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CLINICAL REPORT

Incidentally Detected 131-Iodine Avid Parotid Oncocytoma Coexistent with Papillary Carcinoma Thyroid

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Abstract

131-I radioactive iodine (RAI) scan is an important modality in the management of differentiated thyroid cancer to detect recurrent or residual disease. Thus it is important to have knowledge about the possibility of false positive findings in these scans to avoid wrongful diagnosis and unnecessary treatment.

We here by present a patient who underwent total thyroidectomy with lymph node dissection and followed by radioactive iodine therapy for papillary thyroid cancer. He had 131-I iodine avid nodular lesion in the left parotid gland which was later proven to be oncocytoma on histopathology.

False positive findings on radioactive iodine scans are a possibility which should be known to surgeons as well as nuclear medicine physicians for accurate diagnosis and appropriate management.

Keywords 131- I radioiodine scan · Oncocytoma · Differentiated thyroid cancer · Radioiodine therapy · Papillary thyroid cancer

Introduction

Differentiated thyroid cancer (DTC) includes papillary and follicular histological variants which accounts for almost 90% all thyroid cancer cases [1]. The good prognosis of DTC could be due to less aggressive behaviour and effective use of radioactive iodine (RAI) after total thyroidectomy in patients who are at risk for persistent or recurrent disease [2]. The principle of use of RAI in diagnoses and treatment of DTC is presence of sodium iodide symporter (NIS) which facilitates iodide transport in well differentiated thyroid cancer cells like normal thyroid cells [3]. There can be false-positive findings on 131-I RAI whole body scan (WBS), which can be attributed to a wide variety of reasons including ectopic thyroid tissue, physiological uptake in other tissues, RAI retention in body cavities or ducts, direct RAI bonding to metallic foreign bodies, contamination, inflammation and infection, and non-thyroid neoplasms etc. Therefore it is very important to correlate unusual findings on the RAI scan with the patient's history, examination, cross sectional imaging, tumor marker levels like serum thyroglobulin (Tg) levels and histopathological features of the lesion if required [4].

This case report focuses on a possible scenario of a false positive finding on RAI scan which was further evaluated and finally diagnosed as an parotid oncocytoma which is a very rarely reported finding in literature.

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Case Report

60 year old hypertensive male presented to the surgical oncology department with past history of coronary artery disease and percutaneous transluminal coronary angioplasty with complains of right sided neck swelling for past 6 months associated with dysphagia to both solids and liquids for 1 month. He had no associated complains of change in voice, weight gain or loss, loss of appetite, intolerance to heat or cold, altered bowel habits, hair loss or ophthalmic symptoms.

On clinical examination the right lobe of the thyroid gland was enlarged and firm measuring about 3 × 3 cm and moving up with deglutition. Skin over the swelling was normal. Trachea appeared central. Conglomerated nodal mass was palpable at right cervical level II and III region measuring about 3 × 3 cm.

The patient underwent pre-operative 18 F- FDG PET/CT (Fluorodeoxy glucose positron emission tomography/computed tomography) scan, which showed FDG avid 2.5 × 3.2 cm nodule replacing the right lobe of thyroid and extending into isthmus, extending posteriorly in right paratracheal region with specks of calcification (SUVmax-11.12) (shown in Fig. 1f,g). Multiple FDG avid (SUVmax-17.13) nodes in the right central compartment, right level II and level III region – largest measuring 3.5 × 3 cm in level II compressing the internal jugular vein (shown in Fig. 1d,e). Also, note was made of metabolically active left intraparotid nodule measuring 1.9 × 1.2 cm (SUVmax-14.17) (white arrow, Fig. 1a,b). Few non FDG avid subcentimetric nodules noted in both lungs. Ultrasound

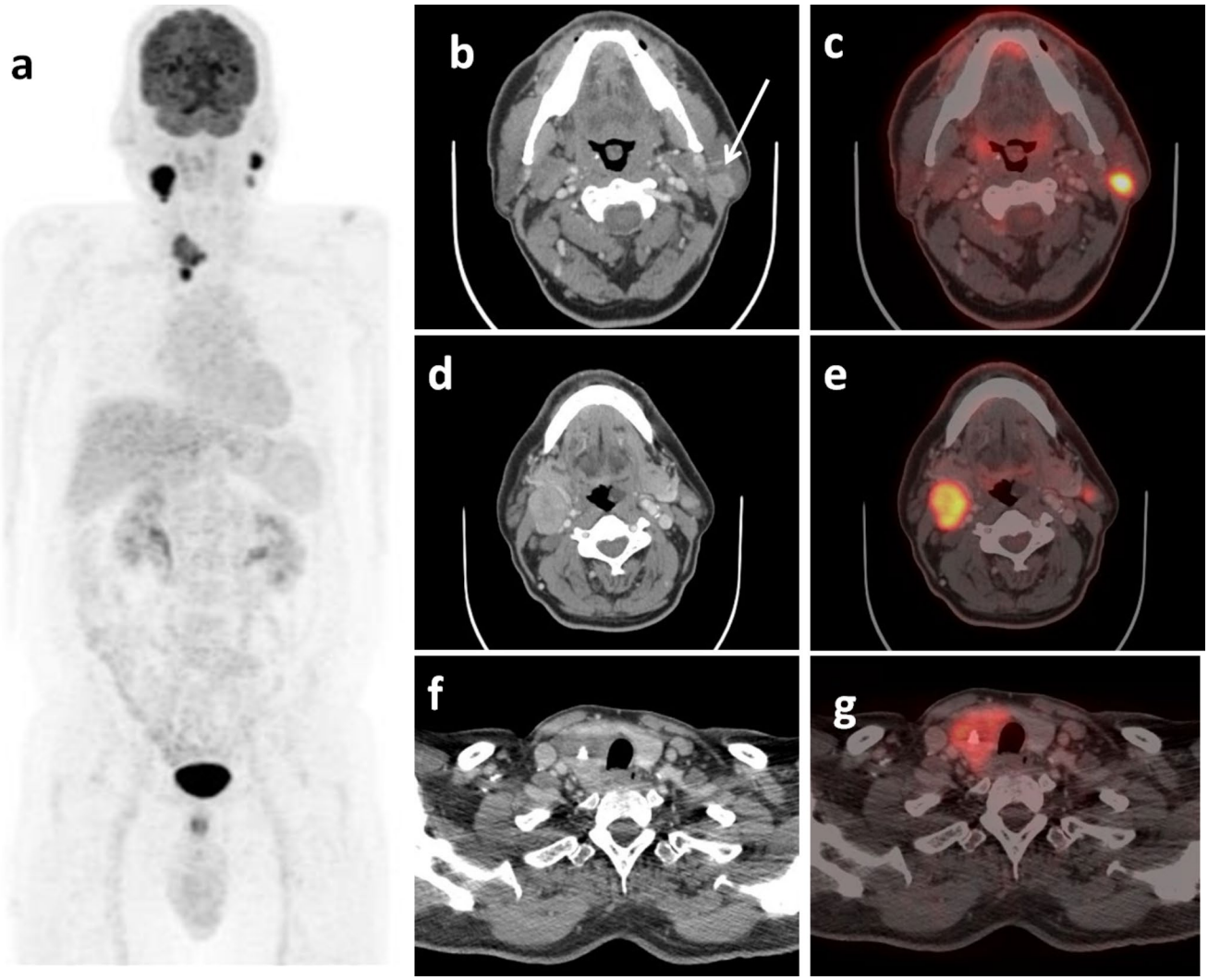

Fig. 1 Shows maximum intensity projection (MIP) image (a), axial sections of CT and fused PET/CT (b-g) showing FDG avid soft tissue nodule in left parotid gland (SUVmax-14.17) (white arrow), FDG avid bilateral cervical lymph nodes, largest right cervical lymph nodal mass measuring 3.5 × 3 cm (SUVmax-17.13) and FDG avid heterogeneously enhancing soft tissue lesion with specks of calcification in right lobe of thyroid gland (SUVmax-11.12)

guided fine aspiration cytology (FNAC) from right thyroid nodule and right upper deep cervical lymph node showed papillary carcinoma (Bethesda VI) and metastasis from papillary carcinoma respectively. At this time FNAC from left parotid nodule was not done considering very unlikely site of metastases from papillary thyroid cancer to deep parotid lymph node. Clinically the patient was staged as papillary carcinoma thyroid cT2N1bMx. Fibreoptic laryngoscopy was done preoperatively to evaluate the vocal cord status which revealed mobile bilateral vocal cords with a vallecular cyst on right side.

The patient underwent total thyroidectomy with central compartment clearance and bilateral selective neck dissection (II-V). A Kochers incision was used for performing the surgery and intra-operative findings were as follows – 4 × 5 cm hard nodule replacing the right lobe of thyroid and involving the isthmus, 1 × 1 cm hard nodule over the upper pole of left lobe of thyroid gland, conglomerated nodal mass involving right level II and III measuring about 3 × 3 cm each, multiple metastatic nodes noted in right level IV, left level II, III and IV (Fig. 2a-d).

The final histopathology revealed 4 × 3.5 × 2.6 cm nodule involving right lobe and isthmus of thyroid (unifocal), conventional papillary carcinoma with lymphovascular invasion and intratumoural perineural invasion present but no extrathyroidal extension noted. The lymph node yield was 72, and 10 lymph nodes were proven metastatic (5 in the right lateral compartment and 5 in the central compartment) with extranodal extension seen. Pathological staging for the disease was papillary carcinoma (classical variant) pT2N1b. According to American thyroid association risk stratification the patient belonged to high risk category. The case was discussed in joint clinic and the patient was referred to nuclear medicine for radioactive iodine treatment.

Post operatively the lab values were - Thyroid stimulating HormoneTSH – 74µIU/ml, anti- Thyroglobulin (Anti-Tg) 1882U/ml, and Thyroglobulin 0.16ng/ml. Low dose (2 mCi) 131-I whole body scan showed small I-131 avid residual thyroid tissue in the neck (remnant) (Fig. 2a, thin arrow) and focal 131-I uptake in left parotid region (Fig. 3a, thick arrow). Patient received high dose radioiodine therapy- 150 millicurie in view of elevated serum Anti Tg levels and suspicious lung nodules. Post therapy scan showed no significant additional lesion compared to pre-therapy whole body scan. On follow up (10 months after radioiodine therapy) blood results were as follows – TSH is 82.49 µIU/ml, Anti- Thyroglobulin is 1098 U/ml, Thyroglobulin-0.01 ng/ml. Follow up 2mCi 131-I RAI scan showed no scan evidence of iodine uptake in thyroid bed (suggesting ablation of remnant thyroid tissue, Fig. 3b) and persistent focal area of increased 131I uptake in left parotid region (Fig. 3b, thick arrow) corresponding to soft tissue nodular lesion in deep left intraparotid region with increased 131-I uptake as shown in 131-I SPECT/CT images (Fig. 3c-e). In view of persistent 131-I avid lesion in left parotid gland (corresponding to same FDG avid left parotid nodule/node in preoperative FDG PET/CT scan); ultrasound guided fine needle aspiration cytology of left deep intraparotid node was done and it showed sheets of oncocytic cells without any nuclear atypia or anisocytosis; feature suggesting low grade benign oncocytoma (Fig. 4a-d).

The case was discussed in joint clinic and tumor board - considering the benign nature of the parotid oncocytoma; it was decided to keep the patient under active surveillance. Patient is currently doing well and is on regular follow up.

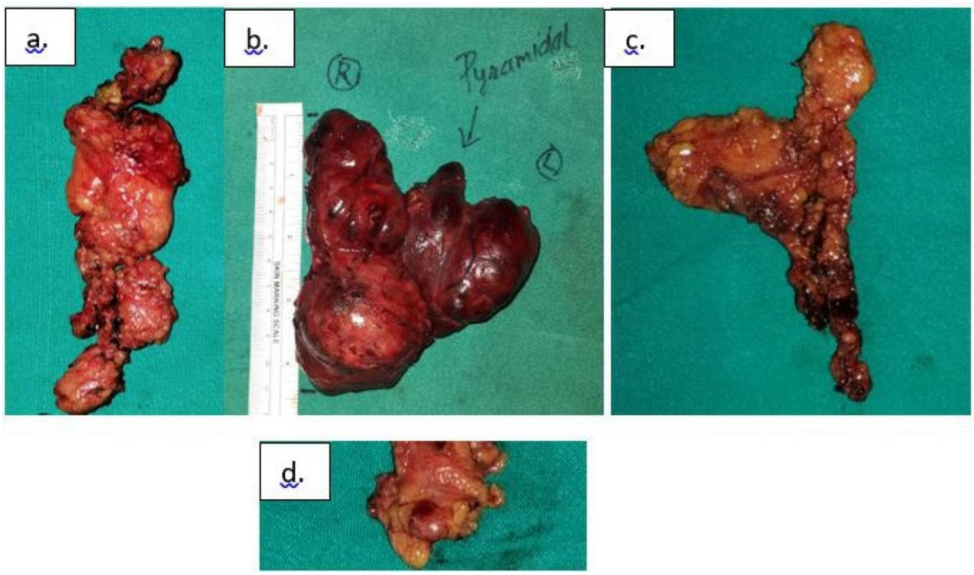

Fig. 2 Specimens of (a) Right selective neck dissection II-V (b) Total thyroidectomy (c) Left selective neck dissection II-V (d) Central compartment clearance

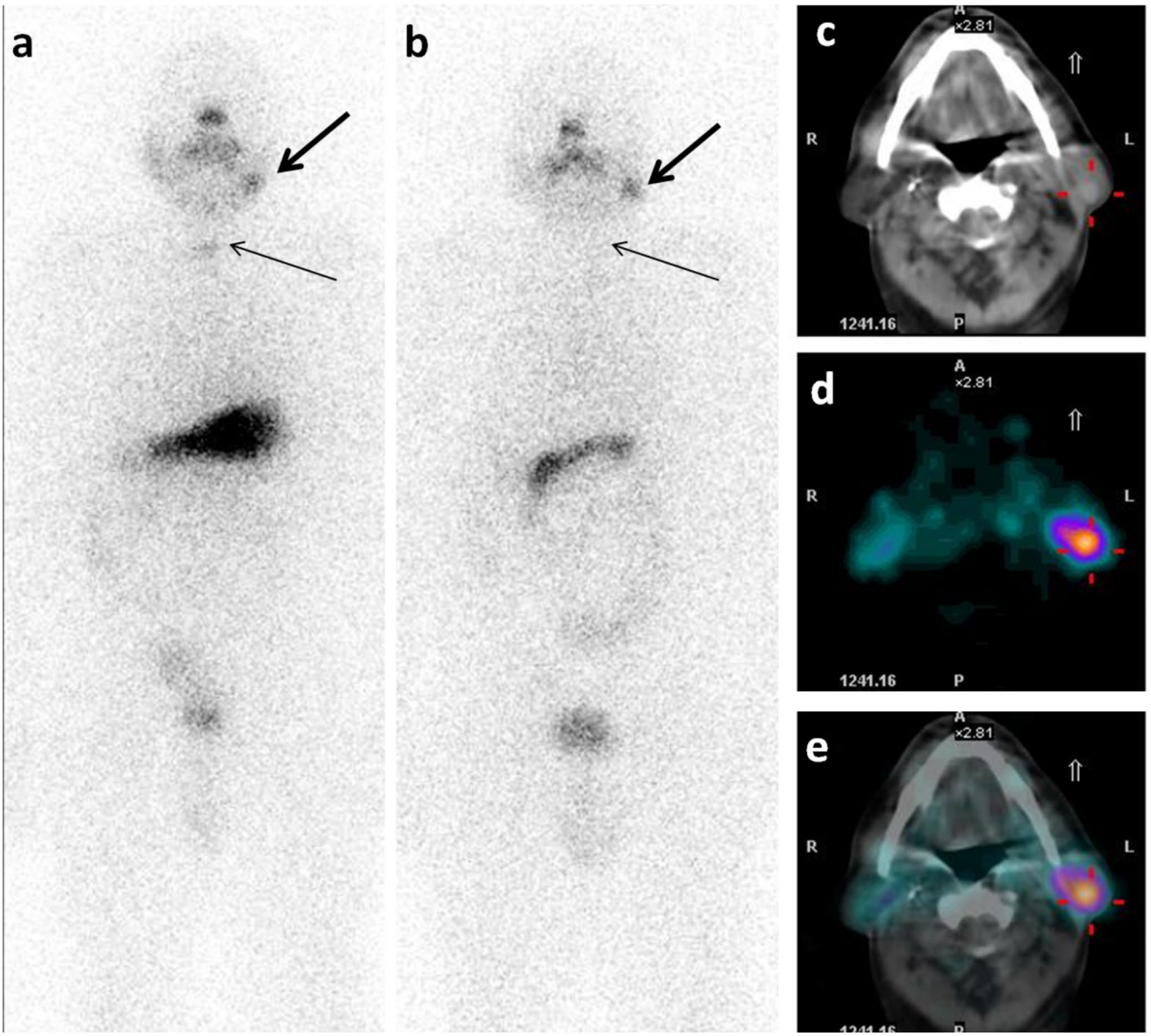

Fig. 3 (a) Baseline 131-I whole body scan (WBS) showing mild 131-I uptake in thyroid bed (remnant) (shown by thin arrow) and focal 131-I uptake in left parotid region (thick arrow). Figure 3(b) shows follow up 131-I WBS done 10 months after radioiodine ablation therapy showing ablation of remnant thyroid tissue in thyroid bed (shown in figure b, thin arrow) and persistent focal 131I uptake in left parotid region (b, thick arrow), corresponding to soft tissue nodular lesion in deep left intraparotid region with increased 131I uptake as shown in 131-I SPECT/CT images (c-e)

Discussion

Papillary thyroid carcinoma (PTC) constitutes 70% of thyroid neoplasm. Conventional PTC shows papillary architecture with branching papillae and covered by cells with eosinophilic cytoplasm with enlarged nuclei [5].

Oncocytomas are benign epithelial tumours characterized by oncocytes with eosinophilic granular cytoplasm rich in mitochondria [6]. They occur most commonly in their sixth to eighth decades and are slightly predominant in women [6]. Oncocytomas account for less than 1% of all salivary gland neoplasms [7]. 82% of salivary gland oncocytoma occur in the parotid [4]. The recurrence rate of oncocytoma is reported as 20 to 30% (after incomplete excision) but malignant transformation is rare [7]. Oncocytes were first described as constituents of normal canine thyroid gland by german pathologist Hurthle in year 1894. Hamperl in year 1931 coined the term "Oncocyte". The word oncocyte is derived from the Greek word "onkousthai" which means – to swell or become larger [8]. Oncocytic cells are thought to originate from the transformation of epithelial cells of salivary gland ducts or acini. Oncocytes have been

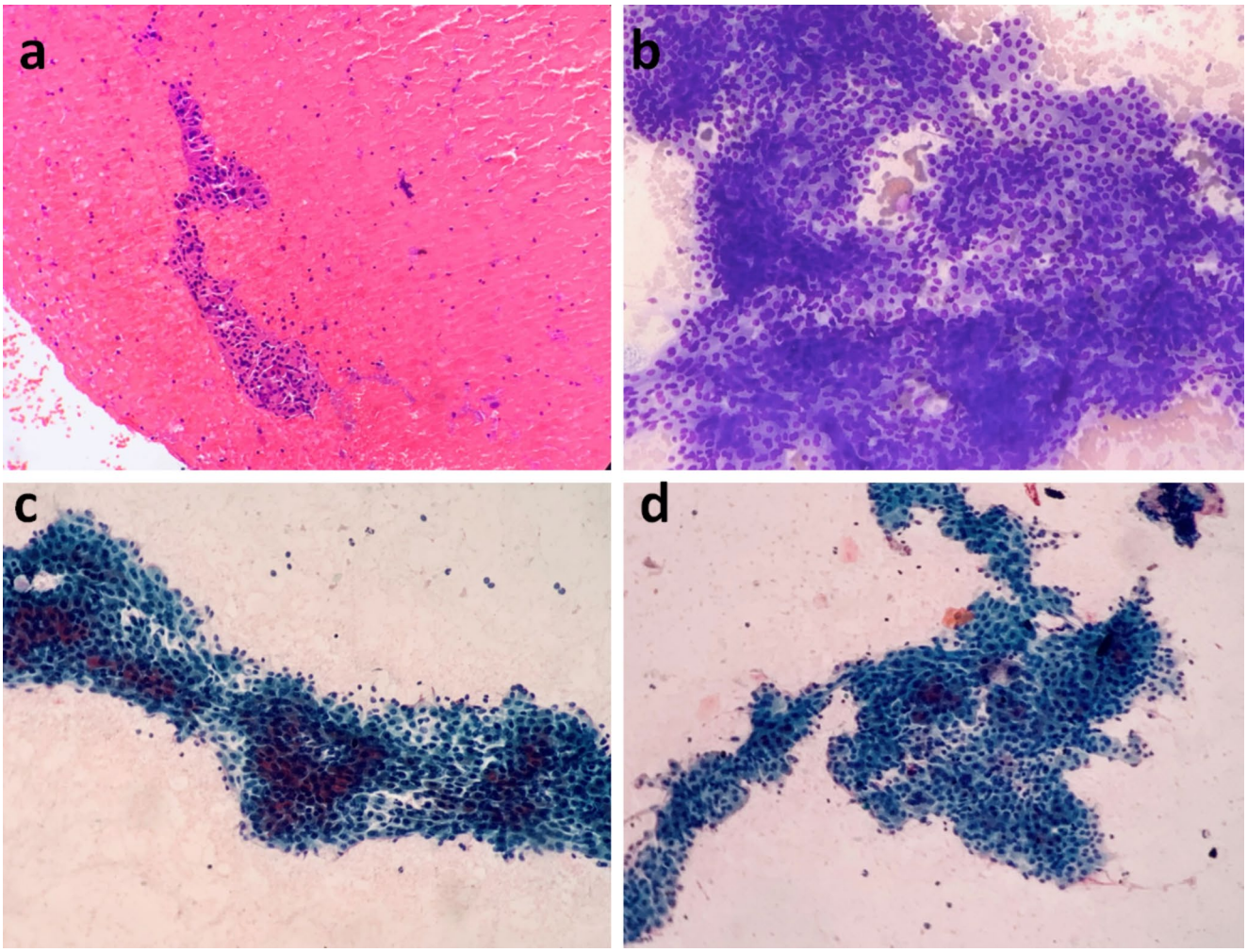

Fig. 4 (a) shows Cell block preparation, (40X) section shows few clusters of benign oncocytic cells. Figure 3(b) shows100X, giemsa stained smear showing sheets of oncocytic cells with abundant cytoplasm. Figure 3 (c,d) shows 200X, Papanicolaou stained smears showing sheets of oncocytic cells without any nuclear atypia or anisocytosis

found to arise in various glandular and secretory epithelia. Oncocytic change has been noted in numerous locations like salivary glands, pituitary, thyroid, parathyroid, nasal cavities, sinuses, ocular caruncle, lacrimal glands, buccal mucosa, eustachian tube and larynx. The synonyms used for oncocytes in thyroid gland includes oxyphilic cells, Askanazy cells and Hurthle cells [8].

Parotid oncocytoma are also called oxyphilic granular cell adenoma. Parotid oncocytoma can show radioiodine uptake as they arise from salivary duct epithelium [9]. Also, they have been shown to demonstrate intense FDG uptake on 18 F FDG PET scans and accumulates technetium Tc99m pertechnetate which have both been attributed to the high content of metabolically active mitochondria [10].

Radioiodine uptake can occur in various tissues although the mechanism is not clearly understood, different proposed mechanisms include functional sodium iodide symporter (NIS) expression- in normal tissues like thymus, breast, salivary glands and gastrointestinal tract, or various benign and malignant tumours, or uptake due to metabolism of radioiodinated thyroid hormone, or retention of radioiodinated body fluids (saliva, tears, blood, urine, gastric and mucosal secretions, etc. associated with or without structural change, or retention and uptake of radioiodine in inflamed tissue and contamination by physiologic secretions [11].

There are few reported cases of synchronous oncocytoma and warthin's tumour in ipsilateral parotid gland [12] but simultaneous occurrence of oncocytoma of parotid with papillary carcinoma thyroid is very rare in reported literature. Although they are pathologically distinct entities, but the simultaneous occurrence, and presence of 131I Iodine uptake in parotid oncocytoma have led us to report this case.

Conclusion

RAI whole body scan is an essential tool in management of differentiated thyroid cancer. However, few other disease conditions can also present with false positive 131 iodine uptake on RAI scans and misinterpretation can result in a battery of expensive tests and unnecessary treatment for the patient. Thus it is important to be aware of possible physiological and pathological causes for 131I iodine uptake and proceed judiciously after thorough clinical/imaging/histological correlation if one finds an abnormal 131Iodine avid lesion not corresponding to thyroid tissue as seen in this case.

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Declarations

Ethics approval The study is conducted abiding the ethical standards of the institution.

Disclosure statement No potential conflict of interest relevant to this article exist.

Conflict of Interest There is no conflict of interest amongst the authors of the study.

Consent A written and informed consent was taken for the procedure.

References

1. Sherman SI (2003) Thyroid carcinoma. Lancet 361(9356):501–511
2. Orosco RK, Hussain T, Noel JE, Chang DC, Dosiou C, Mittra E et al (2019) Radioactive iodine in differentiated thyroid cancer: a national database perspective. Endocr Relat Cancer 26(10):795–802
3. Ravera S, Reyna-Neyra A, Ferrandino G et al (2017) The sodium/iodide symporter (NIS): molecular physiology and preclinical and clinical applications. Annu Rev Physiol. ;79:261–89 A recent review article on iodide homeostasis and properties of sodium-iodide symporter, which are important to understand some of the mechanisms for false-positive RAI uptake
4. Karin, Wu (2021) Uzoezi Ozomaro,Robert Flavell. Causes of false-positive Radioactive Iodine Uptake in patients with differentiated thyroid Cancer. Curr Radiol Rep 9:6
5. Lloyd RV, Buehler D, Khanafshar E (2011) Papillary thyroid carcinoma variants. Head Neck Pathol 5:51–56
6. Oncocytoma of parotid (2014) Gland: a case report and review of the literature. Case Rep Oncol 7:109–116
7. Huvos AG (2005) Oncocytoma. In: Barnes L, Eveson JW, Reichart P, Sidransky D (eds) World Health Organization classification of tumors: pathology and genetics, head and neck tumors. IARC Press, Lyon, pp 242–243
8. Prabakaran SS, Chen F, Aguirre A (2010) Oncocytoma of the parotid gland and its mimickers: a Comprehensive Review. North Am J Med Sci 3(4):171–180
9. Ausband JR, Kittrell RI, Cowan Ri et al (1971) Radioisotope scanning for parotid oncocytoma. Arch Otolaryngol 93:628–629
10. Shah VN, Branstetter BF (2007) Oncocytoma of the parotid gland: a potential false positive finding on 18F-FDG PET. AJR Am J Roentgenol 189:W212–W214
11. Oh J-R, Ahn B-C (2012) False-positive uptake on radioiodine whole-body scintigraphy: physiologic and pathologic variants unrelated to thyroid cancer. Am J Nucl Med Mol Imaging 2(3):362–385
12. Araki Y, Sakaguchi R (2004) Synchronous oncocytoma and Warthin's tumour in the ipsilateral parotid gland. Auris Nasus Larynx 31:73–78