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Treatment of multiple solitary plasmacytomas with cytokine-induced killer cells

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Abstract

Background aims. Currently available treatment methods for advanced plasmacytoma include surgery, chemotherapy, radiotherapy, immunomodulatory agents, hematopoietic stem cell transplantation and donor lymphocyte infusion. We report a case of advanced refractory multiple solitary plasmacytomas in a 68-year-old Asian man with multiple bone lesions, in whom autologous cytokine-induced killer (CIK) cells were administered in an effort to eliminate residual tumor lesions. *Methods.* CIK cells were infused monthly for 21 courses. *Results.* The patient has survived 63 months since the first hospital visit without disease progression for 40 months. *Conclusions.* This case represents the first report of autologous CIK cell immunotherapy used successfully to suppress multiple solitary plasmacytomas and resolve bone lesions.

Key Words: *cancer, chemotherapy, cytokine-induced killer cells, immunotherapy, plasmacytoma*

Introduction

Multiple solitary plasmacytomas are characterized as primary or secondary plasmacytomas that can include bone and soft tissue. Multiple solitary plasmacytomas were first identified by the 2003 Working Group of the UK Myeloma Forum, on behalf of the British Committee for Standards in Haematology (1). In terms of clinical course, multiple solitary plasmacytomas can arise from a solitary plasmacytoma of bone or result from recurrent multiple myeloma 2–3 years after local radiotherapy or surgical resection. Each year, >5% of patients diagnosed with solitary plasmacytoma of bone progress to multiple solitary plasmacytomas (1).

Donor lymphocyte infusion has been demonstrated to treat successfully patients with recurrent myeloma after allogeneic hematopoietic stem cell transplantation (2,3). However, treatment of myeloma requires a higher T-cell count than required for the treatment of other diseases sensitive to donor lymphocyte infusion treatment. This line of therapy may increase the incidence of graft-versus-host disease in patients with myeloma (4,5), partially owing to severe immunodeficiency (6). Additionally, it has been demonstrated that bone marrow donors who have previously accepted active immunization transfer the specific immunity to the recipient patient with myeloma, which enhances the graft-versus-myeloma effect (7–9).

Cytokine-induced killer (CIK) cells are a group of heterogeneous immune effector cells, and application of these cells is currently the most widely used adoptive immune cell therapy in the treatment of various solid tumors (10,11) and hematologic malignancies (12–16). However, the effectiveness of CIK cells in the treatment of plasma cell tumors has rarely been reported. We report a case of advanced refractory multiple solitary plasmacytomas associated with multiple bone lesions completely relieved by repeated infusion of autologous CIK cells.

Case report

The patient was a 68-year-old Asian man. The patient presented at a routine physical examination in April 2007 at Chinese PLA General Hospital with osteolytic destruction combined with peripheral soft tissue swelling at the left ninth rib identified on

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computed tomography (CT). The patient reported having no discomfort, fever, night sweats or weight loss. Further examination revealed increased (19.8 g/L) blood immunoglobulin G (IgG; normal range, 7−16.6 g/L) and increased (4.70 g/L) κ light chain (normal range, 1.70−3.70 g/L). The results of blood and urine immunofixation electrophoresis were negative (M protein, negative). No abnormalities were observed in the complete blood count, blood urea, creatinine, electrolytes, lactate dehydrogenase, serum calcium, serum albumin and serum protein electrophoresis. The patient's bone marrow was negative for myeloma cells as determined by bone biopsy. Positron emission tomography/CT performed on April 19, 2007, showed a limited lesion with abnormally increased fluorodeoxyglucose metabolism at the left ninth rib on early and delayed images. The maximum and mean standardized uptake values were 8.5 and 8.0, respectively (Figure 1A). CT-guided aspiration biopsy confirmed the lesion at the left ninth rib was a plasmacytoma. The patient underwent resection of the ninth rib under general anesthesia on May 22, 2007. Postoperative biopsy revealed the plasmacytoma was 4 cm × 3 cm × 1.5 cm in size. Immunohistochemistry showed changes of tumor cells including κ (+++), λ (focal +), CD38 (++), CD138 (+), CD79α (−) and Ki-67 (positive <25%) (Figure 1B−D).

Regular follow-up visits were scheduled after surgery with no further planned treatment. Approximately

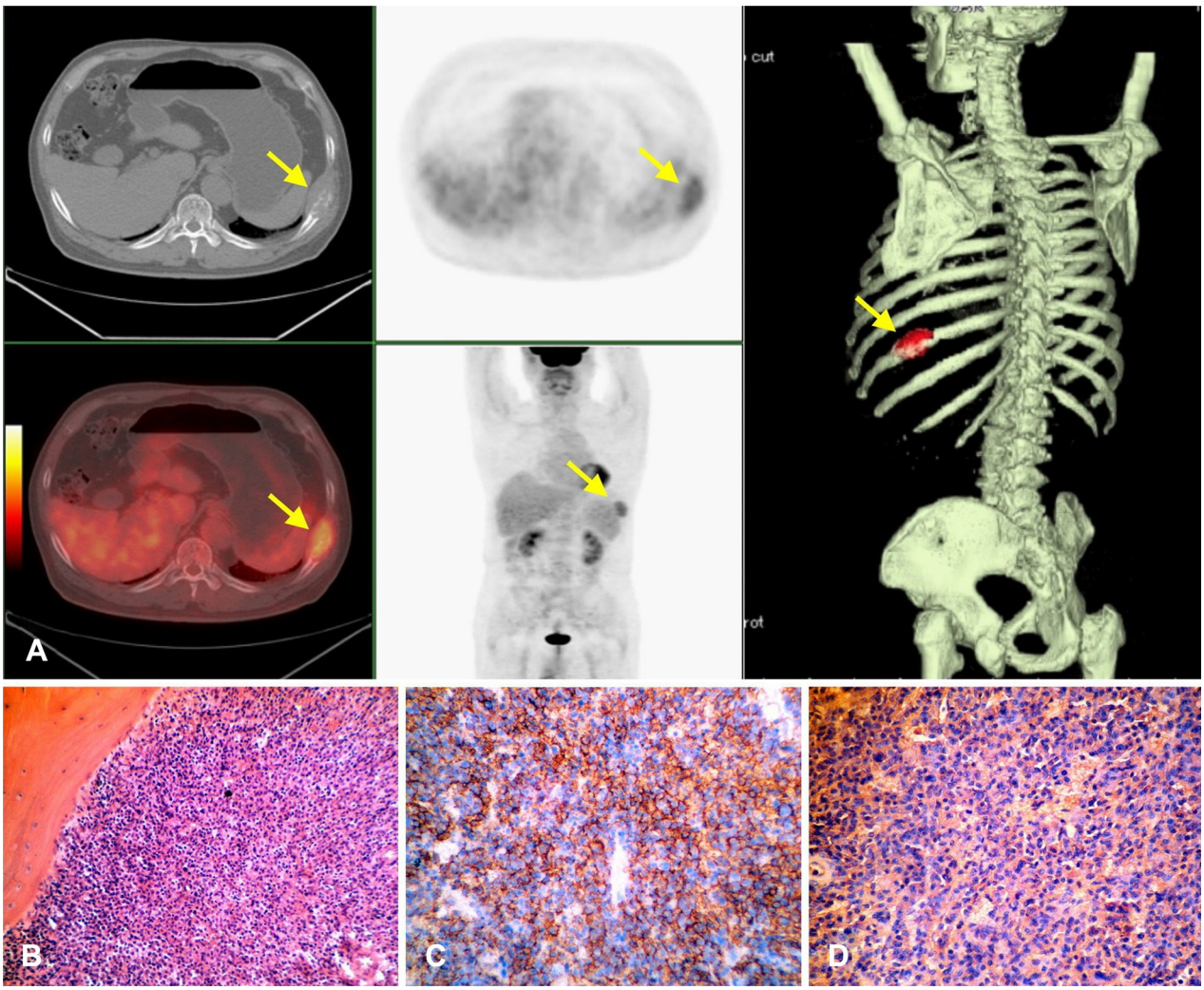

Figure 1. (A) Positron emission tomography/CT showed a limited abnormal lesion 4.8 cm × 2.1 cm × 4.1 cm in size at the left ninth rib. The lesion had increased abnormal fluorodeoxyglucose metabolism, and the maximum and average values of standardized uptake value were about 6.8 and 6.7, respectively. CT showed a soft tissue mass with adjacent bony erosion. (B) Tumor section from the removed ninth rib demonstrated diffuse invasion of plasma cell-like tumor cells into the bone tissue. (Hematoxylin-eosin, ×200.) (C) CD38 immunohistochemical staining of tumor tissue removed from the ninth rib was strongly positive, which suggested stained cytoplasm and membrane of the tumor cell. (Labeled streptavidin biotin, ×400.) (D) κ light chain immunohistochemical staining of tumor tissue removed from the ninth rib was strongly positive, which suggested stained cytoplasm and membrane of the tumor cell. (Labeled streptavidin biotin, ×200.)