Case Report

Needle Tract Seeding of Thyroid Follicular Carcinoma after Fine-Needle Aspiration

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1. Introduction

Fine-needle aspiration (FNA) is a crucial diagnostic technique for establishing a cytological or pathological diagnosis, and its use has become common in the management of thyroid nodules and disorders. While tumor seeding from FNA is relatively lower for thyroid cancers compared to other malignancies, there are reports of thyroid needle tract tumor seeding which raises concerns regarding its widespread usage. The utility of FNA as a fast and cost-effective tool is undeniable, with its application and interpretation refined from its initial appraisal in 1993 by Gharib and Goellner [1]. As such, we report a case of needle tract seeding of thyroid follicular carcinoma and review existing literature of such occurrences.

2. Case Report

A 51-year-old lady with invasive thyroid follicular carcinoma presented with needle tract deposits in her right sternocleidomastoid (SCM) and platysma muscle. Her medical history includes hypertension and a multinodular goitre. After FNA in 2010, the dominant 1.8 cm solid right thyroid lower pole nodule was palpable measuring 2 cm, along with a superficial right lower neck 0.5 cm nodule. An ultrasound showed no internal vascularity within the right SCM at 1.1 × 0.8 × 0.7 cm and 0.9 × 0.6 × 0.5 cm (Figure 1). FNA reiterated findings of a follicular neoplasm for the right lower pole nodule with suggestions of thyroid follicular lesions for the right lower neck.
subcutaneous nodule and right SCM nodules with no lymphoid yield identified. Computed tomography (CT) neck was also performed, illustrating findings congruent to the thyroid ultrasound with no regional lymphadenopathy (Figure 2).

The patient subsequently underwent a total thyroidectomy, right central compartment clearance, excision of right SCM and platysma nodules with reimplantation of the bilateral parathyroid glands on 27th August 2018. Intraoperatively, there was a right platysma nodule with 2 right SCM nodules along the same tract, consistent with possible FNA tract seeding (Figure 3). Postoperative recovery was uneventful, and the patient was discharged well and stable on postoperative day 4.

Histology of the resected specimen confirmed a widely invasive follicular carcinoma of the right thyroid lobe invading the isthmus and extrathyroidal tissue, measuring 3 cm in maximum dimension, with capsular and vascular invasion. The right SCM and platysma nodules were positive for deposits of follicular carcinoma. Meanwhile, none of the 11 lymph nodes harvested showed evidence of metastatic carcinoma, and resection margins were clear of malignancy. Final histology report revealed a T3bN0MX right thyroid follicular carcinoma with needle tract deposits in the right SCM and platysma. Discussions at a head and neck oncologic multidisciplinary meeting established the likelihood of needle tract deposits on a background of invasive follicular carcinoma of the right thyroid lobe and recommended for postoperative radioactive iodine therapy (RAI). Following RAI, an I-131 whole body scan with single-photon emission CT (SPECT-CT) of the neck and thorax was performed on 5th October 2018, revealing uptake in multiple small bilateral lung nodules suspicious for metastases with no other suspicious uptake. The patient remained well and stable upon...
review in February 2019 with no evidence of tumour recurrence.

3. Discussion

Unlike other tumours including hepatocellular carcinoma and pancreatic tumours, thyroid FNAs are deemed to be at lower risk for needle tract seeding of neoplastic cells [2–4]. Reports of thyroid FNA tumour seeding are few and far between with their techniques refined over the years in minimising such postulated risks.

FNA is a vital tool in the diagnosis and management of thyroid tumours. While exceedingly rare, there are concerns regarding its potential for tumour seeding. Tumour cells can be disseminated along the puncture tract when the aspirate needle is withdrawn [5]. These cells can then propagate, forming distant islands or “seeds” from the original tumour. In our patient’s case, the right platysma and SCM nodules are likely the cause of direct needle tract tumour seeding, which occurred 8 years from her previous FNA in 2010. Any suggestion of distant metastases to these sites would be peculiar given that (1) these are uncommon sites of distant tumour spread from thyroid neoplasms and (2) the right platysma and SCM nodules developed along a straight line that can be traced from the skin to the thyroid nodule, suggesting seeding along the tract of previous needle puncture for FNA.

Various technical recommendations to minimise the risks of tumour seeding, including the usage of ultrasound guidance, an experienced operator, smaller gauge needles, fewer sampling passes, and the release of negative pressure during needle withdrawal, have been reported [6–8]. The use of smaller gauge needles, in particular, has been an area of contention. Cases of needle tract seeding occurred predominantly in cases where needles of 23 gauge or larger were used [7]. There is no clear consensus regarding optimal

Figure 3: Intraoperative pictures: (a) skin markings prior to incision, right thyroid nodule (long white arrow), right SCM nodules (short white arrow), platysma nodule (black arrow), (b) right platysma nodule (black arrow) with SCM underneath (white arrow), and (c) 2 right SCM nodules (white arrows). SCM, sternocleidomastoid muscle.
needle gauge for FNA with some recommending 21–27-gauge needles [1, 6, 9, 10] and others advising smaller 25–27-gauge needles, citing no differences in diagnostic yield [8, 11, 12]. These recommendations, however, remain postulations for risk-reduction, due to the infrequency of thyroid FNA needle tract seeding. Taking into account the countless thyroid FNAs that are performed, the application of these techniques may prove counterproductive and has to be balanced with the need for sufficient specimen yield for assessment.

Besides technical circumstances, tumour “aggression” and propensity for dissemination may also contribute to the risks of needle tract seeding. A review of the existing literature revealed 3 other cases of cutaneous dissemination of follicular thyroid cancers with time from FNA-to-seeding ranging between 1 month and 5 years [4, 13, 14]. While the time to the presentation of cutaneous dissemination varied significantly, 2 cases with earlier presentations reported by Panunzi et al. [13] and Ito et al. [15] exhibited features predisposing to a biologically more aggressive tumour. The former was afflicted with multiple myeloma and, having undergone chemotherapy, is significantly immunodeficient, thus posing a risk in propagating neoplastic cells [16]. Meanwhile, the patient reported by Ito et al. had cells with high proliferative activity with the presence of biological markers Ki-67 and galectin-3, both with possible roles in the development of follicular carcinoma [15]. Meanwhile, our case demonstrated an aggressive tumour with capsular and vascular invasion, possibly contributing to the development of tumour “seeds” within the right SCM and platysma even after 6 years from initial FNA. The prolonged duration to discovery of tumour seeding may have contributed to heightened disease dissemination resulting in multiple lung metastases. In contrast, the patient in Uchida et al.’s report was fairly quiescent, showing invasion through tumour capsule with no other features reflecting tumour aggression [14]. Even with the resurfacing of needle tract tumour deposits after 5 years from FNA, there was no evidence of disease progression or dissemination.

4. Conclusion

Thyroid FNA remains an indispensable tool in the guidance of thyroid nodule management. While needle tract seeding is uncommon, various technical precautions may be undertaken to reduce such occurrences, thereby safeguarding patient safety while ensuring precise diagnosis and treatment.

Conflicts of Interest

The authors declare no conflicts of interest for this paper.

References


