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Clinical Records

Primary extramedullary plasmacytoma in the middle ear: differential diagnosis and management

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Abstract
Primary extramedullary plasmacytoma (PEP) is an uncommon neoplasm of plasma cell origin which afflicts the head and neck mainly. In this study we report a rare case of a 34-year-old man who presented with left ear tinnitus, hearing loss, blocked feeling and headache. Exploratory tympanotomy revealed a mass extending into the attic and the mastoid antrum. Following canal wall-up mastoidectomy, the tumour was carefully removed. Histological examination (including immunoperoxidase staining) and thorough clinical, laboratory and radiological evaluation revealed an exclusively cytoplasmic monoclonal IgG immunoglobulin PEP. The combination of surgery (including a second-look procedure) and radiotherapy used in this case may be an over-treatment. However, the patient is still disease-free seven years after his first admission to hospital.

Key words: Plasmacytoma; Ear neoplasms

Introduction

Primary extramedullary plasmacytoma (PEP) is a rare tumour, composed of atypical neoplastic plasma cells, which arises outside the bone marrow in patients without evidence of existing multiple myeloma.

The clinical behaviour of this tumour is not clear and local recurrence (even years later), distant metastasis, and transformation to multiple myeloma have been reported (Wanebo *et al.*, 1966; Kapadia *et al.*, 1982; Patterson *et al.*, 1988; Waldron and Mitchell, 1988; Kerr and Dort, 1991).

The most commonly involved site is the submucosal tissue of the upper airway: particularly the nose, sinuses, and nasopharynx (Kerr and Dort, 1991).

We present a rare case of PEP in the middle ear.

Case report

A 34-year-old man was admitted to our hospital in June 1986 with a history of left ear tinnitus of approximately one year, hearing loss, blocked feeling and headache. Clinical examination revealed a reddened, thickened and bulging tympanic membrane. Routine laboratory data and radiographical examinations were within normal limits. The tympanogram of the left ear was type B (flattened curve) and the stapedial reflex was absent. The tympanogram of the right ear was type A and the acoustic reflex was normal. Tuning fork tests and audiometry revealed moderate conductive hearing loss in the left ear.

The patient underwent an exploratory tympanotomy (transcanal approach). The middle ear was filled by a mass extending into the attic and the mastoid antrum. Following canal wall-up mastoidectomy, the tumour was carefully removed along with the incus, the head of the malleus and the stapes. The oval window was covered by a graft of temporalis fascia. After proper transformation, the incus was placed on the graft. Finally, the tympanic membrane was returned to its normal anatomical position. His post-operative course was uneventful.

Histological examination showed large numbers of plasma cells and immature plasmacytoid cells with two or more nuclei and nucleoli (Figure 1). Some of the cells were PAS positive. The supporting stroma was minimal but with increased vascularity (Figure 2). The surface of the mass was covered by an atrophied monostratal epithelium. The immunoperoxidase stain, on formalin-fixed, paraffin-embedded tissue sections, revealed exclusively cytoplasmic monoclonal IgG immunoglobulin (heavy chains). Therefore, an extramedullary plasmacytoma was diagnosed. In addition, more specific laboratory, radiological and histological examinations were performed (Table I).

These investigations, were carried out to rule out multiple or other lesions and systemic involvement, and to confirm the diagnosis. Additional post-operative radiation was recommended which the patient refused and he was discharged.

Eight months later he was readmitted to hospital for a follow-up examination. The results were all within normal limits (Table I). The patient also had a new exploratory tympanotomy which revealed no local recurrence. He was persuaded to have a course of localized radiotherapy (4000 rad).

At another follow-up six months later (14 months after the first operation), there was no evidence of recurrence of the disease, metastasis or transformation to multiple myeloma.

Seven years after his first hospital admission, the patient is still free of symptoms. Clinical, laboratory and radiological investigations exclude any signs of the disease (Table I).

Discussion

Plasma cell lesions of the head and neck include plasma cell

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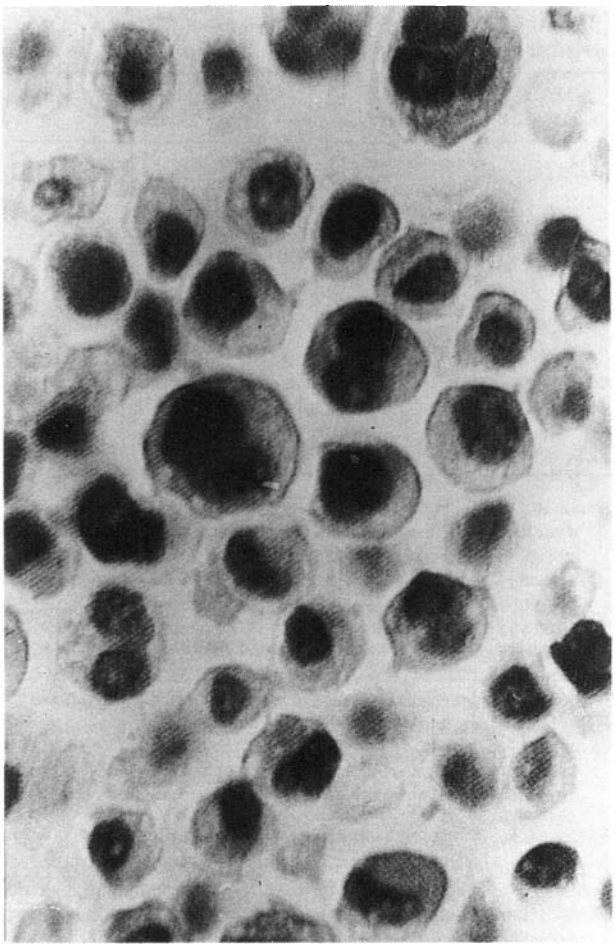

FIG. 1

Mature plasma cells and immature plasmacytoid cells with two or more nuclei and nucleoli (H&E; × 400).

granuloma, multiple myeloma, primary extramedullary plasmacytoma (PEP) and solitary plasmacytoma of bone (Rubin *et al.*, 1990). Diagnostic difficulties may arise in differentiating PEP from other lesions as well as malignant disorders (Kapadia *et al.*, 1981; Neiman *et al.*, 1981; Kapadia *et al.*, 1982).

Corwin and Lindberg (1979) proposed the following criteria for the diagnosis of a PEP distinct from an extraskeletal early manifestation of multiple myeloma:

(1) Presence of a solitary focus of tumour proven by biopsy.
(2) Bone marrow biopsy from a site remote from the tumour and with less than 10 per cent plasma cells.
(3) Absence of anaemia: haemoglobin >2.01 mmol/l.
(4) Serum protein analysis. If a serum monoclonal protein is detected, then its level should fall over several months after local and adequate treatment.

We think that the above criteria are inadequate and that radiological skeletal survey, renal function tests and urine electrophoresis should be added. Our case satisfied all the above criteria.

Plasma cell granuloma is characterized by mature plasma cells. However, atypical or immature plasma cells may coexist or even predominate in the tissue sections. Light microscopy is not always helpful in distinguishing between the two lesions. If the immunoperoxidase stain reveals intracytoplasmic polyclonal immunoglobulins, the diagnosis of plasma cell granuloma is confirmed, as PEP have exclusively cytoplasmic monoclonal immunoglobulins (in our case IgG). In the rare cases where no cytoplasmic immunoglobulins can be found, electron microscopy usually solves the problem.

Solitary plasmacytoma of bone is a mainly osteolytic lesion. Therefore, differential diagnosis is not difficult, although PEP in occasional cases may cause local bone destruction. Our case had no lytic bone lesions.

The most difficult differential diagnosis is probably encountered with certain cases of malignant lymphomas (Kapadia *et al.*, 1982). Although both may show pyroninophilic and intracytoplasmic immunoglobulins, the intensity of staining is greater for PEP, and variable or even negative in lymphomas. We agree with Kapadia *et al.* (1982) that in some extreme cases of round cell malignancies, only a combination of all histological means (light and electron microscopy, histochemistry, immunohistochemistry, etc) can confirm the diagnosis.

The treatment of PEP is variable depending on its location and the extent of the disease.

PEP is highly radiosensitive (Toriumi and Wolff, 1988) and a complete response can be obtained with radiotherapy, if the disease is localized. Surgery may be useful, especially when dealing with an extensive local disease. Additional (adjustive) chemotherapy should also be considered in such cases (Kapadia *et al.*, 1982).

However, the appearance of a PEP in the middle ear has not been previously described, and there is therefore no experience of the treatment of a PEP in this location.

We performed a canal wall-up mastoidectomy and we carefully removed the mass from the middle ear. As the patient initially refused additional radiotherapy, we performed a new exploratory tympanotomy at follow-up which revealed no local recurrence. We are not sure if the second-look procedure [as sometimes recommended in children's cholesteatomas (Rosenfeld *et al.*, 1992)] is necessary in the case of a PEP in the middle ear, as the recurrence rate of the disease in this location is not

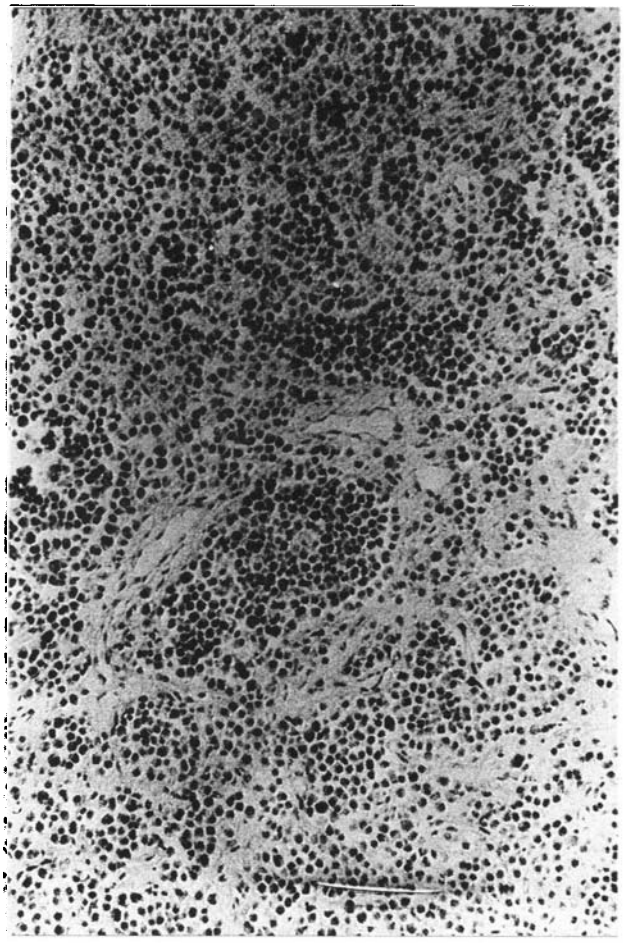

FIG. 2

Diffuse infiltrate composed of mature and immature plasma cells with minimal supporting stroma but with increased vascularity (H&E; × 125).

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TABLE I
LABORATORY, RADIOLOGICAL AND HISTOLOGICAL EXAMINATIONS

	First survey	Follow-up 8 months later	Follow-up 7 years later
Haematocrit	0.48	0.47	0.48
Haemoglobin	2.48 mmol/l	2.42 mmol/l	2.47 mmol/l
White blood cells	5.4×10^9/l	5.8×10^9/l	6.1×10^9/l
Plasma cells	240×10^9/l	250×10^9/l	235×10^9/l
ESR	6 mm/h	7 mm/h	9 mm/h
Total serum protein	67 g/l	68 g/l	70 g/l
Serum electrophoresis	Normal	Normal	Normal
Serum immunophoresis	Normal	Normal	Normal
Proteinuria (in 24 h)	0	0	0
Bone marrow aspirate	Normal	Normal	Normal
Radiological survey	Negative	Negative	Negative
Renal function tests	Normal	Normal	Normal
Blood, urea, nitrogen, calcium, uric acid, etc	Normal	Normal	Normal

known. The patient was persuaded eventually to have a course of localized radiotherapy so as to minimize the possibility of recurrence.

A combination of surgery and radiotherapy proved to be an adequate and effective treatment, as seven years later there were no signs of the disease. We think that regular follow-ups should be continued indefinitely to observe any signs of recurrence, metastasis or transformation to multiple myeloma. Of course, the possibilities for such developments are very low due to the fact that the seven-year follow-up was negative.

Acknowledgement

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References

Corwin, J., Lindberg, R.D. (1979) Solitary plasmacytoma of bone *versus* extramedullary plasmacytoma and their relationship to multiple myeloma. *Cancer* **43:** 1007–1013.

Kapadia, S. B., Barnes, L., Deutsch, M. (1981) Non-Hodgkin's lymphoma of the nose and paranasal sinuses: a study of 17 cases. *Head and Neck Surgery* **3:** 490–499.

Kapadia, S. B., Desai, U., Cheng, V. S. (1982) Extramedullary plasmacytoma of the head and neck. A clinicopathologic study of 20 cases. *Medicine* **61:** 317–329.

Kerr, P. D., Dort, J. C. (1991) Primary extramedullary plasmacytoma of the salivary glands. *Journal of Laryngology and Otology* **105:** 687–692.

Neiman, R. S., Barcos, M., Berard, C., Bonner, H., Mann, R., Rydell, R. E., Bennett, J. M. (1981) Granulocytic sarcoma: a clinicopathologic study of 61 biopsied cases. *Cancer* **48:** 1426–1437.

Patterson, J. W., Parsons, J. M., White, R. M., Fitzpatrick, J. E., Kohout-Dutz, E. (1988) Cutaneous involvement of multiple myeloma and extramedullary plasmacytoma. *Journal of the American Academy of Dermatology* **19:** 879–890.

Rosenfeld, R., Moura, R., Bluestone, C. (1992) Predictors of residual-recurrent cholesteatoma in children. *Archives of Otolaryngology–Head and Neck Surgery* **118:** 384–391.

Rubin, J., Johnson, J. T., Killeen, R., Barnes, L. (1990) Extramedullary plasmacytoma of the thyroid associated with a serum monoclonal gammopathy. *Archives of Otolaryngology–Head and Neck Surgery* **116:** 855–859.

Toriumi, D. M., Wolff, A. P. (1988) Pathologic quiz cases. *Archives of Otolaryngology–Head and Neck Surgery* **114:** 338–341.

Waldron, J., Mitchell, D. B. (1988) Unusual presentations of extramedullary plasmacytoma in the head and neck. *Journal of Laryngology and Otology* **102:** 102–104.

Wanebo, H., Geller, W., Gerald, F. (1966) Extramedullary plasmacytoma of the upper respiratory tract: recurrence after latency of 36 years. *New York State Journal of Medicine* **66:** 1110–1113.

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