CASE REPORT

Bone regeneration after chemotherapy for vault lymphoma

Yosuke Akamatsu,¹ Masayuki Kanamori,¹ Hiroshi Uenohara,¹ Teiji Tominaga²¹Department of Neurosurgery, Sendai Medical Center, Sendai, Japan²Department of Neurosurgery, Tohoku University Graduate School of Medicine, Sendai, JapanCorrespondence to
Dr Masayuki Kanamori,
mkanamori@med.tohoku.ac.jp

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SUMMARY

A 76-year-old woman presented with a mass in the left frontal region of the scalp. On admission, neurological examination found no deficits. CT revealed an osteolytic mass lesion in the left frontal cranial vault. She underwent open biopsy of the subcutaneous lesion. Histological examination identified cells with pleomorphic nuclei and marked nucleoli, and immunohistochemical staining showed these cells were positive for CD20, but negative for CD3. The histological diagnosis was diffuse large B-cell lymphoma. The patient received chemotherapy consisting of rituximab, cyclophosphamide, adriamycin, vincristine and prednisolone. Fluorine-18 fluorodeoxyglucose positron emission tomography demonstrated complete response. Follow-up CT revealed that the tumour had completely disappeared, with regeneration of the destroyed bone. The regenerated skull bone had adequate strength without significant deformity, so cranioplasty was unnecessary. The present case demonstrates the regeneration of destroyed skull bone after chemotherapy for cranial vault lymphoma.

BACKGROUND

Cranial vault lymphoma is an extremely rare entity. Osteolytic changes are frequently associated with cranial vault lymphoma,^{1 2} but radiological changes after chemotherapy have never been reported. The present case demonstrates the regeneration of destroyed skull bone after chemotherapy for cranial vault lymphoma.

CASE PRESENTATION

A 76-year-old woman presented with a 1-month history of mass lesion in her left frontal area. She had diabetes mellitus, but no familial history of malignancy. The subcutaneous mass lesion was 10 cm in diameter, and soft without erosion of the skin or tenderness. The patient had no neurological deficits.

INVESTIGATIONS

CT revealed an osteolytic mass lesion in the left frontal cranial vault (figure 1A, B). Fluorine-18 fluorodeoxyglucose positron emission tomography ([¹⁸F]FDG PET) revealed high uptake of [¹⁸F]FDG in the sphenoid bone, ribs, vertebrae and retroperitoneum.

DIFFERENTIAL DIAGNOSIS

These radiological findings of multiple osteolytic lesions suggested that the mass lesion could be

metastatic skull tumour, malignant lymphoma or meningioma.

TREATMENT

Open biopsy of the subcutaneous lesion in the left frontal area was performed. Histological examination identified cells with pleomorphic nuclei and marked nucleoli (figure 1C), and immunohistochemical staining showed these cells were positive for CD20, but negative for CD3. The histological diagnosis was diffuse large B-cell lymphoma. The patient received seven cycles of combination chemotherapy consisting of rituximab, cyclophosphamide, adriamycin, vincristine and prednisolone. [¹⁸F]FDG PET demonstrated complete response.

OUTCOME AND FOLLOW-UP

Follow-up CT revealed that the tumour had completely disappeared, with regeneration of the destroyed bone (figure 1D). The regenerated skull bone had adequate strength without significant deformity, so cranioplasty was unnecessary. The patient remained free from recurrence of lymphoma 9 months later.

DISCUSSION

The present case demonstrates the regeneration of destroyed skull bone after chemotherapy for cranial vault lymphoma. Cranial vault lymphoma is an extremely rare finding with only 38 reported cases of primary lymphoma of the cranial vault including the present case.² Osteolytic changes were confirmed in 74% of the patients in reported series. However, radiological changes of the destroyed skull bone after treatment for the vault lymphoma were not reported. The present case of vault lymphoma demonstrates regeneration of the completely destroyed skull bone with adequate strength without significant deformity after chemotherapy.

The exact mechanisms underlying the bone regeneration of destroyed skull bone in this case remain unclear. The periosteum and dura may be important in the repair of bony defects of the skull.³ Presumably, the diploe and cortical bones were completely destroyed by the tumour invasion, whereas the periosteum and dura were preserved in this case. Alternatively, complete remission of cancer may be related to bone regeneration after radiation therapy for nasopharyngeal carcinoma.³ Under such conditions, tumour cells may have caused bone loss by directly resorbing bone mineral and matrix, and by stimulating osteoclasts through cytokines. Through this mechanism, tumour

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Figure 1 Brain (A) and bone (B) CT scans demonstrating an osteolytic mass lesion in the left frontal cranial vault. (C) Photomicrograph of the surgical specimen demonstrating cells with pleomorphic nuclei and marked nucleoli. H&E staining, original magnification $\times 200$. (D) Bone CT scan after seven cycles of chemotherapy, demonstrating disappearance of the mass lesion and regeneration of the destroyed skull bone.

disappearance may have lead to suppression of the osteolytic process in our case.

In conclusion, the present case demonstrates osteolytic change leading to bone regeneration after chemotherapy for vault lymphoma. Further investigations may clarify whether these responses are common or exceptional in this rare entity.

Contributors YA was involved in the acquisition of data, drafting the article. MK was involved in the acquisition and interpretation of data, drafting the article. HU was involved in the interpretation of data, critically revising the article. TT was involved in the critically revising the article.

Competing interests None declared.

Patient consent Obtained.

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Learning points

- Osteolytic changes are frequently associated with cranial vault lymphoma.
- Combination chemotherapy is effective for this disease.
- Osteolytic change may lead to bone regeneration after chemotherapy for vault lymphoma.

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