

40 Years of Retinoblastoma: Better Survival Rates Despite Stable Second Primary Neoplasms

We read with great interest the article by Fernandes et al.¹ that was published in the May/June 2018 issue. There are some points that were not elucidated in this research and we would like to address them. The authors found an improvement in the survival rate of patients with retinoblastoma from 1973 to 2012 and suggested that the “improvement in survival rates may be due to the decreased incidence of second malignant neoplasms as a consequence of the decreased use of radiation therapy” (p. 185), but they do not support this with any data.

To clarify this hypothesis, we also used the SEER database to review cases of primary retinoblastoma between 1973 and 2013. We analyzed the SEER 18 database’s 1,719 cases of primary retinoblastoma (840 more cases than Fernandes et al.¹ identified with the SEER 9 database). Second primary neoplasms occurred in 2.9% (n = 50) of the patients in a mean time of 156 ± 125 months after the retinoblastoma diagnosis. The cumulative risk for developing a second primary neoplasm remained relatively constant throughout the analyzed period. The Kaplan–Meier risk for second primary neoplasms at the 120-month follow-up was 1.9% between 1973 and 1982, 2.7% between 1983 and 1992, 2.4% between 1993 and 2002, and 1.5% between 2003 and 2013 ($P = .95$). Patients who were diagnosed as having retinoblastoma ($P = .01$) and bilateral disease ($P < .01$) when younger than 1 year were at an increased risk for second primary neoplasms.

We evaluated the risk of developing a second primary neoplasm between the following treatment groups: patients who had surgery with no or unknown radiotherapy or chemotherapy (surgery), patients treated with radiotherapy with or without concomitant surgery and with no or unknown chemotherapy (radiotherapy+), and patients treated with chemotherapy with or without surgery and with no or unknown radiotherapy (chemotherapy+). The cumulative risk for developing second primary neoplasms was superior in the radiotherapy+ and chemotherapy+ groups when compared to the surgery group ($P < .001$ and $P = .03$, respective-

ly). However, the risk difference between the first two groups was not statistically significant ($P = .09$). When analyzing time until the second primary neoplasm, we found no differences in the radiotherapy+ or chemotherapy+ groups (median: 111 months; range: 28 to 316 months and median: 85 months; range: 7 to 435 months, respectively) ($P = .30$).

Late tumors remain a major concern for retinoblastoma survivors. Although Fernandes et al.¹ suggested a relationship between improved survival rates and decreased development of second primary neoplasms as a consequence of decreased radiotherapy, our conclusions differed. We found stable rates of second primary neoplasm development during the analyzed period. In addition, we verified an increased risk for second primary neoplasm in patients with bilateral disease who were diagnosed when younger than 1 year. These findings support an intrinsic predisposition in some patients to develop second primary neoplasms. Studies have reported the trend of patients with bilateral retinoblastoma who develop a significantly higher numbers of second primary neoplasms because of their predisposing genotypic characteristics.^{2,3} The ability to recognize high-risk groups is essential for long-term monitoring and early detection. We believe that the verified improvement in the survival rate is more likely related to the improvement in treatment strategies. However, more studies are needed to review these questions.

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