CASE REPORT

# Cutaneous spreading of parathyroid carcinoma after fine needle aspiration cytology

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**ABSTRACT. Background: Ultrasound-guided fine needle aspiration cytology (FNAC) of suspect parathyroid adenomas is sometimes used for the diagnosis of primary hyperparathyroidism (PHPT). FNAC complications are rare or mild. We describe the first case in literature of cutaneous spread of parathyroid carcinoma after FNAC. Case: A woman underwent a neck ultrasound which revealed a solid hypoechogenic nodule of 1.5 cm at the level of the inferior pole of the right thyroid. In the same time a FNAC of the nodule was performed. Cytology showed no atypical cells. Successively PHPT was diagnosed and a few weeks later the patient had a subcutaneous lump in the same area of FNAC. The patient underwent surgery and histology of the specimen showed a differentiated parathyroid carcinoma. The postoperative course was regular and calcium and parathormone resulted normal. Conclusion: The use of FNAC should be carefully assessed in the presence of suspect parathyroid carcinoma, because this could cause a possible diffusion of a parathyroid carcinoma along the needle tract.**

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## INTRODUCTION

Ultrasound-guided fine needle aspiration cytology (FNAC) of suspected parathyroid adenomas is sometimes used for the diagnosis of primary hyperparathyroidism (PHPT) together with other non invasive procedures such as: ultrasound, 99m technetium sestamibi, TC and MRI (1, 2). FNAC complications are rare or mild. We describe a case of cutaneous spread of parathyroid carcinoma after FNAC.

## CASE REPORT

P.D., a woman aged 39 suffering from a pain in the cervical fore-front underwent a neck ultrasound which revealed a solid hypoechogenic nodule of 2 cm in diameter, at the level of the inferior pole of the right thyroid. The nodule appeared completely dissociated from the thyroid and it was partially cystic. The citology showed lymphocytes in a thyroid cellullar pattern, suggesting a thyroiditis.

A year later the patient underwent a further neck ultrasound. At this time a thyroid nodule was confirmed but also a 1.5 cm lesion, posterior to the right lobe, was identified. The ultrasound guided FNAC (22 gauche needle) of the lesion showed groups of moderately cohesive cells with round-ovoid sometimes hyperchromatic nuclei. Occasional "naked" nuclei were also evident. The cytoplasm was pale or amphophilic, occasionally vacuolated. Successively, blood tests showed elevated calcium: 3.54 mmol/l (2.2-2.6 mmol/l) and PTH: 736 ng/l (10-60 ng/l).

Diagnosis of PHPT was achieved and the patient was admitted to this Surgical Unit for further diagnostic studies and therapy. The patient claimed that a skin lesion had appeared at the site of the FNAC, three weeks after this had been carried out, and had begun to swell progressively. Clinical examination revealed a 2 cm swelling of the skin located in the right cervical region. Another enlargement at the right lobe of the thyroid gland was palpable and had a hard-wooden consistency. It was situated in correspondence, but completely separated from the cutaneous lesion. The neck ultrasound with a 7.5 MHz linear probe displayed a solid irregular lesion which extended in a longitudi-

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nal direction for 1.5 cm, next to the lower pole of the right lobe of the thyroid gland and it was considered an enlarged parathyroid gland. The thyroid gland was normal. No lymphadenopathy was evident. Another solid ovoid swelling of about 2 cm in diameter with acute parenchymal vascularization was sited under the skin in the fore-right cervical region, opposite the strap muscles. Scintigraphic images obtained in fifteen minutes and three hours after administration of 99m Tc-Sestamibi (555MB9) showed the presence of late hyperaccumulation of the radionuclide, attributed to the inferior right parathyroid gland. Ultrasound of the kidneys evidenced bilateral nephrolitiasis. X-ray of the skeleton segments such as hands and cranium displayed the typical signs of osseous resorption, decalcification and osteopenia such as in PHPT disease. Bone densitometry revealed diffuse signs of mineral loss and bone thinning. Bi-humoral parameters were the following: ionized calcium 3.4 mmol/l (2.2-2.6 mmol/l); phosphorus 0.8 mmol/l (1-1.5 mmol/l); parathyroid hormone 501 ng/l (10-60 ng/l); TSH 0.03 mU/l (0.6-4.6 mU/l); T4 and T3 were normal; calcitonin 3 ng/l (<50 ng/l). PHPT was diagnosed and cutaneous spreading from parathyroid carcinoma after FNAC was suspected.

The patient underwent surgery with total removal of the skin over the lesion. This was situated in a suprafascial position apparently free from the prethyroid muscles. Subsequently, the right lobe of the thyroid was isolated. A nodule was appreciable in correspondence of the lower pole of the thyroid. It was firm and densely adherent to the right lobe of the thyroid. Total lobectomy was carried out as well as inferior right parathyroidectomy, after visualization of the superior right parathyroid (which looked normal) and the recurrent nerve. Histology of the inferior parathyroid gland resulted on differentiated parathyroid carcinoma, a follicular nodule was present in the right thyroid lobe. The underskin nodule resulted differentiated parathyroid carcinoma (1.5 cm) with elevated mitotic index (8x10 HPF) (Fig. 1). The post-operative course was regular with a rapid return to normal calcium levels. The patient, a year after surgery, showed no signs of local or metastatic recurrence. Calcium is 2.2 mmol/l and PTH 40 ng/l.

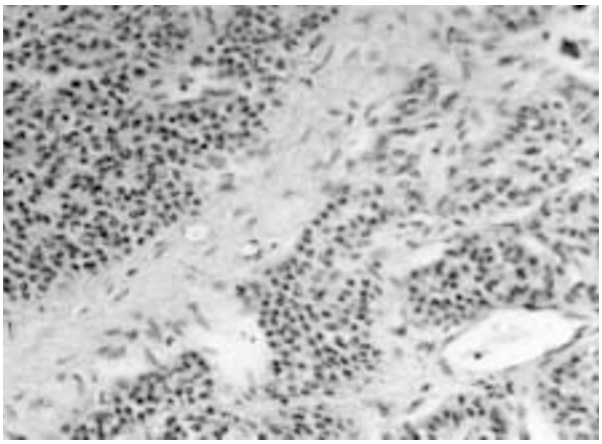

Fig. 1 - *Parathyroid carcinoma. The cells show a trabecular pattern of growth and are separated by collagenous bands (x 100 Haematoxylin-Eosin). See mitoses in the top-right corner.*

## DISCUSSION

Spread of malignant cells along the needle tract after FNAC is rare but represents a possible complication of this procedure (3). The incidence of metastases after FNAC of different tumours range between 0.003% and 0.005% (4). In laboratory, spread of neoplastic cells along the needle tract after FNAC on animals has been widely demonstrated (5). In differentiated carcinomas of the thyroid, metastases following FNAC have only been reported in two cases (6, 7). No case of cutaneous spread of parathyroid carcinoma following FNAC has been previously described and studies concerning the use of FNAC for echographically suspect parathyroid lesions are relatively limited (2, 8, 9). The prevalence of parathyroid carcinoma in PHPT is about 2-3% (10).

Differential diagnosis between the thyroid tissue and parathyroid cells in needle aspirated material can be particularly difficult (1, 11). Karstrup *et al*. (9) report of a 45% insufficient rate following FNAC in 60 suspect parathyroid tumors. According to Tikkakosky *et al*. (12), in 60 patients affected by PHPT who undergo ultrasound-guided FNAC before surgery, parathyroid cells are identified only in six cytological tests. Most pathologists will find very difficult also to recognize the parathyroid origin of a FNAC and to make a distinction between adenoma and carcinoma. On the other hand, ultrasound-guided FNAC can be very useful if the PTH measurement in the needle wash-out is performed. This measurement will ascertain the parathyroid origin of the lesion in virtually 100% of the cases. FNAC of a parathyroid lesion should not be considered essential for PHPT because the diagnosis is essentially biochemical. One reason for performing FNAC from a suspect parathyroid tumor could be to secure the correct localization in order to perform non-surgical procedures lilce ethanol injection (13). In this specific case the patient was firsty supposed to have a thyroid nodule. The pain reported by the patient was probably misinterpreted as thyroiditis. Indeed, the biochemical diagnosis of PHPT was made after the FNAC. Thus, the cuta-

neous lesion described in our case report is most likely a parathyroid carcinoma metastasis connected with FNAC. Parathyroid carcinoma metastases are rare manifestations of this illness (13). The most common sites of metastasis include cervical lymphnodes (30%), lung (40%) and liver (10%); other locations are bones, pleura and pericardium (14). Wang *et al*. (15) report on 28 patients with parathyroid carcinoma for which local recurrence occurred three years after surgical treatment and appeared with invasion of contiguous structures such as thyroid, muscles, recurrent nerve, vessels, esophagus and trachea. Rare cases of recurrent or persistent hyperparathyroidism are represented by spread of parathyroid tissue fragments in the muscles or soft tissue of the neck, occurring aflter surgery, in case of rupture of the tumour (16). The endocrine function of fragments of parathyroid tissue is regained rapidly as confirmed by the highly successful number of parathyroid self-transplants during thyroid or parathyroid surgery (17).

## CONCLUSIONS

The possible spread of a parathyroid carcinoma along the needle tract after FNAC, as in this case report, requires careful use of this procedure in the diagnostic protocol of hyperparathyroidism. Cytologic evaluation and PTH measurement from the needle wash-out can be very useful to assess the localization of a parathyroid lesion but FNAC should be carefully assessed if parathyroid carcinoma is suspected. Severe hypercalcemia, exceedingly high PTH and a palpable mass in the neck suggesting a malignant lesion should advise to avoid this procedure. In fact, possible spread of parathyroid carcinoma during surgical intervention can influence the prognosis of this rare illness depending the chance of survival on early and radical surgical intervention.

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