CASE REPORT – OPEN ACCESS

International Journal of Surgery Case Reports 37 (2017) 36–40

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Primary squamous cell carcinoma of the thyroid: Case report and systematic review of the literature

Florian Struller, Moritz Senne, Claudius Falch, Andreas Kirschniak, Alfred Konigsrainer, Sven Muller*

Clinic for Visceral, General and Transplant Surgery, Tuebingen University Hospital, Germany

ARTICLE INFO

Article history:
Received 1 February 2017
Received in revised form 9 June 2017
Accepted 11 June 2017
Available online 13 June 2017

Keywords:
Primary squamous cell cancer
Thyroid
Surgery
Radiochemotherapy
Case report
Systematic review

ABSTRACT

BACKGROUND: Primary squamous cell cancer (PSCC) of thyroid is a rare malignancy with poor prognosis. It is mandatory to exclude secondary involvement of the thyroid by panendoscopy, CT-scan and immunohistochemical analysis. As treatment surgery, radiation and rarely chemotherapy is employed.
METHODS: A systematic review of the literature was conducted searching medline and embase database using the medical subject headings "primary squamous cell carcinoma of thyroid" and "primary squamous cell cancer of thyroid", for articles published until April 2016 (n = 1733). Of interest were the used treatment modalities and survival outcomes.
RESULTS: A total of 35 publications reporting on 50 cases including ours were finally analyzed. A curative treatment approach was described in 24 patients (48%). Additional radiotherapy, chemotherapy or radiochemotherapy was applied in 17, 7 and 7 patients respectively. Median overall survival was 6 months [range 0–48] for 47 patients. Disease free survival was only achieved in 8 patients with disease limited to the thyroid gland, complete surgical resection and additional radiotherapy or radiochemotherapy [reported median 20 months; range 12–48].
CONCLUSION: Reported disease free survival of PSCC of the thyroid was only achieved in patients with complete surgical resection in combination with adjuvant radio- and/or chemotherapy. However long term survival has not been reported in the literature yet.

1. Introduction

Primary squamous cell carcinoma (PSCC) of the thyroid is a rare neoplasm and constitutes less than one per cent of all primary thyroid carcinomas [1]. It can occur at any age but the median age of presentation is the fifth and sixth decade [2]. It is usually diagnosed as advanced disease with infiltration in adjacent organs or as an incidentaloma with poor prognosis. It is crucial to exclude any metastatic disease, direct extension from an extra-thyroidal primary tumor and the association with a tall cell variant of papillary carcinoma of the thyroid before making the diagnosis as this has impact on potential treatment [3]. Therefore mandatory tools for the diagnosis of primary squamous cell carcinoma of the thyroid are panendoscopy, CT-Scan or PET-CT and immunohistological analysis [4]. The ideal potentially curative treatment has not been ruled out yet. Currently, there are different treatment option described which include surgery, chemotherapy and radiation [5]. Additionally, the value of lymphadenectomy has not been further investigated for the patientís outcome.

2. Methods

The following case report was presented according to the SCARE guidelines [6]. Additionally a systematic review of the literature was conducted searching medline and embase database using the medical subject headings "primary squamous cell carcinoma of thyroid" and "primary squamous cell cancer of thyroid", for articles published until March 2016. All English written publications reporting on primary squamous cell carcinoma of the thyroid were included. Complete diagnostic work up including immunohistochemistry, CT-Scan and panendoscopy to exclude secondary squamous cell cancer of the thyroid were mandatory. Cases were also included by the diagnosis of an autopsy study, which showed no other source of squamous cell carcinoma than the thyroid. We excluded following cases:

- cases of secondary disease to the thyroid
- cases which have been diagnosed only by fine needle aspiration cytology (FNAC)

* Corresponding author at: Working Group for Surgical Technique and Training, Clinic for General, Visceral and Transplant Surgery, Tuebingen University Hospital, Germany, Waldhörnlestrasse 22, 72076, Tuebingen, Germany.
E-mail address: sven.mueller@med.uni-tuebingen.de (S. Muller).

http://dx.doi.org/10.1016/j.ijscr.2017.06.011

- cases in which SCC was present in association with other thyroid malignancies
- such as papillary carcinoma, adenocarcinoma or anaplastic carcinoma
- cases in which complete diagnostic work-up as CT-scan, panendoscopy and immunohistochemistry was not performed
- double citations

The objectives of this review were the evaluation of the assessment of local and distant tumor extension, described treatment options (surgery, radiotherapy, chemotherapy), number of patients with curative intended treatment and the outcome parameters recurrence, disease free and overall survival with respect to additional radiotherapy and/or chemotherapy. A curative intended treatment was assumed when a complete (R0) resection was achieved.

3. Case presentation

3.1. Patient history and treatment

A 61- year old female patient with the history of a hashimoto thyreoiditis was admitted at our hospital because of a clinically visible single thyroid nodule in the left lobe. Cervical sonography revealed a total thyroid volume of 11.7 ml with a single hypoechogenic nodule of 2.5 × 2.1 × 2.4 cm, displaying an irregular ventral contour. A scintigraphy showed the nodule to be hypofunctional. Additionally the patient had diagnosed a non-classified collagenosis with fibrosis of the lung. The operation was initiated as a hemithyreoidectomy left. After the diagnosis of a squamous cell carcinoma in the frozen section biopsy the operation was completed as a total thyroidectomy. Because of sonographic unsuspicious cervical lymph nodes a prophylactic lymphadenectomy was not performed. The postoperative course was uneventful and the patient could be discharged at the 3rd postoperative day. The possibility of secondary thyroid involvement deriving from other primary cancers was ruled out by PET-CT and panendoscopy. Postoperatively the patient received 30 fractions of adjuvant radiation therapy of the thyroid bed, the regional lymphatic drainage and the mediastinum with 54 Gy and a boost of the thyroid bed with 60 Gy over a 8-week period. 37 months after surgery, the patient developed a local recurrence infiltrating the left carotic artery and pulmonary metastasis. The patient refused any further treatment but is still alive 40 month after initial surgery.

3.2. Histopathological and immunohistochemical findings

The resected thyroid weighed 15 g. The left thyroid measured 4,0 × 3,0 × 2,2 cm. The cut surface showed a withish tumor with a size of 2,7 × 2,0 × 1,5 cm and the margins were clean. The right thyroid weighed 5 g with a size of 3,5 × 2,5 × 1,9 cm and an unremarkable cut surface. Microscopically the tumor appeared as a knotty grown solid epithelial neoplasm with

herd-like necrosis and hyperchromatic nuclei with prominent eosinophilic nucleoli, partially with horn formation. The tumor cell complexes were surrounded by collagen-rich connective tissue, with patch shaped lymphocytic infiltrates, which partially formed secondary follicles.

Histopathology and immunohistochemistry showing positivity for p63, CK5 is displayed in Fig. 1a–c while staining for thyroglobulin was restricted to the non-neoplastic thyroid tissue (Fig. 1d). In summary, the specimen showed a 2,7 cm in size, low differentiated, keratinizing squamous cell carcinoma. The surrounding parenchyma was presenting with a lymphocytic thyroiditis, presenting a final TNM-classification: pT2, pNx, L0, V0, G3, R0

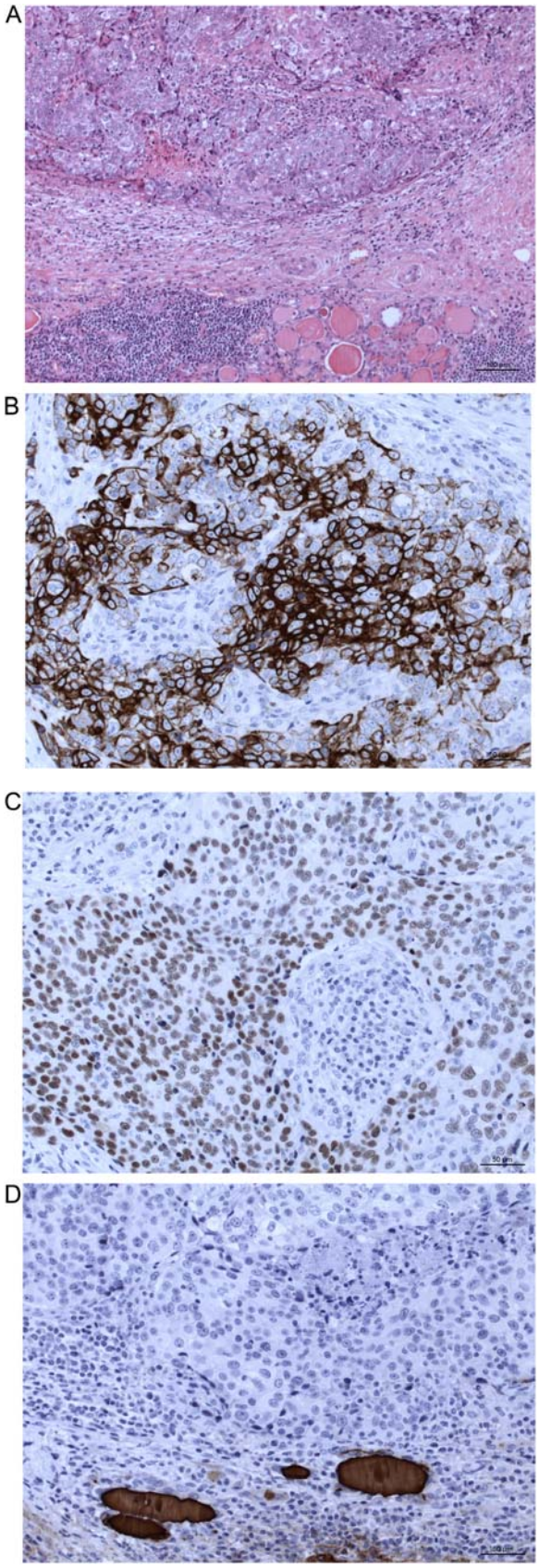

Fig. 1. a) Hematoxylin and eosin –staining 200×, b) Cytokeratin 5/6 immunohistopathology, c) p63 immunohistopathology, d) thyroglobulin immunohistopathology.

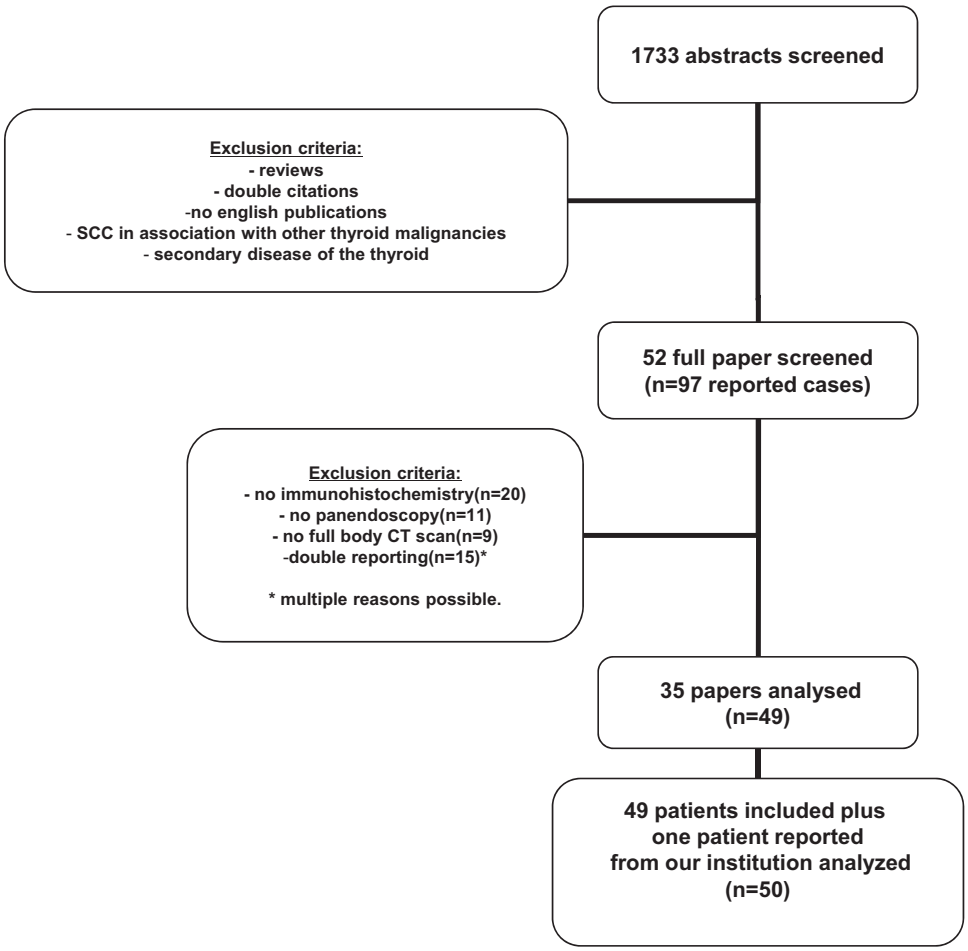

Fig. 2. The flow chart of identified studies.

4. Results of systematic literature review

1733 abstracts could be extracted from medline and embase database using the medical subject headings "primary squamous cell carcinoma of thyroid" and "primary squamous cell cancer of thyroid". A flow diagram of literature research is displayed in Fig. 2. According to the inclusion/exclusion criteria, 52 full papers with reporting of 97 cases were screened. Some 17 publications with 48 cases without complete work-up, including CT-scan, panendoscopy, immunohistochemistry and double citations were excluded [6–22]. Finally, 35 papers and ours reporting on 50 patients were available for analysis [2–523–53].

The median age of these 50 patients was 64 years [range 28–88] with a higher prevalence in woman (n = 35; 70%). Patient characteristics and treatment details are listed in Table 1. Patients were grouped into cases with curative treatment intention (complete surgical resection) and palliative treatment intention (incomplete surgical resection). A coexisting Hashimoto thyroiditis was described in eight cases. Locally advanced tumor stage was described in 43 patients (86%), 26 patients (52%) had tumor infiltrated cervical lymph nodes and 5 patients (10%) had distant metastasis at the time of diagnosis. Complete resection of the tumor was achieved in 24 patients (48%) and thus a curative treatment approach was assumed.

As surgical treatment 30 patients had a total thyroidectomy (60%) whereas 10 patients had a hemithyreoidectomy (20%) and 10 subtotal thyroid resection (10%). 27 patients (54%) had an additional cervical lymphadenectomy.

Table 1
Patient characteristics and treatment details.

	Curative treatment intention n=	Palliative treatment intention n=
Patients	24	26
Median Age in years [range]	60 [28–88]	66 [36–82]
Female	17	18
Coexsiting Hashimoto thyroiditis	5	3
Staging		
T1/2	5	2
T3	11	1
T4	8	23
N+	11	15
N-	12	4
N-Status not mentioned	1	7
M+	0	5
M-	23	19
M-Status not mentioned	1	2
G1	2	2
G2	1	4
G3	7	6
G-Status not mentioned	14	14
Surgery		
Thyroidectomy	16	14
Hemithyroidectomy	8	2
Other subtotal thyroid resection	0	10
additional Lymphadenectomy	19	8
Additional Treatment		
Preoperative Chemotherapy	1	0
Postoperative Radiotherapy	10	7
Postoperative Chemotherapy	4	2
Postoperative Radiochemotherapy	3	4

Regarding a postoperative additional treatment, 17 patients received a radiotherapy (34%), 6 patients a chemotherapy (12%) and 7 patients a radiochemotherapy (14%).

The dominating regime of radiation was 60 gray in 30 fractions and a platinium-containing chemotherapy. In 45 patients details on recurrence and survival were reported. The median survival of these 45 patients was 6 months [range 0–40 months] with 39 patients (81%) dying within 12 months. One patient developed a local recurrence after 9 months and died after 14 month while our reported case developed a local and systemic recurrence after 37 months being still alive after 40 months. In seven cases a disease free survival was reported at 12, 15, 18, 20, 21, 24 and 26 months respectively [median 20 months; range 12–26]. None of these seven patients had a lymph node involvement and all received an adjuvant therapy (five times radiotherapy, one chemotherapy and one radiochemotherapy).

5. Discussion

Primary squamous cell cancer of the thyroid is a rare disease and mostly diagnosed at an advanced stage with poor prognosis [5]. Up to date there are only a few cases of PSCC of the thyroid described. The problem in analyzing PSCC is the differentiation of SCC primarily arising in the thyroid versus secondary SCC metastasis. Crucial for an accurate analysis of all PSCC cases is therefore an exclusion of all unproven primary cases. The right diagnosis of a PSCC of the thyroid is achieved through the combination of clinical, radiologic, endoscopic and immunohistologic findings. A computertomography of the neck and chest is necessary to exclude other sources of a squamous cell carcinoma which metastasized in the thyroid, e.g. from the larynx or lung [54,55]. By definition PSCC of the thyroid is entirely composed cells of squamous origin [1]. Immunohistochemistry can elucidate the typical cytokeratin pattern (CK 5/6 and CK 7) which is crucial to exclude an squamous cell carcinoma deriving or coexisting with a papillary carcinoma of the thyroid [51,56]. Further positivity of p53 and p63 as marker of poor differentiation in combination with Ki-67 can be helpful in making the right diagnosis [5]. Negativity for TTF-1 and thyroglobulin expression, both markers for follicular and papillary carcinomas, exclude the possibility of these common tumors [25].

The origin of PSCC of the thyroid is unclear and includes several unproven different hypothesis. Some suggest that squamous cells can originate from embryonic remnants containing squamous cells, such as the thyroglossal duct or the thymic epithelium [53]. Another theory assumes that squamous metaplasia of the follicular epithelium might develop due to the chronic inflammation in thyroiditis (e.g. Hashimoto thyroiditis) [27]. Our review shows 8 cases out of 45 with a lymphocytic infiltration of the thyroid next to squamous cell carcinoma, diagnosed as chronic thyreoidits.

Reviews by Syed et al. from 2011 and Cho et al. from 2014 reported 28 publication with a total of 84 cases of PSCC of the thyroid and 39 publication with 89 cases respectively [1]. Taking out the cases with lack of complete diagnostic work up as described above, only 49 patients from 35 publications remained available in our analysis (mainly due to a lacking immunohistochemistry). Disease free survival was only reported in seven patients with early tumor stage limited to the thyroid gland without lymph node involvement, complete surgical resection in combination with additional radiotherapy and/or chemotherapy. All other patients presented with advanced disease and succumbed irrespective of any treatment within the following 6–12 months. Lymphadenectomy and extended resections had no impact on patient survival. Many case reports suggest that PSCC of the thyroid is poorly responsive to either chemotherapy or radiotherapy concluding that any additional treatment to surgery can be omitted. However since no data comparing the natural course of the disease versus palliative radiochemotherapy and surgery alone versus surgery and additional radiochemotherapy are lacking this conclusion should be considered cautiously. Furthermore all described cases with disease free survival received an additional radiotherapy and/or chemotherapy. In contrast to the review by Syed et al. who concluded that surgery, radiation and chemotherapy in any reported combination have little or no impact in improving outcome or prolonging survival and recommended palliative trachetomy our results show that a small number of patients with disease limited to the thyroid gland benefit from complete surgical resection in terms of a hemithyroidectomy or total thyroidectomy.

Squamous cell carcinomas, e.g. of the esophagus or the pharynx as well as larynx, are usually treated by radiotherapy [57]. Though, some reports declared squamous cell carcinoma of the thyroid to be radioresistant [3,34]. Our data show, that disease free survival greater 12 months was only achieved in seven patients with an early tumor stage without lymph node involvement, complete surgical resection in combination with additional radiotherapy and/or chemotherapy. However as presented in our case with a recurrence after 37 months real long term survival has not been reported in this pathology making cure within this disease doubtful.

Finally because of the highly aggressive course of PSCC of the thyroid we recommend that staging and treatment should be analog to that of anaplastic thyroid cancer. Surgical resection should be limited to cases with possible complete surgical resection in combination with adjuvant radio- and/or chemotherapy omitting resectional surgery in cases with airtract infiltration, metastatic cervical lymph nodes and distant metastasis. Cure is very unlikely in PSCC of the thyroid, as disease free long-term survival has not been reported in the literature yet.

Conflicting interests

Nothing to declare.

Funding

Nothing to declare.

Ethical approval

Not applicable.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

S.M. & F.S. contributed by designing, facilitating and planning the manuscript, collecting data, performing the interpretation, writing and revising the manuscript, and final approval of the submitted manuscript. M.Se., C.F., A.Ko & A.K. contributed by interpretation, revising and final approval of the submitted manuscript.

Acknowledgments

We acknowledge support from Deutsche Forschungsgemeinschaft and Open Access Publishing Fund of University of Tübingen.

Guarantor

Dr. Sven Müller accepts full responsibility for the work, had access to the data, and controlled the decision to publish.

References

[1] M.I. Syed, M. Stewart, S. Syed, et al., Squamous cell carcinoma of the thyroid gland: primary or secondary disease, J. Laryngol. Otol. 125 (2011) 3–9.
[2] I. Ab Hadi, R.D. Bliss, T.W. Lennard, A.R. Welch, Primary squamous cell carcinoma of the thyroid gland: a case report and role of radiotherapy, Surgeon 5 (2007) 249–251.
[3] H. Kleinhans, K.W. Schmid, T. Verse, Primary squamous cell carcinoma of the thyroid gland, HNO 61 (2013) 661–663.
[4] M.A. Tunio, M. Al Asiri, M. Fagih, R. Akasha, Primary squamous cell carcinoma of thyroid: a case report and review of literature, Head Neck Oncol. 4 (2012) 8.
[5] M. Shrestha, S.K. Sridhara, L.J. Leo, G.L. Coppit, 3rd and Ehrhardt NM. Primary squamous cell carcinoma of the thyroid gland: a case report and review, Head Neck 35 (2013) E299–303.
[6] R.A. Agha, A.J. Fowler, A. Saetta, I. Barai, S. Rajmohan, D.P. Orgill, the SCARE Group, The SCARE statement: consensus-based surgical case report guidelines, Int. J. Surg. 34 (2016) 180–186.
[7] R. Agrawal, V. Tandon, A. Agrawal, G. Agrawal, N. Krishnani, S.K. Mishra, Squamous cell carcinoma of thyroid gland, J. Assoc. Phys. India 49 (2001) 279–280.
[8] C.Y. Chen, H.S. Tseng, C.H. Lee, W.P. Chan, Primary squamous cell carcinoma of the thyroid gland with eggshell calcification: sonographic and computed tomographic findings, J. Ultrasound Med. 29 (2010) 1667–1670.
[9] A.M. Cook, L. Vini, C. Harmer, Squamous cell carcinoma of the thyroid: outcome of treatment in 16 patients, Eur. J. Surg. Oncol. 25 (1999) 606–609.
[10] S. Ghoshal, T. Bhattacharyya, A. Sood, R. Tyagi, Palliative radiation in primary squamous cell carcinoma of thyroid: a rare case report, Indian J. Palliat Care 19 (2013) 192–194.
[11] R.L. Goldman, Primary squamous cell carcinoma of the thyroid gland: report of a case and review of the literature, Am. Surgeon 30 (1964) 247–252.
[12] T.Y. Huang, S.G. Lin, Primary squamous cell carcinoma of the thyroid, Indiana Med. 79 (1986) 763–764.
[13] V.K. Kapoor, D. Sharma, A.K. Mukhopadhyay, T.K. Chattopadhyay, Primary squamous cell carcinoma of the thyroid gland–a case report, Jpn. J. Surg. 15 (1985) 60–62.
[14] C.G. Kleer, T.J. Giordano, M.J. Merino, Squamous cell carcinoma of the thyroid: an aggressive tumor associated with tall cell variant of papillary thyroid carcinoma, Mod. Pathol. 13 (2000) 742–746.
[15] G.S. Korovin, D.B. Kuriloff, H.T. Cho, S.M. Sobol, Squamous cell carcinoma of the thyroid: a diagnostic dilemma, Ann. Otol. Rhinol. Laryngol. 98 (1989) 59–65.
[16] S.C. Kukreti, P.V. Prabhune, G.H. Upadhyaya, H.H. Shah, Primary squamous cell carcinoma of the thyroid gland, J. Indian Med. Assoc. 58 (1972) 287–288.
[17] P.V. Kumar, S.A. Malekhusseini, A.R. Talei, Primary squamous cell carcinoma of the thyroid diagnosed by fine needle aspiration cytology. A report of two cases, Acta Cytol. 43 (1999) 659–662.
[18] K.T. Mai, H.M. Yazdi, L. MacDonald, Fine needle aspiration biopsy of primary squamous cell carcinoma of the thyroid gland, Acta Cytol. 43 (1999) 1194–1196.
[19] A. Prakash, S.C. Kukreti, M.P. Sharma, Primary squamous cell carcinoma of the thyroid gland, Int. Surg. 50 (1968) 538–541.
[20] S. Sanchez-Sosa, N.P. Rios-Luna, R. Tamayo Bdel, K. Simpson, J. Albores-Saavedra, Primary squamous cell carcinoma of the thyroid arising in Hashimoto's thyroiditis in an adolescent, Pediatr. Dev. Pathol. 9 (2006) 496–500.
[21] K. Sapalidis, I. Anastasiadis, N. Panteli, et al., Primary squamous cell carcinoma of the thyroid gland, J. Surg. Case Rep. 2014 (2014).
[22] W.J. Simpson, J. Carruthers, Squamous cell carcinoma of the thyroid gland, Am. J. Surg. 156 (1988) 44–46.
[23] F. Booya, T.J. Sebo, J.L. Kasperbauer, V. Fatourechi, Primary squamous cell carcinoma of the thyroid: report of ten cases, Thyroid 16 (2006) 89–93.
[24] M. Asik, E. Binnetoglu, H. Sen, et al., Less aggressive disease in patients with primary squamous cell carcinomas of the thyroid gland and coexisting lymphocytic thyroiditis, Contemp. Oncol. (Pozn) 19 (2015) 458–461.
[25] N.K. Batchelor, Primary squamous cell carcinoma of the thyroid: an unusual presentation, J. Bronchol. Interv. Pulmonol. 18 (2011) 168–170.
[26] F. Bolfi, M.A. Domingues, M. Sobrinho-Simoes, et al., Primary squamous cell carcinoma of the thyroid diagnosed as anaplastic carcinoma: failure in fine-needle aspiration cytology? Case Rep. Pathol. 2014 (2014) 301780.
[27] L.R. Bonetti, M. Lupi, M. Trani, et al., EGFR polysomy in squamous cell carcinoma of the thyroid: report of two cases and review of the literature, Tumori 96 (2010) 503–507.
[28] R.K. Chaudhary, E.L. Barnes, E.N. Myers, Squamous cell carcinoma arising in Hashimoto's thyroiditis, Head & neck 16 (1994) 582–585.
[29] R.N. Chavan, B. Chikkala, C. Biswas, S. Biswas, D.K. Sarkar, Primary squamous cell carcinoma of thyroid: a rare entity, Case Rep. Pathol. 2015 (2015) 838079.
[30] K.H. Chen, Y.H. Chou, A.L. Cheng, Primary squamous cell carcinoma of the thyroid with cardiac metastases and right ventricle outflow tract obstruction, J. Clin. Oncol. 30 (2012) e260–3.
[31] Kulshreshtha P. Chintamani, J. Singh, et al., Is an aggressive approach justified in the management of an aggressive cancer–the squamous cell carcinoma of thyroid? Int. Semin. Surg. Oncol. 4 (2007) 8.
[32] F.Y. De Vos, A. Sewnaik, J.H. de Wilt, E.J. Smid, M.A. den Bakker, E. van Meerten, Combined therapy for thyroid squamous cell carcinoma, Head Neck 34 (2012) 131–134.
[33] M. Fassan, G. Pennelli, M.R. Pelizzo, M. Rugge, Primary squamous cell carcinoma of the thyroid: immunohistochemical profile and literature review, Tumori 93 (2007) 518–521.
[34] T. Harada, M. Katagiri, C. Tsukayama, Y. Higashi, K. Shimaoka, Squamous cell carcinoma with cyst of the thyroid, J. Surg. Oncol. 42 (1989) 136–143.
[35] E.B. Kampsen, N. Jager, M.H. Max, Squamous cell carcinoma of the thyroid: a report of two cases, J. Surg. Oncol. 9 (1977) 567–578.
[36] Y.S. Ko, T.S. Hwang, H.S. Han, S.D. Lim, W.S. Kim, S.Y. Oh, Primary pure squamous cell carcinoma of the thyroid: report and histogenic consideration of a case involving a BRAF mutation, Pathol. Int. 62 (2012) 43–48.
[37] K.Y. Lam, C.Y. Lo, M.C. Liu, Primary squamous cell carcinoma of the thyroid gland: an entity with aggressive clinical behaviour and distinctive cytokeratin expression profiles, Histopathology 39 (2001) 279–286.
[38] J.L. Long, A.M. Strocker, M.B. Wang, K.E. Blackwell, EGFR expression in primary squamous cell carcinoma of the thyroid, The Laryngoscope 119 (2009) 89–90.
[39] J.T. Lui, M.N. Khalil, S.P. Chandarana, Primary squamous cell of the thyroid-an abbreviated clinical presentation, J. Otolaryngol. Head Neck Surg. 43 (2014) 17.
[40] O. Makay, T. Kaya, Y. Ertan, et al., Primary squamous cell carcinoma of the thyroid: report of three cases, Endocr. J. 55 (2008) 359–364.
[41] J. Misonou, M. Aizawa, M. Kanda, Y. Uekita, T. Motohara, Pure squamous cell carcinoma of the thyroid gland–report of an autopsy case and review of the literature, Jpn. J. Sur. 18 (1988) 469–474.
[42] K. Mussig, J. Dahm, A. Koitschev, et al., Primary squamous cell carcinoma of the thyroid, Intern. Med. J. 38 (2008) 69–70.
[43] P.E. Riddle, H.P. Dincsoy, Primary squamous cell carcinoma of the thyroid associated with leukocytosis and hypercalcemia, Arch. Pathol. Lab. Med. 111 (1987) 373–374.
[44] M. Sahoo, C.S. Bal, D. Bhatnagar, Primary squamous-cell carcinoma of the thyroid gland: new evidence in support of follicular epithelial cell origin, Diagn. Cytopathol. 27 (2002) 227–231.
[45] K. Saito, Y. Kuratomi, K. Yamamoto, et al., Primary squamous cell carcinoma of the thyroid associated with marked leukocytosis and hypercalcemia, Cancer 48 (1981) 2080–2083.
[46] C. Theander, B. Loden, J. Berglund, T. Seidal, Primary squamous carcinoma of the thyroid?a case report, J. Laryngol. Otol. 107 (1993) 1155–1158.
[47] A. Tsuchiya, S. Suzuki, T. Nomizu, Y. Yamaki, R. Abe, S. Katayama, Squamous cell carcinoma of the thyroid–a report of three cases, Jpn. J. Surg. 20 (1990) 341–345.
[48] W.M. Wan Muhaizan, K.S. Phang, N.A. Sharifah, D. al Amin, Primary squamous cell carcinoma of the thyroid–a case report, Malaysian J. Pathol. 20 (1998) 109–111.
[49] H. Yucel, N.C. Schaper, M. van Beek, B. Bravenboer, Primary squamous cell carcinoma of the thyroid years after radioactive iodine treatment, Neth. J. Med. 68 (2010) 224–226.
[50] W. Zahradka, B. Spiesecke, [Primary squamous cell cancer of the thyroid], Z. Gesamte Inn. Med. 44 (1989) 562–563.
[51] X.H. Zhou, Primary squamous cell carcinoma of the thyroid, Eur. J. Surg. Oncol. 28 (2002) 42–45.
[52] P.W. Zimmer, D. Wilson, N. Bell, Primary squamous cell carcinoma of the thyroid gland, Mil. Med. 168 (2003) 124–125.
[53] J.M. Jones, W.G. McCluggage, C.F. Russell, Primary squamous carcinoma of the thyroid, Ulster Med. J. 69 (2000) 58–60.
[54] J.Y. Jang, K.W. Kwon, S.W. Kim, I. Youn, Primary squamous cell carcinoma of thyroid gland with local recurrence: ultrasonographic and computed tomographic findings, Ultrasonography 33 (2014) 143–148.
[55] M.M. Wagner, J.K. Cure, J.J. Caudell, et al., Prognostic significance of thyroid or cricoid cartilage invasion in laryngeal or hypopharyngeal cancer treated with organ preserving strategies, Radiat. Oncol. 7 (2012) 219.
[56] E. Vardar, N. Erkan, U. Bayol, C. Yilmaz, M. Dogan, Metastatic tumours to the thyroid gland: report of 3 cases and brief review of the literature, Radiol. Oncol. 45 (2011) 53–58.
[57] T.I. Eom, B.Y. Koo, B.S. Kim, et al., Coexistence of primary squamous cell carcinoma of thyroid with classic papillary thyroid carcinoma, Pathol. Int. 58 (2008) 797–800.
[58] H. Keski-Santti, A.A. Makitie, K. Saarilahti, Intensity-modulated radiotherapy in definitive oncological treatment of hypopharyngeal squamous cell carcinoma, Eur. Arch. Otorhinolaryngol. 272 (2015) 2489–2495.