

The prevalence of thyroid malignancy incidentally detected by ultrasound in patients with non-thyroidal head and neck cancer

EJ Yun¹, DY Yoon¹, YJ Kim², KW Oh³

Department of Radiology¹ & Endocrinology², Kangdong Seongsim Heart Hospital, Hallym University, Department of Endocrinology³, Kangbuk Samsung Hospital, Sungkyunkwan University, Seoul, Korea

Background

Thyroid cancer is one of the common head and neck malignancies and may be found incidentally with other head and neck cancers. However, to our knowledge, there have been few studies to investigate incidentally detected lesions of the thyroid gland in patients with head and neck cancer.

Purpose

To evaluate the prevalence and risk of malignancy in incidental thyroid lesions identified by ultrasound (US) in patients with head and neck cancer.

Materials and Methods

Patients

All patients undergoing surgery for head and neck cancers (Jan 2004 - Jan 2012).

Among them, 717 patients underwent US of the neck for the preoperative evaluation of cervical lymph node status.

20 studies [diffuse thyroid disease without a focal nodular appearance (n = 16) & prior thyroidectomies (n = 4)] were excluded

A final 697 patients (542 men & 155 women; mean age, 59.1 ± 12.7 years; range, 18-91 years) were included in this study.

Sites of primary head and neck cancers

- larynx (n = 162), tongue (n = 112), hypopharynx (n = 83), tonsil (n = 79), oral cavity (n = 54), salivary gland (n = 51), paranasal sinus (n = 44), hard or soft palate (n = 36), nasopharynx (n = 26), and others (n = 50).

Thyroid US and US-guided FNA

Performed by two radiologists (EJ Y and DY Y), more than 10 years of experience in thyroid and neck US.

iU 22 ultrasound unit (Philips Medical Systems, Bothell, WA) or Acuson Sequoia 512 (Siemens Medical Solutions, Mountain View, CA) using a 5- to 15- MHz linear array transducer.

Results

- 236/ 697 patients had thyroid incidentalomas.

Single (n= 99) / 2 nodules (n=41) / 3 nodules (n=12) / 4 or more nodules (n=84)

- 61/ 236 patients (25.8%) : US-guided FNA (due to suspicious malignancy)

Non-diagnostic (n=10) -> periodic US F/U after H&N cancer treatment

Thyroidectomy (n=39) (Total, 22 / Partial, 17)

- Histopathological diagnosis (56 patients)

By FNA (n=17) / FNA + surgery (n=34) / surgery (n=5)

Benign : 42 lesions (34 patients) ; nodular hyperplasia (n=29) / follicular adenoma (n=10) / chronic thyroiditis (n=3)

Malignant : 24 lesions (22 patients) ; Rt. Lobe (n=12) / Lt. lobe (n=10) / Isthmus (n=2)

23 papillary & 1 follicular carcinomas

Lymph node metastases ; Central compartment (level VI) : 2 patients, Central + lateral compartments : 2 patients

Distant metastasis ; T1N0M0 (n=18) / T1N1aM0 (n=2) / T2N1bM0 (n=1) / T3N1bM1 (n=1)

-212 patients (did not undergo total thyroidectomy)

; 47 patients (without US F/U) - followed-up with other modalities (n = 30), lost to follow-up (n = 13), died during the follow-up (n = 4)

; 165 patients (US follow-up) (mean, 24.0 ± 18.5 months; range, 4 ~ 106 months) no radiologic evidence of thyroid malignancy

- Significant age difference (p = 0.0000)

Incidental thyroid lesion (+) vs. (-) mean age ; [62.5 ± 11.8 years] vs. [57.1 ± 13.1 years]

- Significant sex difference (p = 0.0000)

Women (82/155; 52.9%) >> men (154/542; 28.4%)

- Overall, of the 236 patients with incidental thyroid nodules discovered on US, 22 had a thyroid malignancy.

-If one assumes that all non-biopsied lesions were benign, the risk of malignancy for the entire population of patients with incidental thyroid lesions was 9.3% (22/236; 95% CI, 7.5-11.3%) on a patient-by-patient basis.

-No statistically significant difference was found between the malignant and benign groups with regard to age and sex, respectively.

Discussion

High-frequency US provides greater spatial resolution than other imaging modalities and therefore detect and accurately localize more incidental thyroid lesions.

Previous studies have shown that incidental thyroid lesions were found in 10% to 67% of patients studied by US examination performed for non-thyroid indications (Table 1).

US also has ability to differentiate malignant from benign thyroid nodules ; Malignant features-Taller-than-wide shape, spiculated margin, marked hypoechoogenicity, absence of a halo, predominantly solid composition, the presence of micro- or macrocalcifications, and intranodular vascularity. In autopsy series, the reported risk of malignancy of asymptomatic thyroid nodules ranges from 2.9% to 12.5% on patient-by-patient basis. The risk of malignancy in incidental thyroid lesions in our study (9.3%) is in the low range of those of previous US studies(7.7% - 21.6%) . The identification of incidental thyroid lesions may affect surgical planning in patients with head and neck cancer. These lesions deserve further diagnostic work-up prior to the treatment of head and neck malignancies to ensure adequate therapy and to avoid a second-stage operation. Most malignant lesions detected in our study were papillary carcinoma ranging from T1N0M0 to T1N1aM0, which generally has a high rate of long-term survival if treated appropriately with thyroidectomy.

This suggests that early detection of the incidental thyroid cancer in patients with head and neck cancer may have a favorable influence on the survival of such patients. Our prevalence of incidental thyroid lesion (33.9%) is similar to that of a previous report by Wakasugi-Sato et al, who reported a prevalence of 30% in a group of patients evaluated for oral cavity cancer. However, different sex composition in our study group (~80% of male patients) may underestimate the true prevalence of incidental thyroid lesion. (generally, prevalence of thyroid nodules: women>men)

Limitation : Retrospective study, Not all incidentally found thyroid lesions could be histologically confirmed & we assumed that all non-histologically confirmed lesions were benign -> Underestimation of the true malignancy rate

Table 1. Reported prevalence of incidental thyroid lesions detected on US, CT, MR, PET, and PET/CT

Author (reference)	Imaging modality	Publication year	Purpose of examination	Study population	Prevalence	Comment
Brander	US	1991	General population	253	27%	Prospective
Ezzat	US	1994	General population	100	67%	Prospective
Bruneton	US	1994	General population	1000	35%	Prospective
Wiest	US	1998	General population	2,441	10%	Chernobyl nuclear reactor clean-up workers
Kim	US	2002	Thyroid screening + Neck imaging	1,140	15%	Prospective
Wakasugi-Sato	US	2010	Oral squamous cell carcinoma	301	30%	
Present study	US		Non-thyroidal head and neck cancer	690	34%	
Yousem	CT or MR	1997	Neck imaging	231	16%	
Yoon	CT	2008	Neck imaging	734	17%	
Lohan (10)	Time-resolved MRA	2008	Supraaortic arterial disease	624	8%	
Cohen (11)	PET	2001	Various malignant tumors	4,525	2%	
Kim (12)	PET	2005	Various malignant tumors	4,136	2%	
Choi (13)	PET/CT	2006	Various malignant tumors + cancer screening	1,763	4%	
Are (14)	PET	2007	Various malignant tumors	8,800	3%	
Nam (15)	PET	2007	Non-thyroidal head and neck cancer	689	3%	
Eloy (16)	PET or PET/CT	2009	Various malignant tumors	630	5%	
Lin (17)	PET or PET/CT	2011	Lymphoma	1,868	3%	

Summary

The prevalence of incidental thyroid lesion identified by US was 33.9% (236/697), and the rate of malignancy was at least 9.3% (22/236) among these incidental thyroid lesions. We propose that screening of the thyroid gland should be included in the preoperative US examination for cervical lymph node metastases in patients with non-thyroidal head and neck cancer.