Primary squamous cell carcinoma of thyroid: a case report and review of literature

Mutahir A Tunio1*, Mushabbab Al Asiri1, Mosa Fagih2 and Rashad Akasha3

Abstract

Background: Thyroid gland lacks squamous epithelium (except in some rare situations like embryonic remnants or in inflammatory processes); for that reason the primary squamous cell carcinoma (SCC) of thyroid is extremely rare entity, seen only in less than 1% of all thyroid malignancies and is considered almost fatal. So, far, only few case reports have been published in literature.

Case presentation: Herein we present a 54 years old Saudi female with 3 months history of progressive neck swelling and hoarse voice, who was referred to us by her primary care physician as suspected case of anaplastic carcinoma of thyroid for radical external beam radiation therapy (EBRT). Fine Needle aspiration cytology (FNAC) revealed squamous cell carcinoma. Computed tomography (CT) neck showed 10 × 10 cm mass in left lobe of thyroid invading trachea and skin. Extensive staging work up ruled out the possibility of any primary site of SCC other than thyroid gland. Tumor was found unresectable and was referred to radiation oncology. She received palliative EBRT 30 Gy in 10 fractions. After completion of EBRT, there was progression of disease and patient died 3 months after completion of EBRT by airway compromise.

Conclusion: Primary SCC of thyroid is rare and aggressive entity. FNAC is reliable and effective tool for immediate diagnosis. Surgery is a curative option, but it is not always possible as most of cases present as locally advanced with adjacent organs involvement. EBRT alone was found ineffective. Aggressive combined modality (debulking surgery, radiation and chemotherapy) shall be considered for such cases.

Keywords: Squamous cell carcinoma, Thyroid, Rare, Primary, Fatal

Background

Primary squamous cell carcinoma (SCC) of thyroid is an uncommon malignancy and has poor prognosis [1]. SCC of thyroid constitutes less than 1% of thyroid malignancies and has been found fatal within one year of initial diagnosis [2]. The median age is fifth and sixth decade, but can be seen at any age. Main cause of death in these patients is secondary to respiratory interference by direct invasion or compression of the trachea [3]. When SCC of thyroid is diagnosed, the possibility of the tumor arising from adjacent organs (esophagus, larynx) or representing metastatic disease from primary growth somewhere else (lungs) must be considered before concluding the malignancy as SCC of thyroid.

The etiology of SCC thyroid is uncertain as thyroid gland lacks the squamous epithelium. However three theories have been postulated; first the embryonic nest theory suggests that squamous cells are derived from the embryonic remnants such thyroglossal duct, thymic epithelium and ultimobronchial body [4]. Second the metaplasia theory suggests that the environmental stimuli (inflammation and Hashimoto's thyroiditis) result in squamous metaplasia [5]. Third the de-differentiation theory suggests that existing papillary, follicular, medullary and anaplastic thyroid carcinoma de-differentiate into SCC [6,7].

Herein we present a case of 54 years old Saudi lady with locally advanced primary squamous cell carcinoma of thyroid, diagnosed by fine needle aspiration cytology (FNAC) was treated with radiation therapy.

Case presentation

A 54 year old Saudi female presented in our clinic with neck swelling and hoarse voice. She had noticed this
swelling for 3 months and it had been rapidly increasing in size over a week causing dyspnoea and dysphagia to solids. Her previous medical history revealed type II diabetes mellitus since last 10 years and hypothyroidism since last 3 years, for that she was taking thyroxin 50 micrograms daily and metformin. She had no history of smoking and her weight was stable.

On physical examination, her vitals were stable. A fixed hard neck mass of size 8 × 8 cm was palpable in the left thyroid lobe with inflammatory surface Figure 1. There was no palpable cervical lymphadenopathy and examination of chest, heart, nervous system and abdomen was normal. Clinical differential diagnosis was anaplastic carcinoma of thyroid.

Ultrasonography showed huge left thyroid lobe partially cystic and solid mass of size 8.5 × 9 cm. Computed tomography (CT) neck showed 10 × 10 cm mass in left lobe of thyroid, partially necrotic invading to adjacent skin and trachea and no lymphadenopathy was found Figure 2. Serum T4, thyroid stimulating hormone (TSH), thyroglobulin and serum calcium were within normal limits. Fine needle aspiration cytology (FNAC) of mass was performed, which revealed squamous cell carcinoma Figure 3. Differential diagnosis was metastatic.

---

**Figure 1** A fixed hard neck mass of size 8 × 8 cm was palpable in the left thyroid lobe with inflammatory surface.

**Figure 2** Computed tomography (CT) neck showing 10 × 10 cm mass in left lobe of thyroid, partially necrotic invading to adjacent skin and trachea and no cervical lymphadenopathy.

**Figure 3** Fine needle aspiration cytology (FNAC) showing nests of pleomorphic cells with abundant eosinophilic cytoplasm and keratin formation along with intercellular bridging.

**Figure 4** Bone scintigraphy showing no evidence of distant bone metastasis.
| Author [Ref] | Gender/Age | Presentation | Stage | Associated Problem | Treatment given | Survival | Comments |
|-------------|------------|--------------|-------|--------------------|----------------|----------|----------|
| Zimmer PW [1] | Female/64 years | Asymptomatic neck mass | T2N0M0 | - | Total thyroidectomy | 7 months | - |
| Kebapci N [7] | Female/25 years | Right neck mass | T4N1M0 | Hashimotos' thyroiditis | - | - |
| Papillary carcinoma | Total thyroidectomy and RAI therapy | - | 44 months | - | - | - |
| Ko YS [8] | Male/87 years | Asymptomatic neck mass | T4N0M0 | - | Right lobectomy | NA | CKS/6 + CK19 + EMA,p53 focal + BRAF mutation + |
| Mercante G [9] | Male/67 years | - | T2N0M0 | Follicular carcinoma | Lobe-isthmusectomy + Adjuvant chemoradiation | 2 years | - |
| De Vos FY [10] | - | Neck mass | T4N0M0 | - | Induction chemotherapy (Cisplatin + paclitaxel) | - | - |
| Total thyroidectomy | 20 months | Induction chemotherapy resulted in R0 resection | - | - | - | - | - |
| Yucel H [11] | Male/88 years | Neck mass | T4N0M0 | Hyperthyroidism | Total thyroidectomy + Adjuvant radiation therapy | 6 months | Patient RAI therapy 20 years back |
| Eorn TI [12] | Female/43 years | Neck mass | T3N0M0 | Papillary carcinoma | Total thyroidectomy + Adjuvant radiation therapy + S9.4 Gy And RAI | 8 months | CK7 + p 63 + |
| Makay O [13] | Male/53 years | Neck mass, hoarse voice and weight loss | T3N0M0 | - | Near total thyroidectomy + Chemoradiation 50 Gy + Doxorubicin and cyclophosphamide | 2 months | - |
| | Male/71 years | - | - | - | - | 4 months | - |
| | - | - | - | - | - | 5 months | - |
| Fassan M [17] | Female/64 years | Neck mass | T3N0M0 | Goiter | Total thyroidectomy | NA | CK 5/6 + CK 7 + CK 19 + |
| Maamouri F [18] | Female/87 years | Right neck mass | T3N0M0 | Papillary carcinoma | Total thyroidectomy + And RAI therapy | 6 months | - |
| Chintamani [14] | Female/50 years | Dysphagia, hoarse voice and stridor | T4N0M0 | Hyperthyroidism | Total thyroidectomy + Adjuvant radiotherapy 50 Gy | 12 months | - |
| Male/60 years | | | | | | | - |
| Male/58 years | | | | | | | - |
| Jung TS [15] | Male/56 years | Neck mass, hoarse voice | T3N0M0 | Follicular carcinoma | Total thyroidectomy + Adjuvant radiotherapy 50 Gy | 8 years | - |
| Sutak J [19] | Female/80 years | Asymptomatic neck mass | T4N1M0 | Tall cell variant papillary carcinoma | Total thyroidectomy | - | CK 7 + CK 19 + CK AE1/3 + P53 focal + |
| Zhou XH [16] | 4 patients | NA | T4N0M0 | - | Total thyroidectomy + Adjuvant radiotherapy 50 Gy + chemotherapy | 4 months | Longer survival was seen in combined trimodality treatment |
| Lam KY [20] | 4 females/71 years | Neck mass, stridor | T4N0M0 | - | Total thyroidectomy | 4 months | - |

**Table 1 Previously published case reports (2000-2012) of primary squamous cell carcinoma of thyroid**
squamous cell carcinoma from another primary location. CT chest, abdomen, pelvis, magnetic resonance imaging (MRI) of head and neck region, pan-endoscopy, laryngoscopy, esophagoscopy and bone scintigraphy did not reveal any primary lesion or other metastatic disease. Figure 4. Radiological stage was made as T4N0M0.

In a multidisciplinary tumor (MDT) meeting it was labeled unresectable and patient was referred for external beam radiation therapy (EBRT) after prophylactic percutaneous endoscopic gastrostomy (PEG) insertion. Due to retrosternal extention of disease, tracheostomy was deferred. Patient received 30 Grays (Gy) in 10 fractions to thyroid. Post radiation therapy, there was progression size of neck mass with progressive dyspnoea. Patient died of airway compromise 3 months of palliative EBRT.

Discussion
Primary SCC of the thyroid gland is an extremely rare and aggressive entity usually presents with classic triad features; (I) rapidly enlarging mass in the older patients behaving like anaplastic carcinoma, (II) it may be associated with other thyroid malignancies and (III) histological features of intercellular bridges and keratin [8-10]. FNAC is reliable and confirmatory tool, but it is mandatory to exclude the metastatic SCC [11].

Treatment with surgery, radiation therapy and chemotherapy alone has been found ineffective in previously published similar case reports, as majority of these patients present as locally advanced cases not amenable for curative resection Table 1. The better survival rates have been achieved with aggressive combination therapy (surgery followed by adjuvant radiation therapy (50-60 Gy) with or without chemotherapy or induction chemotherapy followed by surgery) [11-16].

Conclusion
Primary squamous cell carcinoma of thyroid is a rare and aggressive entity with poor prognosis. FNAC is effective confirmatory tool, but efforts shall be made to rule out metastatic SCC originating from other sites. Surgery, radiotherapy and chemotherapy alone are ineffective. Aggressive treatment with surgery followed by adjuvant radiotherapy with or without chemotherapy is recommended to achieve better outcome.

Consent
Written permission was taken from the patient for publication of the case report.

Abbreviations
SCC: Squamous cell carcinoma; EBRT: External beam radiation therapy; FNAC: Fine needle aspiration cytology; CT: Computed tomography; RAI: Radioactive iodine; TSH: Thyroid stimulating hormone; MDT: Multidisciplinary tumor meeting; PEG: Percutaneous endoscopic gastrostomy.

Author details
1Department of Radiation Oncology, Comprehensive Cancer Center, King Fahad Medical City, Riyadh, PO 59046, Saudi Arabia. 2Department of Cytogenetics, King Fahad Medical City, Riyadh, PO 59046, Saudi Arabia.

Authors’ contributions
MAT, MAA Manuscript preparation. RA Data Collection. MF Pathological data. All authors read and approved the final manuscript.

Competing interests
Authors have neither potential conflict of interest nor received any grants for this case report.

Received: 28 February 2012 Accepted: 27 March 2012 Published: 27 March 2012

Table 1 Previously published case reports (2000-2012) of primary squamous cell carcinoma of thyroid (Continued)

| Author | Gender | Age | Neck mass | T staging | Procedure | LND | Follow up |
|--------|--------|-----|-----------|-----------|-----------|-----|-----------|
| Jones JM [22] | Male | 48 years | Hoarse voice, left neck mass | T4N1M0 | - | Total thyroidectomy and LND | 8 months |

References
1. Zimmer PW, Wilson D, Bell N. Primary squamous cell carcinoma of the thyroid gland. Mil Med 2003, 168:124-5.
2. Korovin GS, Cho HT, Kutloff DB, Sobol SM. Squamous cell carcinoma of the thyroid: a diagnostic dilemma. Ann Otol Rhinol Laryngol 1989, 98:59-65.
3. Simpson WJ, Carruthers TH. Squamous cell carcinoma of thyroid gland. Am J Surg 1986, 154:66-6.
4. Goldberg HM, Harvey P. Squamous cell cysts of the thyroid with special reference to the etiology of squamous epithelium in the human thyroid. Br J Surg 1956, 43:565-9.
5. Chaudhary RK, Barnes EL, Myers EN. Squamous cell carcinoma arising in Hashimoto’s thyroiditis. Head Neck 1994, 16:582-5.
6. Bronner MP, Livolsi VA. Spindle cell squamous carcinoma of the thyroid: an unusual anaplastic tumor associated with tall cell papillary carcinoma. Mod Pathol 1991, 4:630-43.
7. Kebapci N, Efe B, Kabukcuoglu S, Akalin A, Kebapci M. Diffuse sclerosing variant of papillary thyroid carcinoma with papillary squamous cell carcinoma. J Endocrinol Invest 2003, 26:730-4.
8. Ko YS, Hwang TS, Han HS, Lim SD, Kim WS, Oh SY. Primary pure squamous cell carcinoma of the thyroid: report and histogenetic consideration of a case involving a BRAF mutation. Pathol Int 2012, 62:43-8.
9. Mercante G, Marchesi A, Covello R, Dianese L, Spiano G. Mixed squamous cell carcinoma and follicular carcinoma of the thyroid gland. Auris Nasus Larynx 2011, 38:1-S, PMID 21855238.
10. De Vos FY, Sewnaik A, de Witt JH, Smid EL, den Bakker MA, van Meerten E. Combined therapy for thyroid squamous cell carcinoma. Head Neck 2012, 34:131-4.
11. Yucel H, Schaper NC, van Beek M, Bravenboer B: Primary squamous cell carcinoma of the thyroid years after radioactive iodine treatment. Neth J Med 2010, 68:224-6.

12. Eom TI, Koo BY, Kim BS, Kang KH, Jung SK, Jun SY, Bae HS, Kim LS: Coexistence of primary squamous cell carcinoma of thyroid with classic papillary thyroid carcinoma. Pathol Int 2008, 58:797-800.

13. Makay O, Kaya T, Ertan T, Icoz G, Akylidiz M, Yilmaz M, Tuncyurek M, Yetkin E: Primary squamous cell carcinoma of the thyroid: report of three cases. Endocr J 2008, 55:559-64.

14. Chintamani PK, Singh J, Sugandhi N, Bansal A, Bhattachrya D, Saxena S: Is an aggressive approach justified in the management of an aggressive cancer- the squamous cell carcinoma of thyroid? Int Semin Surg Oncol 2007, 4:8.

15. Jung TS, Oh YL, Min YK, Lee MS, Lee MK, Kim KW, Chung JH: Korean J Intern Med 2006, 21:73-8.

16. Zhou XH: Primary squamous cell carcinoma of the thyroid. Eur J Surg Oncol 2002, 28:43-5.

17. Fassan M, Pennelli G, Pelizzo MR, Rugge M: Primary squamous cell carcinoma of the thyroid. Immunohistochemical profile and literature review. Tumori 2007, 93:518-21.

18. Maamouri F, Goucha A, Ben Mna N, Ben Hassouna J, Debbabi B, Ouslati Z, Boussen H, El May A, Garmoudi A: Tunis J Med 2007, 85:251-3.

19. Sutak J, Armstrong JS, Rusby JE: Squamous cell carcinoma arising in a tall cell papillary carcinoma of the thyroid. J Clin Pathol 2005, 58:662-4.

20. Lam KY, Lo CY, Liu MC: Primary squamous cell carcinoma of thyroid gland: an entity with aggressive clinical behavior and distinctive cytokeratin expression profiles. Histopathology 2001, 39:279-86.

21. Keer GG, Giordano TJ, Merino MJ: Squamous cell carcinoma of the thyroid: an aggressive tumor associated with tall cell variant of papillary thyroid carcinoma. Mod Pathol 2000, 13:742-6.

22. Jones JM, McCluggage WG, Russell CF: Primary squamous cell carcinoma of the thyroid. Ulster Med J 2000, 69:58-60.

doi:10.1186/1758-3284-4-8
Cite this article as: Tunio et al.: Primary squamous cell carcinoma of thyroid: a case report and review of literature. Head & Neck Oncology 2012 4:8.

Submit your next manuscript to BioMed Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at www.biomedcentral.com/submit