Solitary plasmacytoma of the occipital bone: a case report

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Abstract
Solitary plasmacytoma (SP) of the skull is an uncommon clinical entity that is characterized by a localized proliferation of neoplastic monoclonal plasma cells. This case report describes a 50-year-old male that presented with a headache and an exophytic soft mass on the occiput. The diagnosis of SP was based on the pathological results and imaging examinations. The patient underwent occipital craniotomy, skull reconstruction and lower trapezius myocutaneous flap (LTMF) transplantation under general anaesthesia. The tumour was capsulized and extended to the subcutaneous and the subdural space through the dura mater with skull defects. The neo-plasm of the occipital bone involved large areas of scalp and subcutaneous tissue, which resulted in a large postoperative scalp defect that was repaired using LTMF transplantation. All of the tumour was removed and the transplanted flap grew well. Follow-up at 5 months identified an aggressive mass lesion on the right frontal lobe. The patient received six cycles of the PAD chemotherapy regimen (bortezomib, doxorubicin and dexamethasone) and the lesion was significantly reduced. This case demonstrates that LTMF is an alternative approach for the repair of scalp and subcutaneous soft tissue defects caused by the excision of a large malignant tumour of the occipital region. Chemotherapy is the choice of treatment for neoplastic recurrence.

Keywords
Solitary plasmacytoma, lower trapezius myocutaneous flap, scalp reconstruction, plasma cells

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Introduction
Solitary plasmacytoma (SP) is the pathological manifestation of the proliferation of monoclonal plasma cells and an SP that originates in bone tissue is called a solitary plasmacytoma of bone (SPB).\(^1\) Bone destruction may occur in any osseous location but the most common sites are the pelvis, spine, femur, humerus and ribs.\(^2\)\(^-\)\(^4\) An SPB of the skull is rare and a huge growth in the occipital bone is rarely mentioned in the literature.\(^3\)\(^,\)\(^4\) Complete tumour removal is the first and best approach for patients with no lesions in other parts of the body.\(^3\) This current case report describes a rare case of SPB of the occipital bone with scalp involvement, in which the patient underwent radical resection and reconstruction of the large scalp defects through lower trapezius myocutaneous flap (LTMF) transplantation.

Case report
A 50-year-old male patient presented in October 2018 to the Department of Neurosurgery, Hunan Cancer Hospital and the Affiliated Cancer Hospital of Xiangya School of Medicine, Central South University, Changsha, Hunan Province, China with a headache and an exophytic mass on the occiput (Figure 1a). The neurological physical examination showed no findings. Computed tomography (CT) showed a large mass with homogeneous enhancement on the occiput, compressing the bilateral occipital lobe (Figure 1b); and the

Figure 1. Preoperative imaging examinations: (a) preoperative appearance of the tumour; (b) preoperative enhanced computed tomography scan; (c) preoperative enhanced magnetic resonance imaging (MRI); (d) preoperative enhanced MRI scan – axial view; (e) preoperative digital subtraction angiography. The colour version of this figure is available at: http://imr.sagepub.com.
bone window revealed a solitary osteolytic lesion involving the whole entire of the occipital bone. Magnetic resonance imaging (MRI) showed an intra- and extra-cerebral expansile osseous lesion \((79 \times 47 \text{ mm})\); the mass was mostly isointense with the brain parenchyma on both T1- and T2-weighted images and homogeneously enhanced (Figures 1c and 1d). Digital subtraction angiography (DSA) demonstrated that all of the tumour had hypervascularity that was supplied from the occipital artery. In order to decrease bleeding volume and shorten the surgery time, the feeding blood vessel was embolized during DSA (Figure 1e).

The patient underwent occipital craniotomy, skull reconstruction and LTMF transplantation under general anaesthesia. The tumour was capsulized and extended to the subcutaneous and the subdural space through the dura mater with skull defects. Grossly, the tumour had a fish-meat like appearance, mixed with hard cartilage and broken bone (Figure 2a). The tumour had a rich blood supply and despite embolization of the main blood supply artery during DSA before surgery, there was a lot of blood loss during the operation. The tumour mass underwent extended resection, including the marginal bone and involved scalp, forming an \(8 \times 8 \text{ cm}\) bone window and a \(10 \times 6 \text{ cm}\) scalp defect. The skull defect was reconstructed using titanium mesh and the scalp defect was transplanted using LTMF. The trapezius and the skin island \((10 \times 6 \text{ cm})\) and the supplying vessels of the transverse cervical artery and the dorsal scapular artery were marked on the skin (Figure 2b). The island flap was excised and its muscle pedicle dissected up to the

Figure 2. Perioperative procedures and imaging examinations: (a) the tumour was fish-meat soft tan in appearance; (b) the trapezius and the skin island and the supplying vessels of the transverse cervical artery and the dorsal scapular artery marked out on the skin; (c) the island flap and its muscle pedicle were excised; (d) the flap was set into the defect with a well-perfused distal end; (e) the stiches were removed after surgery; (f) postoperative enhanced magnetic resonance imaging (MRI) scan – sagittal view; (g) postoperative enhanced MRI scan – axial view. The colour version of this figure is available at: http://imr.sagepub.com.
rotation point at the medial-superior edge of the scapula (Figure 2c). The LTMF was rotated vertically into the occipital scalp defect through the neck posterior subcutaneous tunnel (Figure 2d). Two weeks after the operation, the transplanted skin island was vital and wound healing undisturbed (Figure 2e). MRI indicated that the tumour was completely removed (Figures 2f and 2g).

Haematoxylin and eosin staining of the tumour showed the presence of atypical plasma cells with typical eccentric round nuclei. Immunohistochemical staining showed the following staining pattern: cytokeratin-P (−), epithelial membrane antigen (−), melan-A (−), CD38 (+), CD138 (+), CD20 (−), Kappa (+), Lambda (+), glial fibrillary acidic protein (−), S-100 (−), CD68 (+), thyroid transcription factor-1 (−), Vim (−), CD3 (−) and Ki-67 (30%) (Figure 3).

The patient refused further radiotherapy for financial reasons. After a follow-up period of around 5 months, he was symptom free and had no clinical evidence of disease. At the 5-month follow-up visit, MRI revealed no in-field recurrence but an aggressive mass lesion with enhancement was found on the right frontal lobe (Figures 4a and 4b). Chemotherapy (PAD regimen: bortezomib, pegylated liposomal doxorubicin and dexamethasone) was administered from 17 April 2019 in the

![Figure 3](http://imr.sagepub.com). Scale bar 100 μm.
Department of Haematology, Hunan Cancer Hospital and the Affiliated Cancer Hospital of Xiangya School of Medicine, Central South University, Changsha, Hunan Province, China. After six consecutive cycles of chemotherapy, the lesion on his right frontal lobe was significantly reduced (Figures 4c and 4d). Postoperative review after 10 months showed no tumour recurrence in situ of the original SPB.

As this was a case report, the Institutional Review Board of Hunan Cancer Hospital waived the need for ethical approval. The patient provided written informed consent for publication that was approved by the Institutional Review Board and the details of the patient have been anonymized.

Discussion

Huge intra- and extracranial SPs of the occipital bone are very rare and few cases have been reported.3,4 SPB is characterized by the presence of a solitary lytic lesion due to monoclonal plasma cell infiltration, with or without soft-tissue extension.5 SPBs account for 70% of all SP cases and they occur primarily in red marrow-containing bones.6 Plasma cells are highly sensitive to radiation.7,8 Radiation therapy remains the
treatment of choice for patients after surgery. According to recommendations from a European expert panel, a total fractionated dose of 40–50 Gy should be given and a margin of at least 2 cm should be employed. In this current case, it was unfortunate that the patient refused radiation therapy for economic reasons. A review was performed 5 months after the operation and a new mass was found on the right frontal lobe. After six cycles of chemotherapy, the tumour had reduced in size significantly, which suggests that chemotherapy has a positive impact on the growth of recurrent tumours.

The imaging characteristics of SPB in the skull are complex and can easily lead to misdiagnosis. Enhanced CT scanning combined with observation of the bone window are credible means by which to diagnose SPB and they could provide more information about osteolytic lesions. In the current case, the MRI examination allowed for the identification of the location, size and shape of the tumour as well as its relationship to the surrounding structures. In our opinion, preoperative DSA is necessary for the identification of the blood supply vessels and to facilitate vessel embolization.

During the current operation, the tumour was found to involve the scalp and subcutaneous tissue. To reduce the probability of tumour recurrence, the involved scalp underwent an extended resection. LTMF was used to facilitate occipital scalp reconstruction. LTMF provides available muscle compartments transferred on a reliable vascular pedicle to the dorsal, suprascapular and neck regions. The benefits of LTMF include well vascularized tissue, ease of harvest and the provision of a large flap located far enough away from the damaged area. The main blood supply to the LTMF originates from the transverse cervical artery and the dorsal scapular artery. This method could solve the problem of insufficient blood supply caused by titanium plate implantation. In addition, the musculocutaneous pedicle could fill the subcutaneous cavity created by the huge tumour resection preventing occipitalia scalp hydrops and secondary infection. LTMF is an alternative approach for the repair of scalp and subcutaneous soft tissue defects caused by excision of a malignant tumour of the occipital region.

Authors' contributions
L.W. studied the case, collected the references and wrote the paper. Z.H. designed the report and wrote the paper. H.C. and H.Z. wrote the paper. X.P. analysed the data. N.R. served as the first chief during surgery and wrote the paper. All authors read and approved the final manuscript.

Declaration of conflicting interest
The authors declare that there are no conflicts of interest.

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