Brief Communication

Occurrence of symptomatic meningioma as a second neoplasm in patients with differentiated thyroid cancer treated with radioiodine

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ABSTRACT

Occurrence of second tumors has been seen in patients with papillary and follicular thyroid cancer.We studied the occurrence of meningioma as a second neoplasm in patients with differentiated thyroid cancer treated with radioiodine at our institution.

Key words: Differentiated thyroid cancer, meningioma, radioiodine

Many reports have till date documented the occurrence of meningiomas after external radiation exposure.[1-4] Similar association with internal radiation therapy, however, has rarely been reported. The purpose of the present study is to assess the true prevalence of 'symptomatic meningiomas needing surgical intervention', in a large number of patients treated with I-131, as part of their treatment of differentiated thyroid cancer (DTC).

Methods and Results

We reviewed records of DTC patients treated at our institution between January 1990 and December 2011. We considered meningiomas arising within one year of DTC to be synchronous. We reviewed a total of 4692 cases (1524 males, 3168 females) of DTC treated with radioiodine at our center. Of these there were 208 children ≤ 18 years.

We found a total of five operated cases of symptomatic meningiomas in the period between 1990 and 2011. All five patients were females. The age range was 34 to 56 years with a mean of 44.6 years and a median age of 44 years. All five had papillary thyroid cancers of which four were classical and one was a follicular variant of papillary carcinoma. No patient had a family history of any malignancy or previous radiation therapy. Three patients presented with a solitary thyroid nodule, while the remaining two had multinodular goiters. Three out of five patients underwent total thyroidectomies, one had a hemi-thyroidectomy, and one had a subtotal thyroidectomy. One patient had nodal disease on a postoperative whole body diagnostic scan, while others had only remnant disease. Post therapy scans did not reveal any additional findings in any patient. The mean radioiodine given to the five patients was 91.3 mCi (range 40 mCi to 208.8 mCi, median 55 mCi) as part of their routine therapy for ablation. The duration between the DTC and meningioma ranged from eleven months to seven years, with a mean of 3.5 years (median four years). All except one patient had solitary meningiomas.

Second malignancies / neoplasms may occur before, synchronously, or after DTC is diagnosed. Papillary thyroid carcinoma and meningioma were described by Barg *et al.* in a 17-year-old boy, who underwent bone marrow transplantation as part of his treatment for acute lymphocytic leukaemia (ALL), after ten years.[5] Sughrue *et al.* analyzed the prevalence of previously diagnosed extracranial malignancies at the time of meningioma diagnosis in 1228 patients, evaluated at a

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single institution. They concluded that the data analyzed, supported a growing body of evidence suggesting an epidemiological link between papillary carcinoma of the thyroid and meningioma, although the link between these tumors was not immediately apparent.[6] The mean latency period from the date of radiation exposure to development of a meningioma, among the radiation-induced meningioma group, was approximately 36 years.[7] The prevalence of pathologically confirmed meningioma in the general population was estimated to be approximately 97.5 / 100,000.[8] We found a prevalence of symptomatic meningioma necessitating surgery in 106 cases per 1,00,000 patients of DTC. However, the difference was not found to be statistically significant ($P < 0.05$).

Early occurrence of meningioma, after an extremely low radiation dose to the cranium, after radioiodine therapy, renders a causal relationship unlikely. All our patients were adults, and interestingly, none of the 208 patients of DTC, ≤ 18 years of age at the time of radioiodine therapy, treated at our center with radioiodine since 1990 till date, have developed symptomatic meningioma as yet.

Our study is limited by some factors. First, neuroimaging is not routinely done in the follow-up of thyroid cancer; hence, a lot of asymptomatic meningiomas may have gone undetected. In fact, even in the five cases reported, the meningiomas may have pre-existed asymptomatically before DTC, and could have later become symptomatic. Also our data shows the prevalence of meningioma surgery, rather than that of meningioma as a whole.

To conclude, given the small number of cases that we found in our data, with two cases being synchronous, and the other three also developing meningioma in less than a decade, the possibility of radioiodine leading to radiation-induced meningioma seems implausible. Also, our data does not suggest an association between meningioma and DTC, as the prevalence is similar to that in the general population.

References

1. Kawahara I, Masui K, Horie N, Matsuo T, Kitagawa N, Tsutsumi K,*et al.* Radiation-induced meningioma following prophylactic radiotherapy for acute lymphoblastic leukemia in childhood. Pediatr Neurosurg 2007;43:36-41.
2. Salvati M, Cervoni L, Artico M. High-dose radiation-induced meningiomas following acute lymphoblastic leukemia in children. Childs Nerv Syst 1996;12:266-9.
3. Strojan P, Popović M, Jereb B. Secondary intracranial meningiomas after high-dose cranial irradiation: Report of five cases and review of the literature. Int J Radiat Oncol Biol Phys 2000;48:65-73.
4. Umansky F, Shoshan Y, Rosenthal G, Fraifeld S, Spektor S. Radiation-induced meningioma. Neurosurg Focus 2008;24:E7.
5. Barg E, Godziński J, Wikiera B, Głab E, Jeleń M. Papillary thyroid carcinoma and meningioma in 17-year-old boy- a late effect of acute lymphoblastic leukemia treatment or a new disease? Case report and literature review. Pediatr Endocrinol Diabetes Metab 2009;15:51-4.
6. Sughrue ME, Shangari G, Parsa AT, Berger MS, McDermott MW. Prevalence of previous extracranial malignancies in a series of 1228 patients presenting with meningioma. J Neurosurg 2010;113:1115-21.
7. Sadetzki S, Flint-Richter P, Ben-Tal T, Nass D. Radiation-induced meningioma: A descriptive study of 253 cases. J Neurosurg 2002;97:1078-82.
8. CBTRUS (2009-2010) CDTRUS Statistical Report: Primary brain and central nervous system tumors diagnosed in eighteen states in 2002–2006. Central Brain Tumor Registry of the United States, Hisdale.

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