

## 'Epidemic' of Thyroid Cancer: Epidemic of Diagnosis

Thyroid cancer is the most common endocrine cancer and accounts for about 1% of all cancers. The incidence has been rising for last few decades all over the world except Africa and the rise in some countries has been of epidemic proportions. In Singapore, the incidence has increased by about 225% between the time periods of 2000 and 2014 (unpublished data). The increase has been seen in both men and women.<sup>1</sup> Women especially in earlier age continue to have an increased incidence of thyroid cancer. This has been attributed to improved access to healthcare due to events related to menopause and reproduction.<sup>2</sup>



Current evidence shows that the increased incidence of thyroid cancers is seen predominantly in the papillary subtype, with no increase seen in other subtypes, such as follicular cancer, anaplastic and poorly differentiated cancer, and medullary cancer. The increase has been prominent in smaller size tumors (less than 4 cm), and more than 50% are of the micropapillary type.<sup>3</sup> However, there has been an increase in larger sized cancers and advanced stage disease as well which can hardly be explained with increased screening and detection.<sup>4</sup> Despite the increasing incidence of thyroid cancer, the effect on mortality has not changed; and has been stable over the last few decades.

What are the factors that have led to the increased incidence of papillary thyroid cancers? There is no doubt that more cancers are being detected with increased detection with the overzealous use of ultrasound. A good example is that of the thyroid cancer epidemic seen in Korea where there was a strong correlation between the proportions of the population screened in a region in 2008 and 2009 and the regional incidence of thyroid cancer in 2009.<sup>5</sup> The increasing use of computed tomography (CT) has also contributed to some increase and treatment of smaller cancers. The more liberal use of CT will further inflate the incidence of thyroid cancer possibly as a result of radiation exposure.<sup>6</sup> Other factors that may also have contributed to the increased papillary over follicular thyroid cancer include iodine prophylaxis and increased incidence of BRAF mutations over the decades.<sup>7</sup>

What is effect of the clinical and economic burden as a result of increased incidence of thyroid cancer? Total thyroidectomy is not without its risks especially permanent hypoparathyroidism and vocal cord paralysis. Added to that is the need for life-long thyroxine, associated problems of physiological suppression and the morbidity of cardiovascular and bone-related problems.<sup>8</sup> Recent data have suggested that such a rapid increase in thyroid cancer for the next 10 years in the US would cost an estimated \$18 to 20 billion.<sup>9</sup> The diagnosis of cancer is associated with a 2.5-fold increase in bankruptcy in the US and, therefore, the increasing incidence and treatment may carry many more risks.<sup>10</sup> What about the medicolegal risks? So far, increase in thyroidectomy has not translated to increased litigation,<sup>11</sup> but this is something that may need monitoring in the future.

Therefore, should we be treating the micropapillary and small thyroid cancers less aggressively? Evidence from Japan and Memorial Sloan-Kettering Cancer Center has shown that only a small proportion (8%) of the cancers progressed and developed lymph node metastasis over a median of 5 years.<sup>12</sup> Mortality from thyroid cancer is anyway low, with effective postoperative treatment modalities like radioiodine ablation that prevents tumor recurrence and mortality. One needs to find a compromise between over diagnosis and beneficial early screening. Perhaps as Cronan suggested in his editorial, it should be time to turn of ultrasound machines for screening<sup>13</sup> and focus on the cancers that pose the biggest risk to patients.

To summarize, the epidemiology of thyroid cancer is not an epidemic of disease but an epidemic of diagnosis.<sup>14</sup>

## REFERENCES

1. Hughes DT, Haymart MR, Miller BS, Gauger PG, Doherty GM. The most commonly occurring papillary thyroid cancer in the United States is now a microcarcinoma in a patient older than 45 years. *Thyroid: official journal of the American Thyroid Association* 2011;21(3):231-236.
2. Kilfoy BA, Devesa SS, Ward MH, Zhang Y, Rosenberg PS, Holford TR, et al. Gender is an age-specific effect modifier for papillary cancers of the thyroid gland. *Cancer epidemiology, biomarkers and prevention: a publication of the American Association for Cancer Research, cosponsored by the American Society of Preventive Oncology* 2009;18(4):1092-1100.

3. Enewold L, Zhu K, Ron E, Marrogi AJ, Stojadinovic A, Peoples GE, et al. Rising thyroid cancer incidence in the United States by demographic and tumor characteristics, 1980-2005. *Cancer epidemiology, biomarkers and prevention: a publication of the American Association for Cancer Research, cosponsored by the American Society of Preventive Oncology* 2009;18(3):784-791.
4. Simard EP, Ward EM, Siegel R, Jemal A. Cancers with increasing incidence trends in the United States: 1999 through 2008. *CA: a cancer journal for clinicians* 2012;62(2):118-128.
5. Ahn HS, Kim HJ, Welch HG. Korea's thyroid-cancer 'epidemic'—screening and overdiagnosis. *The New England J Med* 2014; 371(19):1765-1767.
6. Baker SR, Bhatti WA. The thyroid cancer epidemic: is it the dark side of the CT revolution? *Europ J Radiol* 2006;60(1):67-69.
7. Mathur A, Moses W, Rahbari R, Khanafshar E, Duh QY, Clark O, et al. Higher rate of BRAF mutation in papillary thyroid cancer over time: a single-institution study. *Cancer* 2011;117(19):4390-4395.
8. McLeod DS, Sawka AM, Cooper DS. Controversies in primary treatment of low-risk papillary thyroid cancer. *Lancet* 2013;381(9871):1046-1057.
9. Aschebrook-Kilfoy B, Schechter RB, Shih YC, Kaplan EL, Chiu BC, Angelos P, et al. The clinical and economic burden of a sustained increase in thyroid cancer incidence. *Cancer epidemiology, biomarkers and prevention : a publication of the American Association for Cancer Research, cosponsored by the American Society of Preventive Oncology* 2013;22(7):1252-1259.
10. Macready N. The climbing costs of cancer care. *Journal of the National Cancer Institute* 2011;103(19):1433-1435.
11. Singer MC, Iverson KC, Terris DJ. Thyroidectomy-related malpractice claims. *Otolaryngology—head and neck surgery: Official Journal of American Academy of Otolaryngology—Head and Neck Surgery* 2012;146(3):358-361.
12. Ito Y, Miyauchi A, Kihara M, Higashiyama T, Kobayashi K, Miya A. Patient age is significantly related to the progression of papillary microcarcinoma of the thyroid under observation. *Thyroid: Official Journal of the American Thyroid Association* 2014;24(1):27-34.
13. Cronan JJ. Thyroid nodules: is it time to turn off the US machines? *Radiol* 2008;247(3):602-604.
14. Davies L, Welch HG. Current thyroid cancer trends in the United States. *JAMA Otolaryngol—Head and Neck Surgery* 2014;140(4): 317-322.

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