



Papillary thyroid carcinoma in Denmark 1996–2008: An investigation of changes in incidence

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ARTICLE INFO

Article history:

Received 1 August 2012

Received in revised form 24 September 2012

Accepted 24 October 2012

Available online 20 November 2012

Keywords:

Thyroid cancer

Papillary thyroid carcinoma

Epidemiology

Incidence

ABSTRACT

Background: A rise in the incidence of thyroid cancer has been reported in several countries, and the increase is only seen in the papillary type. Increased detection due to higher resolution ultrasound and fine needle aspiration has been proposed as the explanation, recent registry studies however question this assumption. **Methods:** National, unselected, prospective cohort study of 1350 papillary thyroid cancer patients in Denmark from 1996 to 2008. **Objective:** To analyze changes in incidence by time and to identify factors which might influence detection rate. **Results:** A rise in incidence is seen with age standardized ratios increasing from 1.43 per 100,000 per year in 1996 to 2.16 per 100,000 per year in 2008. The median age at presentation was 46 years and median tumor size was 18 mm. Male/female ratio was 1/2.9. By dichotomizing the material in a time period before and after the 30th of June 2001, no significant change in the proportion of diagnosed tumors smaller than 1 or 2 cm was found, and 42.8% of the rise in incidence was explained by tumors larger than 2 cm. No significant change in diagnostic use of ultrasound or fine needle aspiration was found, and a significant change toward more extensive thyroid surgery could not be confirmed. **Conclusion:** This study shows a significant rise in incidence of papillary thyroid carcinoma in Denmark from 1996 to 2008, which is not explained by increased use of preoperative diagnostic modalities. Other reasons need to be considered.

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1. Introduction

Papillary thyroid carcinoma is the most frequent malignancy of the thyroid gland [1], and a rise in incidence has been reported in several countries [2–6]. In the US a 2.4 fold increase was observed between 1973 and 2002 according to the Surveillance, Epidemiology, and End Results program (SEER) [1]. The authors found that the rise in incidence was almost exclusively caused by papillary

carcinomas smaller than 2 cm. It was also found that mortality remained unchanged over time. Based on the fact that studies of prevalence have shown a frequency of more than 35% of small papillary tumors in autopsy thyroid glands [7], it was concluded that the rise in incidence might be caused by an increased diagnostic detection rate, due to the implementation of high resolution ultrasound scanners. However, later studies have questioned this assumption. Chen et al. [8] reviewed the SEER data from 1988 to 2005 and reported an increasing incidence in all tumor sizes leading to the conclusion “that increased diagnostic scrutiny is not the sole explanation”. Similarly Aschebrook-Kilfoy et al. [9] studied SEER data from 1992 to 2006 and found a similar age-specific pattern and lack of geographic variation across racial/ethnic groups and concluded that “a detection effect cannot completely explain the observed increase in thyroid cancer

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¹ A study from The Danish Thyroid Cancer Group – DATHYRCA (part of the DAHANCA organization) (see Appendix A).

incidence". It seems that no conclusion has been reached concerning the main reasons for the still rising incidence of papillary thyroid carcinomas. Especially the increased use of ultrasound (US) is controversial. Many of the published studies are based on regional or national cancer registries and are without significant clinical information.

In Denmark clinical, pathological and prognostic information about patients with thyroid cancer have been prospectively registered in the national thyroid cancer database – DATHYRCA since January 1, 1996 and due to personal identity numbers and the possibility for crosschecks to national governmental databases a very high completeness is achievable. The setup gives a unique possibility for adding valuable information to the discussion regarding changes of incidence in papillary thyroid carcinoma.

The aim of this study was to analyze changes in incidence over time in a national, prospective series of unselected Danish patients with papillary thyroid carcinoma and to identify factors which might influence detection rate.

2. Materials and methods

The DATHYRCA database is located under the structure of the Danish Head and Neck Cancer Study Group (DAHANCA). The database prospectively registers clinical, surgical, histopathology and follow-up data from Danish thyroid cancer patients, on a national level. To secure completeness the DATHYRCA database was crosschecked to three national governmental databases:

The Danish Cancer Registry, The Danish Pathology Registry and The Danish Patient Registry. All cancers in Denmark are reported to The Danish Cancer Registry, and since 1987, reporting of data has been mandatory. The Danish Pathology Registry is a national database including all histological and cytological reports in Denmark. The Danish Patient Registry includes codes for clinical diagnoses and surgical procedures for all hospitalizations in Denmark. Due to a unique 10 digit personal identification number (CPR-number) it is possible to trace the individual patient throughout all of the governmental registries.

CPR-number lists from the DATHYRCA database were compared to lists from the National Patient Registry and the National Cancer Registry according to the ICD thyroid cancer code (DC73.9) and patients missing in the DATHYRCA database were identified. Furthermore, a cross reference based on topological and morphological codes was made to the Danish Pathology Registry. For patients missing in the DATHYRCA database medical records were retrieved and reviewed resulting in a retrospective inclusion of 182 thyroid cancer patients.

In order to check the DATHYRCA database for missing information concerning the individual patient a subsequent test of key variables on patient characteristics, presurgical diagnostics, surgical procedures and pathological information, was executed and when missing, medical records were reviewed and eligible data added. This strategy does not ascertain completeness on the variable level and information can still be missing in the database. In general diagnostic procedures were taken into consideration

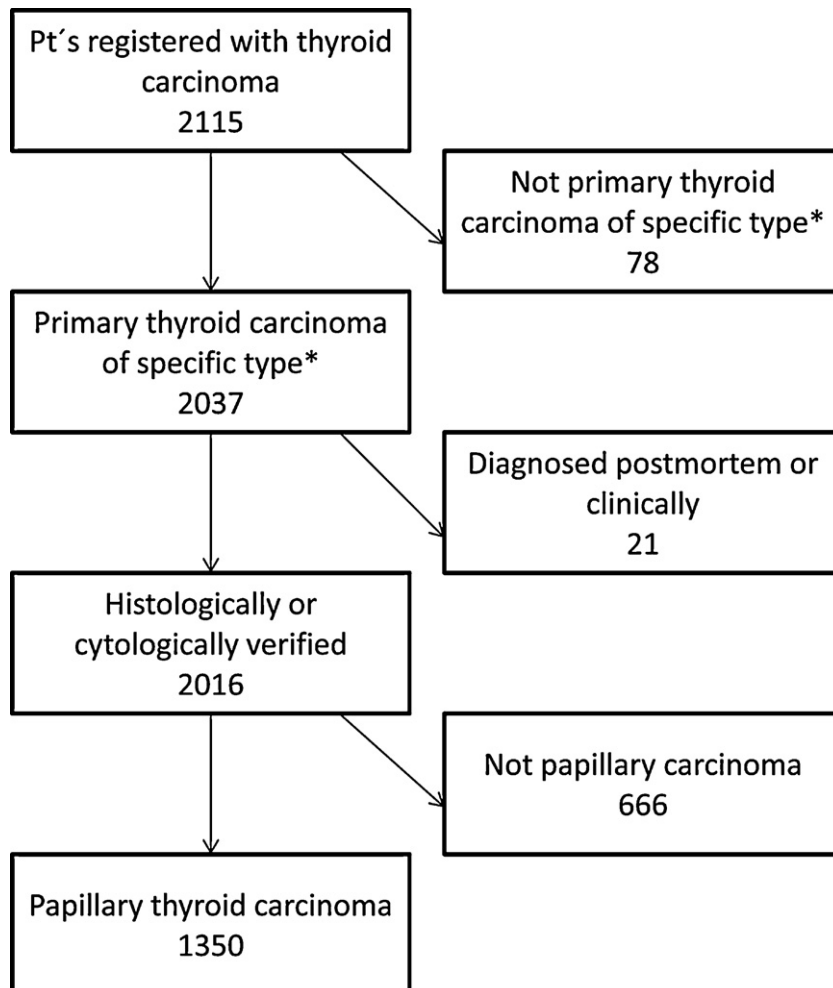


Fig. 1. Flow diagram showing the identification of patients in the DATHYRCA fulfilling the inclusion criteria. *Papillary 67%, follicular 18%, medullary 7% and undifferentiated 8%.

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