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Epidemiology and Prevention

Possible cancer enhancement impact of parathyroid hormone excess

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Abstract

Implication for health policy/practice/research/medical education

Various studies suggest an increased possibility of malignancy in primary hyperparathyroidism compared to the normal individuals which leads to increase mortality and morbidity; since, the location of the tumors is different. Several studies showing that the association between primary hyperparathyroidism and malignancy is more general in nature than emerge of a specific tumor, an issue which needs more investigations..

Keywords: Primary hyperparathyroidism, Malignancy, Parathyroid hormone, Parathormone, Cancer

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Introduction

Primary hyperparathyroidism (PHPTH) is not uncommon, since it affects any rate of one in 1000 individuals. The incidence of this disease also increases with age, with a peak in the elderly of the 70th decade (1). Furthermore, the risk of PHPTH is five times greater in females following 75 years of age (1). Primary hyperparathyroidism is detected by high serum calcium value along with raised serum level of parathormone [parathyroid hormone (PTH)], mainly due to parathyroid adenoma (single gland adenoma), and less frequently hyperplasia of four glands (10–15% of cases) and also rarely due to parathyroid malignancy (<1% of cases) (2,3). Hyperparathyroidism became a commoner endocrine disease currently with a considerable case of asymptomatic individuals in contradiction of disease presentation 50 years ago (4). Therefore, the evolution of PHPTH from disease of bone and stone to an asymptomatic and identically finding disease is due to the widely available biochemical tests after introduction of routine serum calcium assessment by biochemistry auto-analyzers and more knowledge and notice of this disease (2). Some investigators even believe that the incidence of PHPTH is even 28 per 100,000 populaces, with a woman to man ratio of 2:1 with more frequency in postmenopausal females (5). Regardless of multiple endocrine neoplasia syndrome, cumulative evidence proposing an association among this disease and risk of malignancy (4). The probable anti-apoptotic impact of parathormone and the strengthened cancer-related death along with this disease encouraged the investigators to study the likelihood of an enhanced risk of malignancies across this disease (6). This disease is also correlated with an increment of heart disease morbidity and mortality since parathyroidectomy could maintain this risk. In addition, in individuals with PHPTH, diabetes mellitus and impaired glucose tolerance are more commonly detected (7-9). Confirmation of carcinogenic impact of excess parathormone is crucial in determining on the treatment of these patients and the possible necessity for malignancy screening in PHPTH (4). In a previous study by Palmieri et al, considered the incidence of cancer in PHPTH. They examined 1606 cases and found patients with PHPTH, the incidence of all, skin, breast and renal cancers were considerably greater than in cases without PHPTH (10). Various descriptions exist to explain the cancer enhancement feature of PTH. For example, vitamin D, calcium, or ultraviolet light, deficiency may have stimulated effect on parathyroid hormone production. Therefore, these considerations explain the fact behind the possible cancer enhancement feature of PTH. Hence, sufficient ultraviolet light promotes dermal vitamin D generation, along with dietary calcium and vitamin D supplementation may accordingly have cancer-suppressing activity (11). Moreover, parathormone could indirectly increase the hepatic production of growth factor IGF-I, as a cancer promoter. Additionally, many malignancies present receptors for PTH/PTH-related protein. These receptors proceed pro-invasive/

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or co-mitogenic signals in several cancers (11). Further, simultaneous thyroid cancer with papillary origin and hyperparathyroidism have been published in various case reports (12).

In summary, some studies suggest an elevated possibility of malignancy in PHPTH compared to the normal individuals which leads to increase mortality and morbidity. Nevertheless, the location of the tumors is different according to the studies showing that the association between PHPTH and malignancy is more general in nature than emerge of a specific tumor.

Authors' contribution

Conceptualization, validation: HN.
Investigation, data curation, writing—original draft preparation: MD and HN.
Writing—reviewing and editing, visualization, supervision: HN, MK, MD, and NE.

Conflicts of interest

The authors declare that they have no competing interests.

Ethical issues

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

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