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A case report

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Sentinel node radioguided biopsy in surgical management of the medullary thyroid Carcinoma. A case report

INTRODUCTION: *Medullary thyroid cancer is a rare carcinoma. Surgery is the only curative treatment and since cervical lymphnodes metastases are frequent and can occur at an early stage, a standardized central lymphnode dissection is associated to total thyroidectomy. However, the extent of lymphadenectomy to the lateral neck lynphnodes remains debated. To reduce the extent of lymphnode excision, the sentinel node biopsy has been used as an accurate technique to assess the status of the lymphnodes in the regional drainage basin in solid tumors, and more recently, in thyroid carcinoma. In this case report, we show the utility of the radioguided biopsy of the sentinel lymphnode in the surgical management of the medullary thyrod cancer.*
CASE REPORT: *We present the case of a 24-year-old Caucasian, Italian woman with a sporadic medullary thyroid microcarcinoma occasionally detected by neck ultrasound and diagnosed by high serum calcitonin level and fine needle aspiration cytology. There was no ultrasound evidence of lymphnode involvement both in central and lateral compartment of the neck. We performed a preoperative mapping of the the sentinel lymphnodes by the injection of technetium-99m radiolabelled albumin nanocolloids in the thyroid nodule. Then our patient underwent total thyroidectomy combined with radioguided biopsy of the sentinel lymphnodes. Histology confirmed the presence of the medullary thyroid cancer and revealed micrometastases only in two sentinel lymphnodes detected in right lateral compartment of the neck so an ipsilateral lateral neck dissection besides the central neck dissection was performed at the end of operation. Basal and pentagastrin-stimulated serum calcitonin level was undetectable during the follow-up investigations.*
CONCLUSION: *This is the first reported case that shows the utility of the radioguided SLN biopsy for the accurate staging of the cervical lymphnode involvement in patient with sporadic medullary thyroid microcarcinoma. Total thyrodectomy and central neck dissection is recommended for all patients with medullary thyroid carcinoma, but the indication for the lateral neck dissection is still controversial. The radioguided SLN biopsy technique could be a useful tool to perform the dissection only in those patients with proven lateral neck lymphnode involvement and reduce the extention of the lateral lymphnode excision and the incidence of related complications.*

KEY WORDS: Carcinoma, Modullary, Radioguided biopsy, Sentinel lymphnode, Thyroid

Introduction

Medullary thyroid cancer (MTC) is an uncommon thyroid tumor accounting for approximately 5-8% of thyroid cancer diagnoses. In the majority of cases, the preoperative diagnosis is based on the results of thyroid fine-needle aspiration (FNA), serum calcitonin level, and RET proto-oncogene testing. In approximately 10-15% of cases, diagnosis of MTC is made only after thyroidectomy. Lymph node involvement seems to be a low risk factor for death but it increases the risk for loco-regional recurrences and distant metastases. Occult lymph node metastasis of MTC can be detected by sentinel lymph node

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(SLN) biopsy, in patients who had no suspicious cervical lymphadenopathy [1-4].

SLN dissection for melanoma and breast cancer has been validated as an accurate technique to assess the status of the lymph nodes in the regional drainage basin. The sentinel node concept has also been investigated in other solid tumors, and more recently, in thyroid carcinoma. From 1999 to 2007, several Authors have studied the technique of research of SLN by the use of lymphoscintigraphy and intraoperative manual probe in many groups of patients evidentiating the following advantages: avoid futil dissection of the lateral compartment; make a nodes selective dissection; avoid I 131 therapy in patients with SLN negative; identify patients for postoperative 131 I therapy [5].

In this report we describe a patient with sporadic medullary thyroid cancer who underwent thyroidectomy and radioguided SLN biopsy of the neck for the assessment of the lymph node status.

Case presentation

In October 2011, a 24 year old Caucasian, Italian woman was referred to our hospital with a diagnosis of a thyroid micronodule occasionally detected by a routine a neck ultrasound. Familiar history was negative for thyroid nodular disease. Neither palpable thyroid nodules nor suspected lymph nodes were detected on physical examination. Ultrasonography (US) showed the presence of a small round-shape, hypogenic nodule (0.8 mm diameter) suspected for malignancy in the upper pole of the righ thyroid lobe. No other thyroid abnormalities and no suspected neck lymph nodes were found by US. Her initial endocrine laboratory evaluation showed normal thyroid function and no biochemical evidence of thyroid autoimmune disease. However, a high serum calcitonin level (101 pg/mL) was detected. A fine needle aspiration cytology of the thyroid nodule confirmed the suspect of medullary carcinoma.

Preoperative SLN mapping of the neck was performed by the US-guided injection of a suspension of tecnetium-99m (Tc-99m) albumin nanocolloids (37 MBq in 0.3 mL) in the thyroid nodule. Scintigraphic images (planar as well SPECT/CT) (Figs. 1, 2) of the neck were acquired 30 minutes after the injection. The SLN(s) were preoperatively identified by a hand-held collimated gamma probe in the right laterocervical (level II, III) and central (level VI) compartment and marked on the patient's skin.

Surgery was performed the same day, within six hours after lymphoscingraphy. After the total thyroidectomy, the SLNs were identified by the use of an hand held gamma-probe and removed. The frozen section demostrated micrometastases, so an ipsilateral lateral neck dissection was performed. The central neck lymph node dissection was also performed during surgery.

Her histological examination confirmed the presence of a 0.8 cm sized medullary cancer in the in the upper pole of the right thyroid lobe and revealed micrometastases only in the two sentinel lymph nodes detected in right lateral compartment of the neck (level III) (TNM: pT1,N1b, stage IVA). A few days after surgery, she showed undetectable basal serum calcitonin levels. Subsequent clinical evaluation, neck US, and basal and pentagastrin-stimulated serum calcitonin level did not show any evidence of relapse up today.

Fig. 1

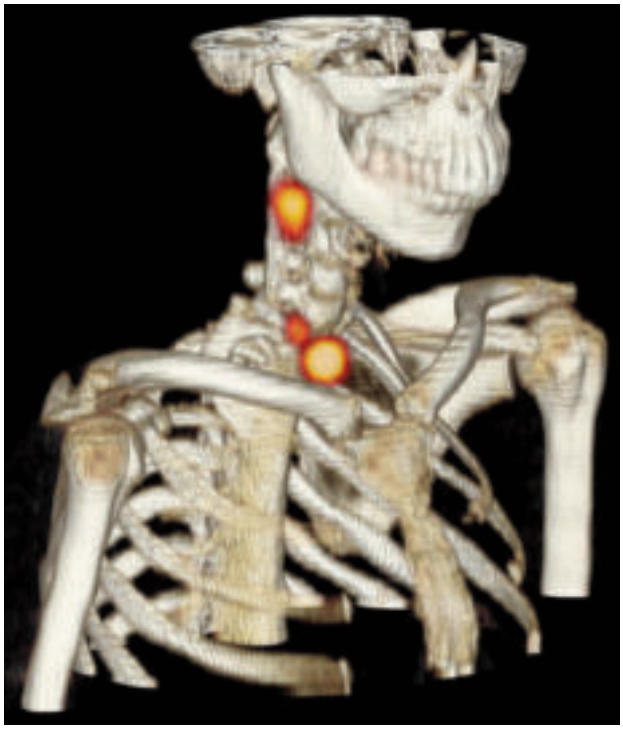

Fig. 2

Discussion

Many factors influence the surgical treatment of the medullary thyroid carcinoma: it is more aggressive than differentiated thyroid carcinoma with higher rates of recurrence and mortality; it is resistent to radioiodine, radiation therapy and chemotherapy; it is multicentric in the 90% of hereditary cases and in 20% of sporadic forms. Nodal metastases are present in more than 70% of cases with palpable disease and can occur at an early stage in 50% of patients. Metastastic contralateral lymph nodes are been found in 30% of patients with unilateral MTC [6,7]. Surgery is the most effective treatment for patients with MTC. The standard therapeutic approach includes total or near total thyroidectomy together with loco-regional node dissection [8,9].
Total thyroidectomy is mandatory either in the hereditary and sporadic forms even because of multifocality or bilaterality of the tumour [10]. On the contrary extent of loco-regional node dissection is still matter of debat and include central compartment dissection and omolateral or bilateral latero-cervical dissection besides central compartment dissection (II, III, IV, V bilateral level and VI level). The last approach, associated with total thyroidectomy, is mandatory in all patients with preoperative positive nodes without limits of age or CT levels. Total thyroidectomy with a central nodes dissection (levels VI and VII) is appropriate for the primary tumours[11]. In this procedure all thyroid and nodal tissue is removed from the level of hyoid bone to the innominate veins. Technically, all nodal tissue sited anteriorly to the trachea is excided behind the sternal notch. Fatty and nodal tissue between carotid vessels and trachea is removed together with paratracheal nodes along the inferior laryngeal nerves up to the head of clavicles [12,13]. A comparison study between procedures in which all nodal tissue and those in which only grossly involved nodes were excided, demonstrated a reduced rate of recurrence and an increased survival in the first group [14].
A preoperative radioguided mapping of the SLN is a well standardized technique, successfully employed in staging the lymph nodes of many tumors but its utility is not still tested in the management of the medullary thyroid carcinoma. In our young patient with a sporadic micro MTC without evidence of clinical neck lymph node involvement, the radioguided SLN biopsy was used to assess the status of the lymph nodes in the regional drainage basins and perform a selective lymph node picking. The detection of micrometastatic SLN(s) in the lateral compartment without metastatic disease in the central lymph nodes suggest that this technique could be useful in this subset of MTC patients to avoid (when the SLN biopsy is negative) unnecessary lateral lymph node dissection, thus reducing the incidence of complications including hypoparathyroidism, recurrent laryngeal nerve palsy, injury of the trachea or oesophagus, thoracic duct fistula [14].

Conclusion

The utility of the radioguided SLN biopsy technique for the assessing of the neck lymph node status is demonstrated in our patient by the undetectable basal and pentagastrin-stimulated serum calcitonin level measured one year after the hystological diagnosis of lymph node micrometastases of MTC only in the SLN(s) of the ipsilateral compartment. The selective dissection of these SLN(s) may have determined the clinical and biochemical disease remission that we have observed still now. The preoperative assessment of the lymphatic drainage by lymphoscintigraphy and the selective sampling of the SLN(s) by the gamma probe could lead to a more timely and efficient surgical treatment for this neoplastic disease.

Riassunto

Il carcinoma midollare della tiroide è raro. Il suo trattamento è chirurgico e consiste in una tiroidectomia totale associata a dissezione dei linfonodi centrali.
L'opportunità della linfoadenectomia dei linfonodi cervicali laterali è argomento controverso. Per ridurre l'estensione della dissezione dei linfonodi laterocervicali ai casi in cui tale procedura sia effettivamente necessaria abbiamo eseguito la tecnica della biopsia del linfonodo sentinella, già praticata in altra patologia tumorale, in un caso di carcinoma midollare, sporadico, diagnosticato con ecografia, determinazione dei livelli di calcitonina serica e citologia dell'agoaspirato. All'ecografia non si evidenziavano linfonodi cervicali centrali o laterali.
Abbiamo eseguito mappaggio preoperatorio dei linfonodi sentinella iniettando Tecnezio 99-m nel nodulo tiroideo. La paziente è stata poi sottoposta a tiroidectomia totale e biopsia radioguidata dei linfonodi sentinella. L'esame istologico ha confermato la presenza di un carcinoma midollare della tiroide e di micrometastasi in due linfonodi sentinella situati nel compartimento laterale destro. Dopo la tiroidectomia l'intervento è stato completato con dissezione dei compartimenti centrale e laterala destro. Al follow-up non sono stati rilevati livelli di calcitonina serica nè basali nè dopo stimolazione con pentagastrina.
Si tratta del primo caso, riportato in letteratura, che dimostra l'utilità della biopsia radioguidata del linfonodo sentinella nella stadiazione linfonodale e del trattamento chirurgico del microcarcinoma midollare della tiroide. Tale biopsia può essere utile ad eseguire la dissezione linfonodale laterale solo nei pazienti con provato coinvolgimento dei linfonodi laterali del collo e quindi a ridurre l'entità della dissezione e delle relative complicanze.

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