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Unexpected complication or diagnostic clue: exaggerated pain during fine needle aspiration biopsy of a neck mass

Beklenmedik bir komplikasyon ya da tanısal ipucu: bir boyun kitlesinin ince iğne aspirasyon biyopsisi esnasında ortaya çıkan aşırı ağrı

Özet

Travmatik nöromalar, vücudun sinir hasarının geliştiği herhangi bir yerinde ortaya çıkabilir. Bu bildiride, papiller tiroid karsinomu nedeniyle yapılan lenf nodu diseksiyonu sonrası boyunda travmatik nöroma gelişen bir olgu sonografik bulguları ile birlikte sunulmaktadır. Biyopsi sırasında ortaya çıkan şiddetli ağrı nöroma için tanısal ipucudur.

Anahtar Kelimeler: Travmatik nöroma; biyopsi; ultrasonografi

Abstract

Traumatic neuromas are known to occur anywhere in the body, but they can develop at any site where a nerve is damaged. In this case, a traumatic neuroma which arose in the neck after lymph node dissection for papillary thyroid carcinoma is reported with its sonographic findings. Severe pain during biopsy procedure is also a diagnostic clue for this condition.

Key words: Traumatic neuroma; biopsy; ultrasonography

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Introduction

A traumatic neuroma is a thwarted attempt by a nerve, injured or severed by prior trauma or surgery, to regenerate, resulting in a tangle of neural fibers and connective tissue. They are diagnosed some years after the trauma, usually by chance, as a small tumor near the scar that is tender to palpation or spontaneously painful. When a nerve is transected, distal axons suffer Wallerian degeneration attributed to the inflammatory response, whereas the axons and Schwann cells of the proximal stump proliferate. They usually do not exceed 2-cm in diameter, are diagnosed between 1 and 10 years after surgery, and can be located in any organ. Although more frequent in peripheral sensory nerves, they can affect any motor or sensory nerve and even nerves of the autonomic nervous system (1).

Traumatic neuromas were found to occur in 1.1-2.7% of patients who underwent neck dissection (1,2). Herein we present a traumatic neuroma in a patient with prior thyroid surgery and neck dissection. Ultrasound and biopsy findings with emphasis on differential diagnosis are discussed.

Case Report

A 54-year old woman with a right-sided neck swelling was referred for ultrasound (US) examination. The patient had history of prior neck dissection for papillary thyroid cancer in 1994 and a second surgery for residual disease a few years later in an outside medical center. US examination revealed a 14x5 mm oval, smooth shaped, homogeneously hypoechoic mass near the jugular and carotid vessels (Figure 1). On Doppler examination the lesion was avascular. Her blood thyroglobulin level was not raised (<0.1 IU/mL) and no pathological uptake was noted on I-131 scintigraphy. Despite the stability of the lesion on follow up US scans of 6 months apart, an US guided fine needle aspiration biopsy was requested by the referring clinician to define the nature of the lesion.

During the biopsy procedure, the patient experienced more pain than anticipated despite adequate local anesthesia (10 ml, prilocaine HCl); as a result the procedure was halted earlier than planned. The patient described a severe, acute, burning and intolerable pain of 10/10 on a relative pain scale, 10 being the worst pain she experienced. The pain caused the patient to squirm, shout and request cessation of the procedure. In our practice for neck biopsies, we administer 10 ml local anesthesic agent, and perform 3 or 4 needle passes on average and the specimens were examined by the cytopathologist on site. If the specimens are inadequate, multiple additional needle passes are made as requested by the cytopathologist. Fine needle aspiration biopsy method is used for neck lesions with a specific modified Menghini semi-automated needle of 20 G, 10 cm (Biomol, HS Hospital Service, Lazio, Italy). Despite early termination of the biopsy in discussion, adequate specimen could be obtained (1 needle pass) and the outcome of the cytopathologic examination proved that the lesion was a traumatic neuroma.

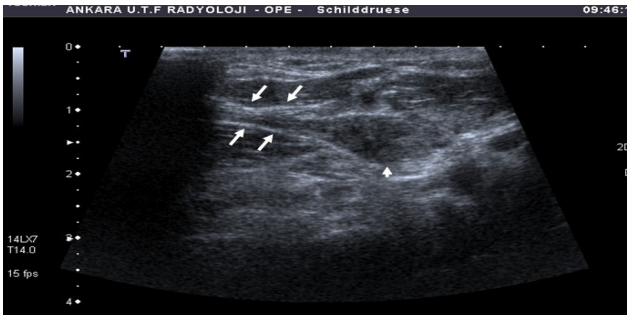

Figure 1. Gray scale US in longitudinal axis showed a right-sided, 14x5 mm, oval, homogenous solid lesion (short arrow) with definite smooth borders in the anterior neck lateral to the jugular vein. Continuation with the nerve at upper pole of the lesion is well depicted in the longitudinal planes (long arrows).

Discussion

Benign neurogenic tumors include traumatic neuroma, Morton neuroma, neural fibrolipoma, nerve sheath ganglion, benign peripheral nerve sheath tumors, neurilemmoma (schwannoma) and neurofibroma. Neurogenic neoplasms represent approximately 10-12% of all benign soft tissue neoplasms (2).

Most of the prior studies reported in the surgical literature are case reports describing the presentation and location of traumatic neuromas

after neck dissection (3). These nodules are localized posterior to the internal and common carotid arteries (ICA and CCA) and most likely result from injury to the peripheral sensory nerves. Traumatic neuromas may arise from the great auricular nerve (C2, C4), the cutaneous cervical nerves (C2, C3), the supraclavicular nerve (C3, C4), and the superficial branches of the cervical plexus which are transected during radical neck dissection (3). Fine-needle aspiration may be nondiagnostic or made difficult by acute tenderness as in our case. Neck dissection, or cervical lymphadenectomy, is a procedure for eradicating metastases to the regional lymph nodes of the neck. A radical neck dissection includes removal of all ipsilateral cervical lymph nodes from the level of the body of the mandible to the clavicle including the spinal accessory nerve, internal jugular vein, and sternocleidomastoid muscle. This procedure is indicated for extensive lymph node metastases or extension of tumor beyond the capsule of the node(s) to involve the spinal accessory nerve and internal jugular vein. The motor branches of the cervical plexus and brachial plexus lie just beneath the fascia overlying the splenius muscle. During dissection of the posterior triangle, these nerves may be transected (4).

Traumatic neuromas are known to occur anywhere in the body, typically involving the peripheral nerves of the extremities but they can develop at any site where a nerve is damaged. (5). Boutin et al. showed that on MRI scans traumatic neuroma is a well-defined mass with high intensity on T2-weighted images, isointense on T1-weighted images and with marked enhancement following contrast administration (6).

Such a well-defined round to oval, homogenous, hypoechoic mass with a focal echogenic area is very likely to be mistaken for a reactive lymph node with its hilum on grey scale ultrasound (7) and may be clinically significant if there is a prior history of lymph node dissection and a primary carcinoma as in our case. However increased vascularity at its periphery may help to distinguish a nerve tumor from a lymph node. Hiler vascularization is typical for a lymph node (7). Also smaller short axis diameter and small short/long axis diameter ratio is expected for traumatic neuromas rather than recurrent lymphadenopathies on US imaging (8). In addition, ectopic or lateral aberrant or recurrent thyroid nodules should also be entertained in the differential diagnosis especially after thyroid dissection. These nodes often show increased central and peripheral vascularity compared to neuromas (10).

Demonstration of a typical mass in the line of the transected nerve is diagnostic of traumatic neuroma. High resolution ultrasound may reveal a well-defined hypoechoic mass with an echogenic nerve running through the center of the mass which is quite suggestive of a neural origin (9). On sonography neurinomas and neurofibromas are usually well-defined, solid, hypoechoic soft tissue masses and have faint posterior acoustic enhancement. Occasionally a neurinoma or a neurofibroma may have a course echotexture or contains discrete focal areas of increases echogenicity, which histologically correspond to collagen deposits (9).

Although schwannomas and neurofibromas are classified as benign neural sheath tumors they have the potential for malignant transformation. A traumatic neuroma which itself is not neoplastic, may grow very slowly, unlike a tumor, therefore indications for surgery are controversial (10). A traumatic neuroma would not be expected to shrink in response to radiation therapy or chemotherapy.

Obviously besides an enlarged lymph node, a thrombosed aneurysm could have similar sonographic appearances and should be considered in differential diagnosis (9). A thrombosed internal jugular vein, necrotic lymph node, or tumor deposit may mimic the appearance of a traumatic neuroma on CT studies. The location of traumatic neuromas, posterolateral and close to either the CCA or ICA, would be unusual for lymphadenopathy in a patient with prior neck dissection. Typical CT characteristics of traumatic neuromas in a patient with a prior neck dissection include a nodule with a radiolucent center, peripherally dense rim, and an intact layer of overlying fat that is stable over time (1).

In our experience, we noticed that biopsy of lesions abundant in nerve tissue especially those which contain sensorial nerves are often quite

painful. The pain is of acute nature and severe in quality. On extremities, a shooting quality of the pain has also been reported by the patients as well. We especially encountered pain during biopsy of neuromas involving both the neck and the extremities. This finding has not been reported widely in the literature but remains anecdotal. We believe this is because as a complication pain has a negative connotation therefore underreported and is quite relative and difficult to measure and compare.

In conclusion, as Yabuuchi et al. have showed that clinical findings such as local tenderness along with the mass after neck dissection, combined with the imaging findings could produce more accurate diagnosis of a traumatic neuroma (8), we recommend that the exaggerated pain response during a fine needle aspiration biopsy for a neck mass should raise the suspicion of a nerve-originating or nerve containing mass.

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