Choroidal Melanomas With a Collar-Button Configuration

Response Pattern After Iodine 125 Brachytherapy

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Objective: To describe a distinctive type of postbrachytherapy response pattern among choroidal melanomas with a collar-button configuration.

Methods: Ninety-three consecutive eyes with choroidal melanoma treated with iodine I 125 brachytherapy before 1991 were reviewed to identify melanomas with a collar-button configuration. Postbrachytherapy response patterns of these melanomas were reviewed.

Results: Thirty-four of the 93 eyes contained tumors with a collar-button configuration. Sixteen (47%) of the 34 eyes demonstrated a postbrachytherapy response pattern characterized by persistence of the collar-button, while the body of the tumor demonstrated shrinkage. During follow-up, the color of the collar-button configuration changed from light brown to dark chocolate (16 [47%] of 34 eyes). Subsequently, irregularly clumped, darkly pigmented debris was observed to slough from the surface of the collar-button configuration into the vitreous cavity (7 [21%] of 34 eyes). The debris was comprised largely of pigment-laden macrophages in 1 eye in which a vitrectomy was performed. In another eye, histopathologic study of spherical clusters of intravitreal brown-colored debris identified malignant melanoma cells.

Conclusions: A distinctive postbrachytherapy regression pattern of melanoma with a collar-button configuration has been identified. The main body of the tumor shrinks, whereas the collar-button configuration persists, appears more prominent, gradually changes to a darker color, and may then shed pigmented debris into the vitreous cavity. This pigmented debris may be composed of pigment-laden macrophages and/or melanoma cells. Clinical characteristics of the vitreous debris may help distinguish malignant invasion by melanoma cells from infiltration by nonmalignant debris and macrophages.


BRACHYTHERAPY is an accepted treatment for selected choroidal melanomas. While there have been many publications1-3 discussing tumor control, visual results, and mortality rates following radiation treatment, there has been little written about the details of response patterns following radiation treatment.

During the past 2 decades, a distinctive type of response pattern that may be seen after brachytherapy of choroidal melanomas with collar-button configuration has been recognized. This report describes this distinctive response pattern and discusses the clinical implications.

RESULTS

The medical records of 93 patients with a clinical diagnosis of choroidal malignant melanoma treated with I 125 brachytherapy were reviewed. Thirty-four of the patients had melanomas with a collar-button configuration. The age of the patients ranged from 26 to 84 years (mean, 60 years). Twenty-one right eyes and 13 left eyes were affected. Tumor sizes ranged from 3.0 to 8.0 mm in thickness (measured from the tumor base to the apex of the collar-button configuration). The smallest base dimension measured 5.0 × 6.5 mm. The base dimension of the largest tumor was 15.0 × 18.0 mm. Follow-up ranged from 1 to 16 years. Following brachytherapy, tumors in 4 eyes grew and the eyes were enucleated (2 of the eyes were enucleated because of treatment failures within the first year, and 2 other eyes were enucleated at 5 and 7 years when the tumors demonstrated an increase in thickness). Fifteen eyes had a uniform shrinkage of the tumor during follow-up. Sixteen (47%) of the 34 eyes showed a distinctive posttreatment response pat-
tern that was characterized by persistence of the collar-button prominence, while the main body of the tumor showed evidence of shrinkage. Although the height of the tumors decreased as measured from the base to the apex of the collar-button configuration, the decreasing mass of the tumor body made the collar-button appear more prominent. During an interval of 1½ to 7 years, the color of the collar-button prominence tended to change from a light milk chocolate to a darker chocolate (16 [47%] of 34 eyes) (Figure 1 and Figure 2). When the darker chocolate color appeared, the texture of the tumor surface appeared similar to velvet. Once this stage was seen, the tumor remained relatively unchanged (7 [21%] of 34 eyes); the tumor began to shed pigmented debris into the vitreous cavity (7 [21%] of 34 eyes); or the collar-button prominence silently regressed, leaving a central umbilication in the tumor (2 [6%] of 34 eyes) (Table 1 and Table 2). In the 7 eyes in which pigmented debris was shed into the vitreous cavity, the debris emanated from the dark, velvety surface of the collar-button prominence. The average duration from the time of brachytherapy until the time pigmented debris began to discharge into the vitreous cavity was almost 6 years. The pigmented debris was often dense enough that it could easily be demonstrated ultrasonographically (Figure 2, D, and Figure 3, C); sometimes the debris was so extensive that it obscured the fundus details (Figure 3, D). The pigmented debris was identified as pigment-laden macrophages from a vitrectomy specimen in 1 eye (case 7, Table 1 and Figure 3, E); in this eye, the debris was irregularly clumped throughout the vitreous without any tendency to cluster into spherules. Although the debris appeared almost black when viewed with indirect ophthalmoscopy and when photographed with the fundus camera (Figure 3, D), individual particles often appeared dark gold or rust colored with slitlamp biomicroscopy.

In another eye, histopathologic study of the vitreous confirmed the presence of malignant melanoma cells within the pigmented debris; in this eye, the pigmented debris continued to shed from the collar-button configuration for 2½ years before the debris began to cluster into brown spherules in the vitreous cavity, having an appearance reminiscent of planets orbiting in space. This eye was enucleated 7½ years after brachytherapy (case 4, Table 1). The details of this case have been previously published.4

In 2 additional eyes followed up for 11 and 16 years, there was a slowly progressive disappearance of the collar-button prominence, eventually resulting in a central umbilication of the tumor (Figure 4). This occurred without recognizable discharge of tumor debris into the vitreous cavity. In these 2 cases, the remaining tumor surrounding the umbilication was the only portion of the tumor that could be discerned with ultrasonography.

Thirteen of the 34 patients died during follow-up, which ranged from 1 to 16 years. The cause of death was from presumed melanoma metastasis in 5 patients, other known causes in 5 patients, and unknown causes in 3 patients. Of the 7 patients in whom the postbrachy-
therapy response pattern included the discharge of irregularly clumped, darkly pigmented debris into the vitreous cavity, 1 died of lung cancer 10 years after brachytherapy; 2 died of metastatic melanoma 3 and 7 years after brachytherapy; and 4 are alive and well 6, 7, 8, and 12 years following brachytherapy.

Among choroidal melanomas with a collar-button configuration, there appears to be a common and rather distinctive regression pattern following $^{125}$I brachytherapy. In this pattern, the main body of the tumor...
responds to radiation treatment by shrinking, whereas the collar-button configuration persists and appears to become more prominent. Although the main body of the tumor appears to shrink more than the collar-button configuration, 3-dimensional studies were not available to document this apparent differential shrinkage. During an interval of 1½ to 7 years, the color of the collar-button configuration then tends to change from light brown to dark milk chocolate (Figures 1 and 2). Coincident with the color change, the surface of the collar-button configuration often develops a texture reminiscent of velvet. Once this stage is reached, 1 of 2 changes may be observed. The collar-button configuration may slowly atrophy, resulting in a central umbilication within the tumor (in the absence of recognized shedding of debris into the vitreous cavity [Figure 4]), or the collar-button surface may begin to discharge large amounts of pigmented debris into the vitreous cavity (Figures 2 and 3). The debris tends to be almost black, as seen with indirect ophthalmoscopy and as recorded with fundus photography (Figure 3, D). Slit-lamp biomicroscopy usually allows the examiner to identify that some of the debris is dark gold or rust colored. In most instances, the debris is irregularly clumped. I believe that intravitreal debris with this type of appearance is generally benign and is composed of
necrotic tissue and pigment granules, some of which have been ingested by macrophages. Such a benign cellular reaction was confirmed in 1 eye (case 7) that underwent vitrectomy to improve vision (Figure 3, E and F). In contrast, if the pigmented debris becomes clustered into spherules within the vitreous cavity, particularly if these spherules are brownish, malignant invasion can be suspected. Histopathologic study confirmed that the intravitreal light brown spherules seen following brachytherapy of a choroidal melanoma in 1 of these cases were indeed composed of malignant melanoma cells (case 4). In the latter case, the spherical clusters in the vitreous were believed to represent malignant invasion, and the eye was enucleated. Examination of the enucleated eye confirmed the presence of malignant cells in the vitreous cavity. Details of this latter case have been reported.4

In 2 eyes, the collar-button excrescence that developed a dark chocolate color eventually atrophied, leaving a central umbilication. In neither of these eyes was pigmented debris seen shedding into the vitreous cavity. Presumably the necrotic collar-button configuration was phagocytosed by surrounding tissue; alternately, continued shedding of the debris into the vitreous cavity was too subtle to be recognized clinically.

I believe that the presence of irregularly clumped pigmented intravitreal debris arising from the surface of a melanoma after brachytherapy is not an indication for additional therapy since the debris most likely represents nonmalignant infiltration by pigment and pigment-laden macrophages. If the debris becomes dense enough to impair the patient’s vision, a vitrectomy may be considered. However, if the debris is clustered into brownish spherules that become suspended throughout the vitreous cavity, reminiscent of the appearance of planets in space, malignant invasion should be suspected. Further follow-up of these and other similar cases will be necessary to learn whether the shedding of pigmented debris into the vitreous cavity has any implications relating to survival. The cases in this small series are too few to draw any conclusions regarding prognosis. Of the 7 patients in whom the postbrachytherapy response pattern included the discharge of pigmented debris into the vitreous cavity, 1 died of lung cancer 10 years after brachytherapy; 2 died of metastatic melanoma 3 and 7 years after brachytherapy; and 4 are alive and well 6, 7, 8, and 12 years following brachytherapy.

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REFERENCES