A wide range of lesions can be identified in association with the skull, presenting variably with neurologic symptoms, scalp pain, tenderness, and/or a palpable lesion. Radiologic studies illustrating this range of lesions have been published but we could not find a comparable pathology survey study. This study compares and contrasts the spectrum of skull lesions seen at a single academic medical center.

Methods/Materials

• 30 cases were selected to illustrate the range of skull lesions seen at our institution.
• The patient’s electronic medical records and all imaging studies were thoroughly reviewed.
• Literature was searched and reviewed using appropriate key words.

Illustrative Cases

Illustrative Case 1: A 59-year-old woman presented for evaluation of skull mass, first noticed about 1.5 years previously as a lump in the back of her head, increasing in size over time. CT and MRI Imaging identified a 3.7 cm lesion with lytic destruction of the skull. A bone scan identified increased uptake limited to the lesion with no other lesions identified. Serum protein electrophoresis performed after frozen section identification of abundant plasma cells in the lesion identified a monoclonal IgG lambda spike, 0.3 g/dL.

Illustrative Case 2: A 78-year-old man presented with a scalp lesion increasing in size at the site of Mohs surgery 2 years previously for squamous cell carcinoma of the scalp. A biopsy was negative by report and he was placed on antibiotics. The lesion continued to increase in size and a second biopsy was positive for squamous cell carcinoma.

Illustrative Case 3: A 75-year-old man presented with a scalp lesion increasing in size. Imaging of his head revealed a 4 x 4.7 cm lytic calvarial mass. Chest, abdomen, and pelvis imaging identified a 3.8 x 3.7 cm lesion in the hepatic lobe with nonspecific features.

Results

Illustrative Case 1

• MRL, TI Sagittal, A: pre-contrast and B: post-contrast identified a destructive, skull-based lesion, 3.7 cm in greatest dimensions.
• C: A head CT scan with bone windows confirmed lytic destruction of the skull.

Illustrative Case 2

• MRL, TI with contrast A: coronal and B: sagittal sections identified a lesion eroding through the skull with extracranial and intracranial epidural components. C: Preoperative view extracranial component of lesion. D: Resection specimen. E: Cross section through the lesion confirmed bone destruction by the mass. F: Histologic evaluation revealed nests of cells with focal squamous differentiation. G: Fragments of bone were noted within the lesion.

Illustrative Case 3

CT scan with contrast, A: coronal and B: sagittal profiles, identified a lesion eroding through the skull with extracranial and intracranial epidural components. C: CD38 immunohistochemistry confirmed the plasma cell nature of the neoplasm. D: In situ hybridization identified lambda light chain monotypia. Combined findings including no other lesions by bone scan are consistent with a plasmacytoma.

Summary of Results

A total of 30 lesions associated with the skull, from patients evaluated at our institution were selected as representative of the range of disease processes seen at this medical center. Ages ranged from from 9 months to 78 years with four lesions identified in children and the remainder identified in adults.

• Intracranial Lesions Invading Bone consisted of meningioma variants, both presenting as large dura-based, extraaxial lesions and en plaque and ovoid lesions not recognized as meningiomas radiologically and included World Health Organization grade 1 and 2 neoplasms.

• Hematopoietic Neoplasms involving the skull included Langerhans cell histiocytosis, histiocytic sarcoma, multiple myeloma, plasmacytoma, and diffuse large cell B-cell lymphoma.

• Primary Skull Lesions included epidermoid cyst, hemangiomma, fibrous dysplasia, osseoma, osteosarcoma, chordosarcoma, and chordoma.

• Metastatic Lesions included those originating from neuroblastoma, lung, liver, and rectum.

• Skin-Based Lesions Invading Skull included squamous cell carcinoma and Ewing sarcoma.

Conclusions

• This study provides the foundation for a comprehensive manuscript which surveys and reviews the wide range of intracranial, skull-associated, hematopoietic, extracranial, and metastatic neoplasms that can occur in association with the skull. Three of the cases are presented here.

• Half of the diagnoses were unexpected based on the differential diagnoses in reports by radiologists.

• It emphasizes the need for clinical-radiologic-pathologic correlation on such lesions and the challenges in generating the differential diagnosis clinically, prior to histologic evaluation.

References