Plasma Cell Granuloma of the Nasal Cavity Treated by Radiation Therapy

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Plasma cell granuloma is a rare, benign tumor most commonly found in the lungs in patients younger than 30 years. Although presentation has been reported at a number of other anatomic sites, this report is the first of plasma cell granuloma of the nasal cavity. The tumor was initially resected, but progression was seen at 1-month follow-up. Because further surgery to completely eradicate the tumor would have been extensive and disfiguring, 40-Gy external beam radiation was given in 20 fractions using a three-field wedge technique. Most recent clinical follow-up at 27 months showed local control. Surgery remains the treatment of choice for plasma cell granuloma when the disease can be completely resected. However, irradiation can also be effective in patients with recurrent or inoperable local disease.
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PLASMA CELL GRANULOMA is a rare, benign tumor which is most common in patients younger than 30 years. It consists of a loose to dense fibrous connective tissue infiltrated by many plasma cells admixed with other inflammatory cells. The variable cellular composition has led to an almost equally variable nomenclature: mast cell granuloma, xanthogranuloma, xanthoma, histiocytoma, inflammatory pseudotumor, and simply, pseudotumor, have all been used.[1]

The tumor usually occurs in the lung, but presentation has also been reported in the brain,[2–4] mandible,[5] thyroid,[6,7] stomach,[8,9] kidney,[10,11] urinary bladder,[12] and head and neck. In the last category there have been cases of the tonsil,[13] larynx,[14] and, most commonly, gingiva and other periodontal tissues.[15,16] We report the first case of plasma cell granuloma arising in the nasal cavity. Treatment was surgical resection followed by external radiation therapy upon disease progression. Radiation therapy has been used in only four previous cases, all of them lung lesions.[1,17,18]

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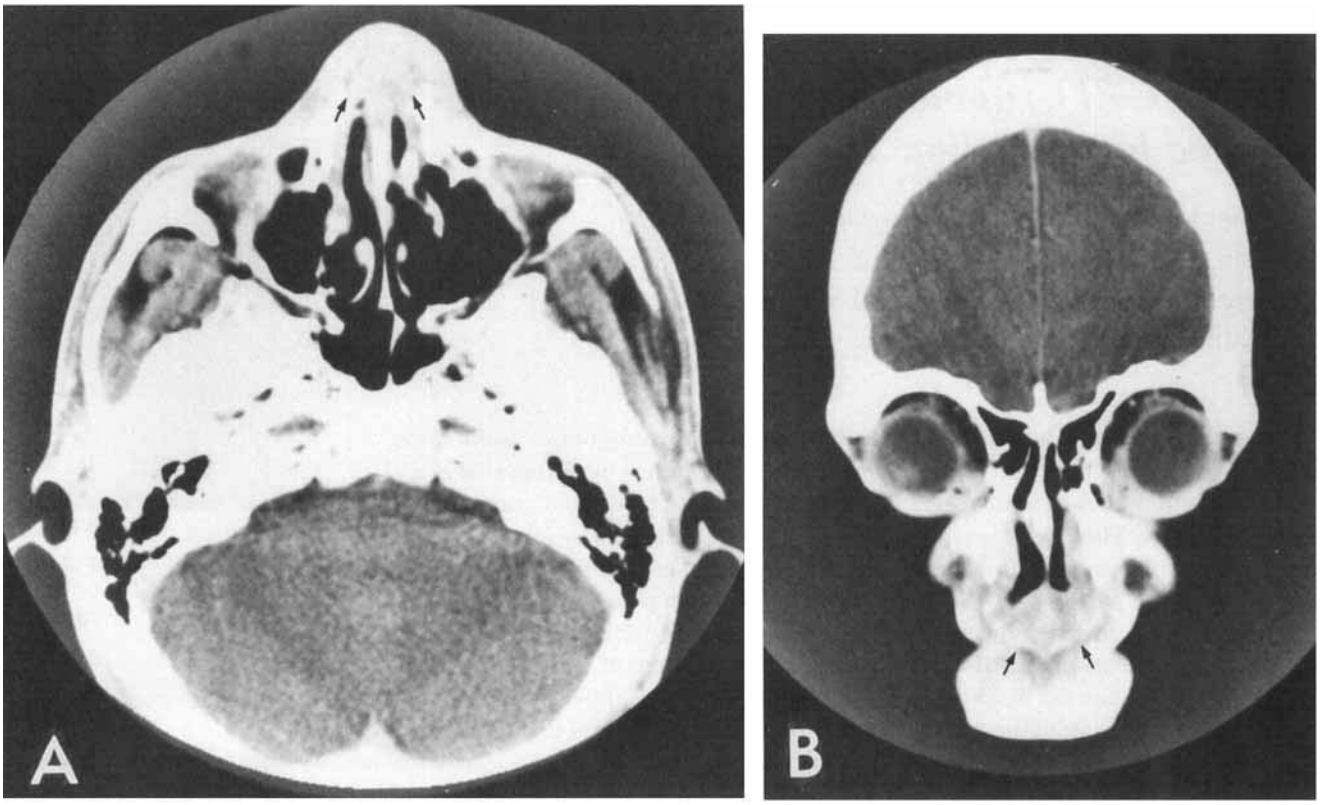
Case Report

An 18-year-old Hispanic man presented with a 2-year history of a slowly expanding mass in the left nasal cavity. Physical examination showed a 2 × 2.5 cm mass partially obstructing the left nostril. There was no lymphadenopathy. Workup included plain chest radiography, urinalysis, complete blood count, SMA-12 serum chemistry profile, and serum electrolytes analysis, all of which showed normal values. Computed tomography (CT) of the head and neck (Figs. 1A and 1B) demonstrated a rounded soft tissue mass in the anterior left nasal cavity, as well as involvement of the anterior portions of the left inferior turbinate and nasal septum.

The patient was prepared for surgery. A Weber-Ferguson incision was made on the left side without splitting the lip, and the mass was visualized. Frozen-section histologic analysis suggested plasmacytoma. The tumor was excised by a debulking procedure after it was freed from the undersurface of the nasal bone by removing the inferior turbinate along with the mucosa of the lateral wall of the nasal fossa. There was no visible tumor at the completion of surgery.

Histologic examination of paraffin sections of the tumor revealed sheets and smaller clusters of inflammatory cells intersected by dense bands of collagen (Fig. 2). The great majority of the inflammatory cells were plasma cells, and the remainder was a variable admixture of small lymphocytes and histiocytes. Cytologic examination showed the plasma cells to be mature, although a few binuclear forms and so-called Mott's cells (which have distended cytoplasm filled with eosinophilic globules, *i.e.*, Russell's bodies) were present (Fig. 3). All of these features and



FIGS. 1A AND 1B. (A) Axial and (B) coronal contrast CT scans demonstrate a slightly enhancing mass in the anterior nasal cavity (arrows), slightly eccentric to the left side. The anterior portions of the nasal septum and left inferior turbinate are thickened.

positive polyclonal staining of the plasma cells for kappa and lambda immunoglobulin light chains by the immunoperoxidase technique indicated a reactive, possibly infectious, rather than neoplastic process. The differential diagnosis included tuberculosis and leprosy, because of the patient's residence in Colombia, but histochemical stains for acid-fast bacteria and fungi gave negative results. Workups for an infectious etiology and for multiple myeloma also gave negative results.

Because the surgical margins were positive and because of the risk of disfigurement from further surgery, it was decided that definitive radiotherapy would be considered should the tumor recur. At 1 month, reevaluation of the nasal cavity revealed progressive disease in the right nasal cavity along the inferior turbinate. The area of involvement was approximately 1 × 1 cm. Fine needle aspiration showed plasma cells admixed with lymphocytes. Immunoperoxidase studies again showed polyclonal staining for both kappa and lambda light chains. However, flow cytometric study revealed a small stem cell line with hypertetraploid DNA content suggestive of neoplasia.

Definitive cobalt-60 (^{60}Co) irradiation was given using an anterior and two lateral 60° wedge fields, which together encompassed the nasal cavity with generous margins. The dose distribution for the three-field technique was developed using planning CT and a treatment planning computer. The given doses were loaded in favor of the anterior field in a ratio of 1:33:37. A total dose of 40 Gy was delivered in 20 fractions over 4 weeks. Scattered radiation to the eyes ranged from 6 to 9 cGy per fraction, determined by using thermoluminescence dosimetry. Repeat CT scan 27 months after treatment showed no evidence of disease, and the patient remains clinically free of disease at the most recent follow-up of 27 months.

Discussion

Plasma cell granulomas are benign, slow-growing, localized lesions that usually present as asymptomatic masses in the lungs of male or female patients younger than 30 years.[19] Surgical resection is standard treatment and usually successful; incomplete resection can result in local regrowth. In our patient, further resection was not performed at the time of regrowth because it was doubtful whether clear margins could be obtained and there was a possibility of considerable disfigurement.

Radiotherapy has been reported in four previous cases of plasma cell granuloma, all involving the lung. In each case, surgical resection was either not possible or entailed major risk to the patient. Imperato *et al.* successfully treated two 5-year-old patients with 43.2 and 45 Gy, respectively.[17] Follow-up examinations for patients of Mehta *et al.* were 5 and 11 years, respectively.[1] A 71-year-old patient received 18 Gy at 2 Gy per fraction, then 30 Gy at 3 Gy per fraction after a 6-month rest interval, with

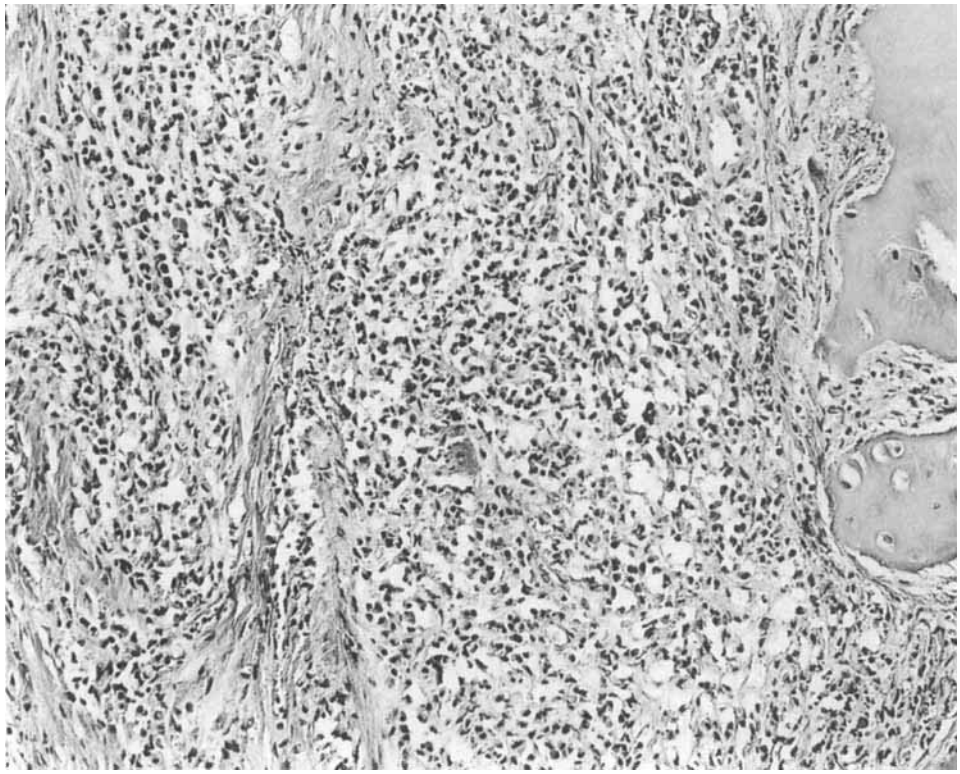


FIG. 2. The nasal cartilage is eroded focally by the disease process. Bands of collagen intersect sheets and clusters of mononuclear cells, the vast majority of which are plasma cells (H & E, original magnification ×50).

no response.[1] Finally, Hoover *et al.* treated a 15-year-old patient with 40 Gy in 19 fractions, with gradual resolution of symptoms.[18]

Our case is the first report of a nasal cavity plasma cell granuloma. Because there is no literature about irradiation in plasma cell granulomas of the head and neck, we de-

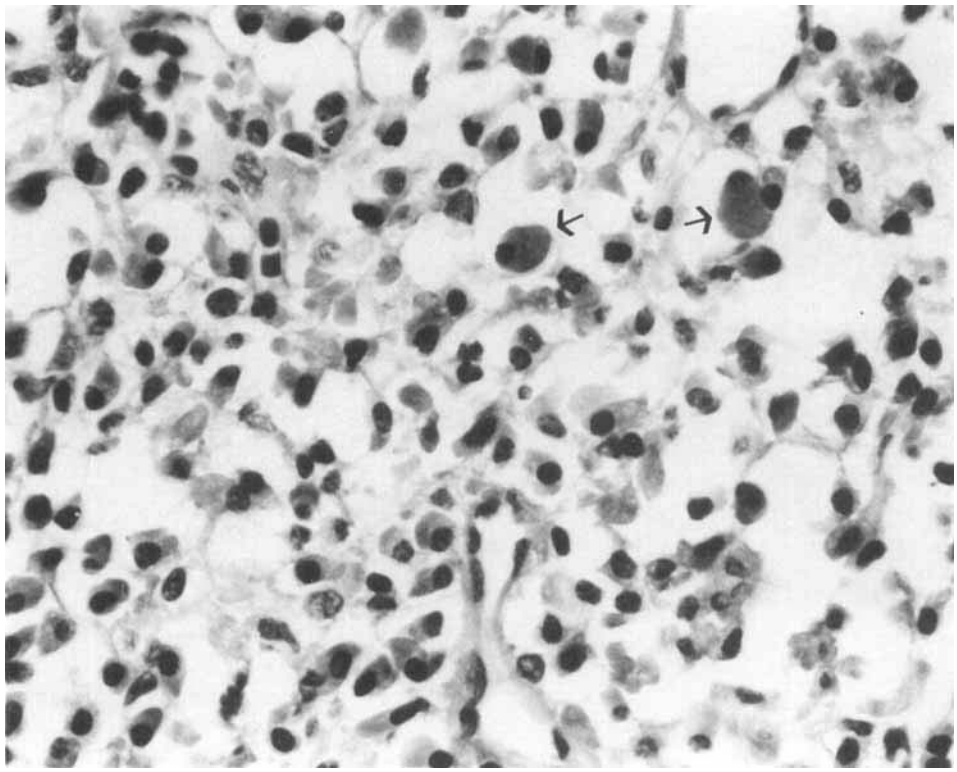


FIG. 3. Mature plasma cells with two Mott cells (arrows) (H & E, original magnification ×500).

rived the tumor dose from the prior radiotherapy treatment of lung plasma cell granuloma and extramedullary plasmacytoma of the head and neck. Lesser treatment was not used because intensive re-treatment with radiation would not be possible if the tumor recurred.

In summary, we believe that plasma cell granuloma is best treated surgically, especially in the young patient, except when surgery would be disfiguring. There are few published data about radiotherapy in these tumors, and they refer to lung lesions. Although doses are speculative, 40 to 50 Gy in 1.8-Gy to 2-Gy fractions to the appropriate fields appears to offer the best possibility for local control.

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