid ultrasound on a 30-year old patient with Basedow disease. Right lobe of 3.9/2.8/6.5 cm and a 3 cm hypoechoic nodule

Basedow disease. One month later, TRAb was still high, of 2.4 U/l while TSH was 1 of under daily 100 µg of levothyroxine. The subject presented a post-operative hypertrophic scar in addition to the following ultrasound aspect: right area with an inhomogeneous structure of 1/1.2/4 cm, left area of 1.4/1.7/4 cm, with multiple images with posterior echo and intense local edema (Figure 2). She will be followed both for dermatological aspects and endocrine substitution.



*Right lobe – longitudinal aspect*



*Left lobe – longitudinal aspect*

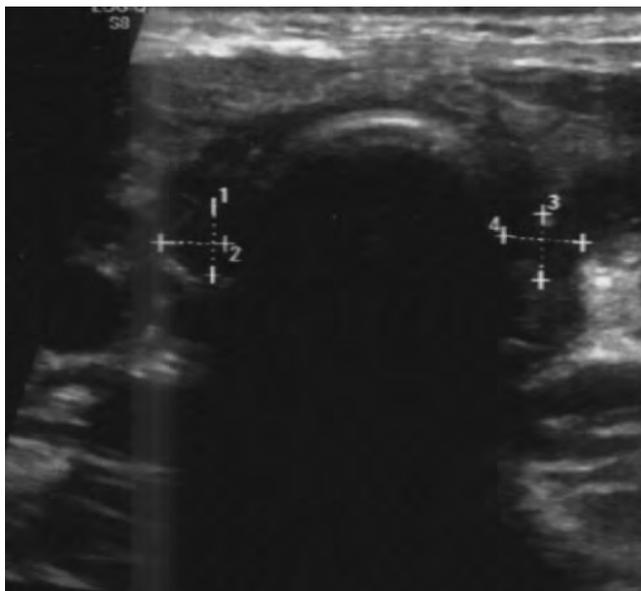


*Left lobe – transversal aspect*

**FIGURE 2.** Post-thyroidectomy neck ultrasound aspect (one month after the procedure)

## Case 2

This is a 44-year old non-smoking female coming from endemic area. The family medical history is negative. She has multinodular goiter with negative autoimmunity. On admission, the clinical evaluation is normal except for symmetrical goiter. She accuses mild local compressive symptoms. TSH is 1 µUI/ml (normal values between 0.5 and 4.5 µUI/ml). Thyroid ultrasound reveals: right lobe of 1.9/2.1/4.3 cm, a left lobe of 2/2/6 cm. Right lobe has a taller than wide nodule of 0.6/1/0.7 cm, and an inferior conglomerate of 3.2/2.6/2 cm. The patient was referred for total thyroidectomy. The subject did not develop any peri-operative complication. The histological report showed chronic autoimmune thyroiditis background of focal type in addition to nodules of colloidal and cystic adenomatosis with hyperplastic epithelium. One month later TSH was 1.4 µUI/ml while the subject was treated with 100 µg of levothyroxine per day. The subject presented a post-operative hypertrophic scar in addition to the following ultrasound aspect: right thyroid area of 0.45/0.42 cm, left area of 0.44/0.52 cm, with hypoechoic structure suggesting an edema in association with inflammatory lymph nodes at lateral cervical level of 0.6/0.2 cm maximum diameter (Figure 3).



**FIGURE 3.** A 44-year old female with hypertrophic scar and post-operative edema. Right thyroid area of 0.45/0.42 cm, left area of 0.44/0.52 cm, with hypoechoic structure suggesting an edema

## DISCUSSION

We introduce two cases of total thyroidectomy that actually were evaluated one month after surgery and the post-operative scars seem hyper-

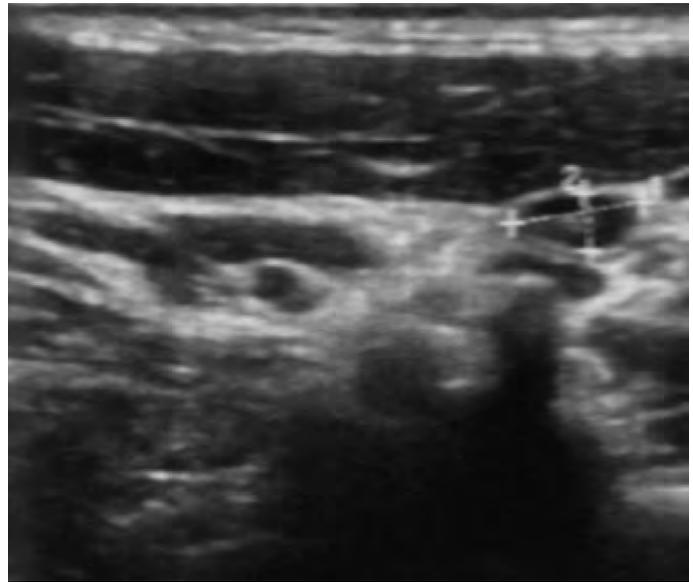
trophic. The evaluation is still too early to fully predict the partial remission or the transformation to keloids (6). Close follow-up is necessary in order to adequate management. Also, the post-operative ultrasound aspect is uncommon due to the presence of distortions or edema as mentioned before. Generally the risk is related to factors like race (Caucasians have lower risk than non-Caucasians), collagen conditions (as Ehlers Danlos syndrome) etc. (7). The risk factors have been introduced in specific scores by some working groups (6). The guidelines of diagnosis and treatment vary (6,8). Topical solutions seem the most reasonable approach as therapy (8).

**The post-operative complications**

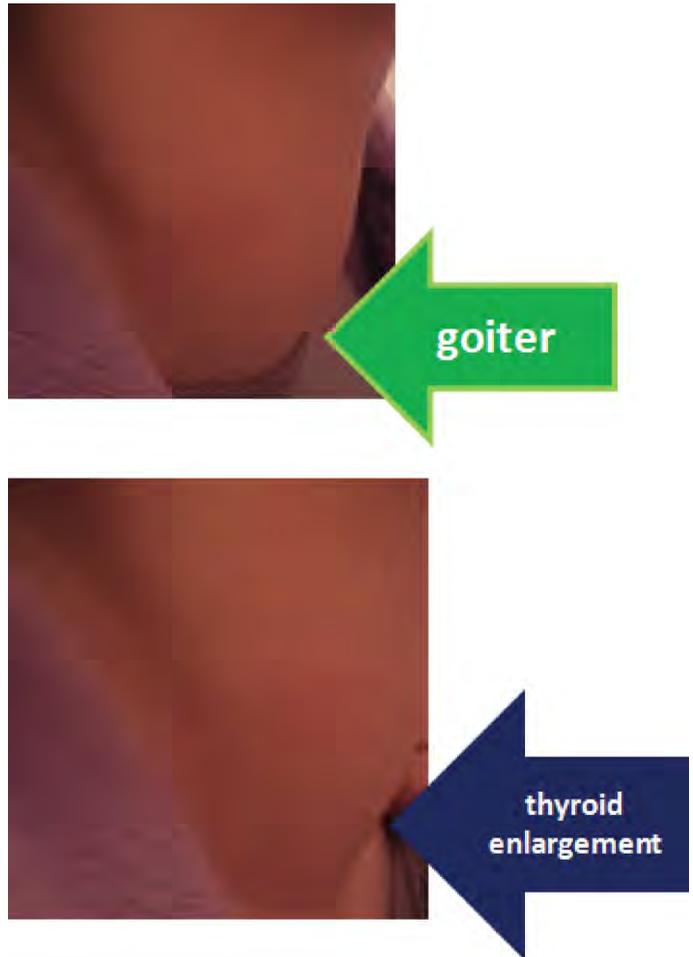
Thyroidectomy is largely used for benign conditions like multinodular goitre but also malignancies like differentiated thyroid cancer of papillary and follicular type as well as medullar cancer and maybe anaplastic carcinoma depending on case or even thyroid metastases (if any) (9,10,11) (Figure 4 and Figure 5). Hyper-function and even electrolytes anomalies must be treated before surgery due to high cardiovascular risk (9,10,11,12). Post-thyroidectomy complications are described in 0-4% of cases, an average of 1% (except for iatrogenic hypothyroidism) (13,14). Among them we mention hypoparathyroidism-related hypocalcemia, edema, neck hematoma, anesthesia and cardiovascular risk during surgery especially if prior cardiac co-morbidities or dys-electrolytemia are presented. A limited number of publications are found related to exclusive risk of keloids and hypertrophic scars after thyroidectomy (15). A case of thyroidectomy via a prior lateral neck scar has been reported (16). A systematic review from 2019 showed that the risk is similar between minimally invasive and video-assisted procedure (17). Robotic remote access surgery at retroauricular level is an alternative to classical incision approach to avoid the visible scars (18). Trans-axillary incision is another alternative to open anterior traditional technique (19,20).

**CONCLUSION**

It is still a matter of debate to classify the high risk patients for developing post-thyroidectomy scars.



**FIGURE 4.** Inflammatory lymph nodes at lateral cervical level of 0.6/0.2 cm maximum diameter



**FIGURE 5.** Thyroid enlargement of a young female patient with Basedow disease and Graves' eye involvement

*Conflict of interest:* none declared  
*Financial support:* none declared

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