Thyroid Cancer in the Pacific

Thyroid cancer is one of only a few cancers that occurs more frequently among women than among men, with incidence rates typically two to three times higher among females than among males in most parts of the world (1). What is less well-known is that rates of thyroid cancer vary substantially geographically. Herein, we describe the international variation in thyroid cancer occurrence, noting the remarkable clustering of elevated incidence rates among residents of multiple islands in the Pacific.

Age-adjusted (world standard) annual thyroid cancer incidence rates per 100,000 population among females and males during the 1980s for selected areas of Europe, North and South America, Asia, Australia, and island nations in the Atlantic and Pacific Oceans are shown in Fig. 1. In most continental nations, the incidence rates of thyroid cancer among women range from about two to about six cases per year per 100,000 population. This is the situation throughout Europe, North and South America, Asia, and Australia. In contrast, rates among numerous Pacific island groups exceed six per 100,000. The world’s highest incidence rates (exceeding 15 per 100,000) are reported among females in Hawaii, French Polynesia, and New Caledonia. The high rates in the Pacific islands tend to affect all ethnic groups, although considerably more so native (Polynesian, Melanesian) than European (white) residents. Among western countries, the highest rates of thyroid cancer are reported for the island of Iceland, while no excess is seen among residents of islands of the South Atlantic ocean. The geographic patterns are generally similar for both sexes, although the variation is most pronounced among females.

Although Fig. 1 displays rates only for selected countries and territories,
thyroid cancer may be more common among Pacific Islanders than anywhere else in the world. Indeed, among the more than 100 cancer registries reporting data (1), not one reported thyroid cancer incidence rates as high as in New Caledonia, French Polynesia, Fiji, or Hawaii. The rates on some islands are based on small numbers of cases and thus may be imprecise, and may also be influenced by differences in the detection and reporting of thyroid cancer; however, the consistency of findings across multiple Pacific island nations is striking. The high rates result in thyroid cancer ranking as one of the top four leading cancers among women in several of these island groups in contrast to its relative rarity in most other populations. Excesses of thyroid cancer are also seen in other Pacific Islands not shown in Fig. 1, including Vanuatu, the Marshall Islands, Palau, and the northern Marianas (2-4), and the high rate of thyroid cancer among Melanesian females in New Caledonia was the subject of a recent detailed report (5).

The causes of the substantial international variation in thyroid cancer are unclear. Perhaps the most established risk factor for thyroid cancer is childhood exposure to ionizing radiation (6), raising the question whether medical or environmental radiation may, in some instances, contribute to the geographic patterns. Several surveys, in fact, indicate that there was an increase of thyroid cancer and nodules among inhabitants of the Marshall Islands who received heavy fallout exposures from atomic weapons testing in the 1950s (7-10). Environmental radiation, however, does not appear to be a likely explanation for the high rates of thyroid cancer across multiple Pacific island groups because most are at a substantial distance from the weapons-testing areas and thus received little or no radiation exposure. Prior radiotherapy to treat benign conditions in childhood is almost certainly rare.

Other factors must be involved in the geographic diversity in thyroid cancer, but their identification awaits detection. Dietary factors, especially those related to iodine intake, may play a major role (11). Although iodine deficiency has long been associated with an increased risk of thyroid tumors, especially follicular types, epidemiologic studies have supported a role as well as for iodine excess in thyroid cancer, especially papillary types (12,13). An increase in the iodine supply and a subsequent rise in the incidence of papillary thyroid cancer has been reported in some but not all investigations in Europe (14,15). It is not clear whether iodine is involved in the Pacific clustering, but we have found levels of urinary iodine to be elevated among participants in a nutritional survey covering both New Caledonia and French Polynesia (16).

Whether environmental, dietary, other lifestyle, hormonal, genetic, and/or other risk factors account for the clustering of elevated thyroid cancer rates in the Pacific is currently unknown. To evaluate the unusual and marked geographic patterns, a systematic multi-island case–control study of thyroid cancer might be considered, incorporating biologic markers of specific exposure (e.g., to iodine) and a special screening for thyroid nodules and cancer (17). Such a study may provide the etiologic clues that lead to the eventual development of preventive measures.

References