

Pleomorphic Lipoma of the Occipital Region: Imaging–Pathology Correlation in a Heterogeneous Fat-Containing Mass

Case: A 70-year-old woman underwent radiological evaluation for a long-standing, slowly enlarging mass at the back of her neck.

Let us begin with the plain radiograph:

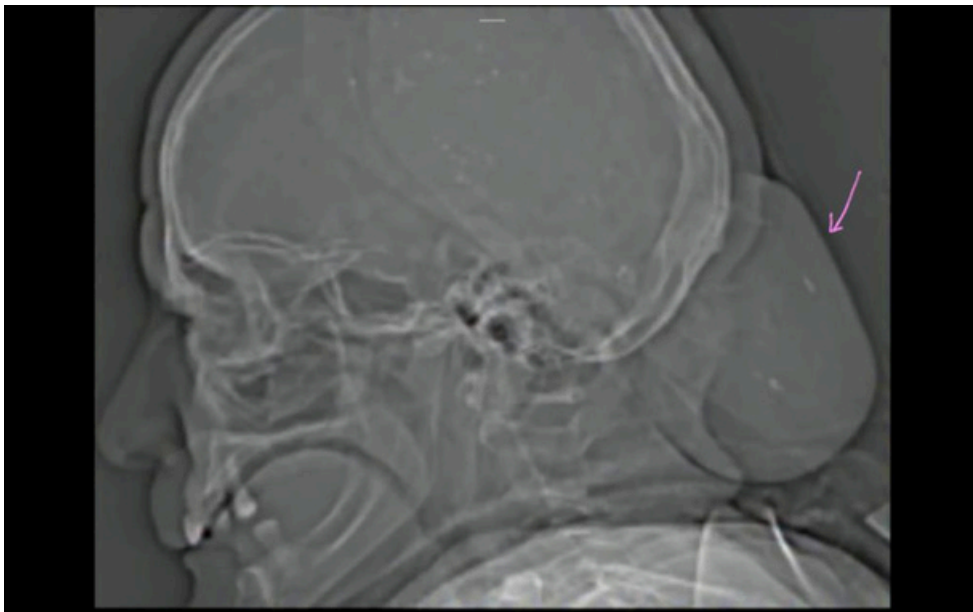


Figure 1. Lateral radiograph showing the mass at the back of the neck.

We see a smoothly contoured mass producing an outward bulge in the posterior neck region. Its relatively radiolucent appearance suggests fat content. However, its internal structure is not entirely homogeneous; a few millimetric radiopaque foci catch our attention.

Could these foci represent calcification? If the mass contains fat, is this appearance sufficient to call it a simple lipoma? With these questions in mind, we move on to cross-sectional imaging.

What does CT add?



Figure 2. Axial CT appearance of the occipital subcutaneous mass.

Axial CT images show a well-defined, heterogeneous mass within the subcutaneous tissues of the occipital region. Linear and patchy components of higher attenuation are interspersed among areas of fat attenuation.

Despite the radiopaque foci noted on the radiograph, no calcification is identified on CT. We therefore do not characterize these radiographic foci as calcifications.

While confirming the fat content, CT also demonstrates another important feature: the mass does not consist entirely of homogeneous adipose tissue.

What do we look for on MRI?

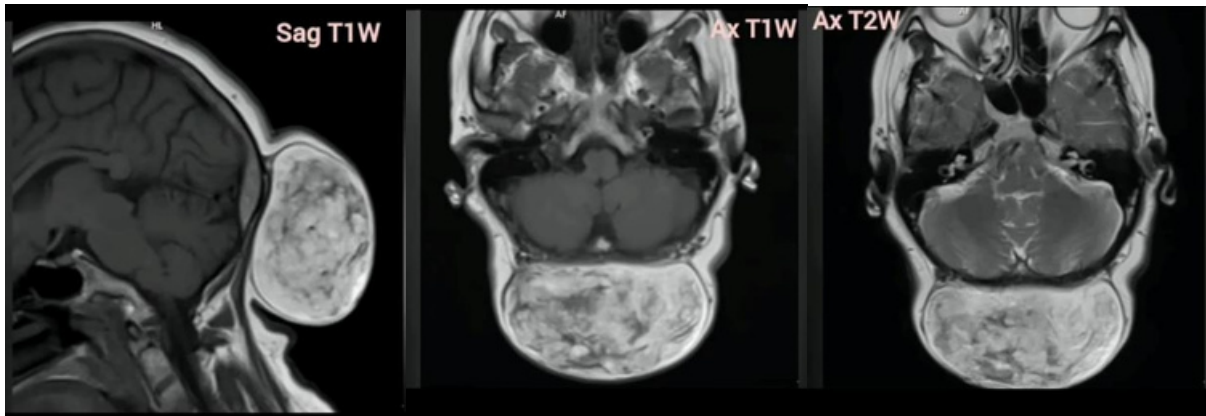


Figure 3. From left to right: non-fat-suppressed sagittal T1-weighted, axial T1-weighted, and axial T2-weighted MR images.

The non-fat-suppressed sagittal T1-weighted image allows us to assess the location of the mass more clearly. The lesion lies within the subcutaneous tissues, produces an outward bulge, and is surrounded by a thin, capsule-like rim. No obvious extension into the deep tissues or destruction of the adjacent bone is evident on the displayed section.

On axial T1- and T2-weighted images, a substantial portion of the mass shows high signal intensity similar to that of subcutaneous fat. Although fat-suppressed MR sequences are unavailable, the areas of fat attenuation on CT support its lipomatous composition.

The most striking feature, however, is its marked heterogeneity. Band-like and patchy areas of lower signal intensity are interspersed among the fat-signal regions, particularly on T1-weighted images. Components of higher attenuation than fat are also visible on CT, demonstrating this heterogeneity on both modalities.

We therefore do not limit our assessment to a simple lipoma. Although the superficial location and smooth contours are relevant findings, they do not independently exclude malignancy. Our question is now not only “Does this mass contain fat?” but also “What do the components accompanying the fat represent?”

No prior examinations were available, so interval growth could not be assessed on imaging. Contrast-enhanced sequences were also unavailable, preventing assessment of the enhancement characteristics of the non-fatty components.

The mass was surgically excised, and histopathological examination established the diagnosis of **pleomorphic lipoma with giant cells**.

What is pleomorphic lipoma?

Pleomorphic lipoma is a benign adipocytic tumor. It most commonly occurs in the posterior neck, shoulder, and upper back, particularly in middle-aged and older men. However, it can also occur in women; the patient's sex in this case does not contradict the diagnosis. [1]

Spindle cell lipoma and pleomorphic lipoma belong to the same tumor spectrum. Mature adipocytes may be accompanied by varying proportions of spindle cells, thick collagen bundles, and myxoid stroma. Pleomorphic lipoma may additionally contain multinucleated "floret-type" giant cells, with nuclei arranged in a pattern resembling flower petals. [2]

The important point is that **"pleomorphic" describes the histological appearance; it does not imply malignant behavior. Pleomorphic lipoma is not pleomorphic liposarcoma.** [1,2]

How does the pathological diagnosis explain our imaging findings?

The feature that initially led us to question a simple lipoma was the marked heterogeneity of this fat-containing mass. The diagnosis of pleomorphic lipoma provides a framework for understanding this appearance: cellular and stromal components accompanying the fat can prevent the entire lesion from appearing like adipose tissue. [2]

Nevertheless, we cannot directly label every low-signal band as collagen or every T2-hyperintense area as myxoid stroma. Such assignments require histological correlation.

In this case, imaging demonstrated a heterogeneous fat-containing mass, while histopathological examination determined the definitive tumor type.

What can we learn from the differential diagnosis?

The main lesson from this case is that heterogeneous fat-containing masses require consideration of other lipomatous tumors in addition to simple lipoma.

Simple lipoma: A predominantly homogeneous fatty appearance is expected, although thin septa may be present. Prominent non-fatty components broaden the differential diagnosis.

Spindle cell and pleomorphic lipoma: These may appear as superficial heterogeneous masses containing variable proportions of fatty and non-fatty components.

Atypical lipomatous tumor / well-differentiated liposarcoma: Thick or irregular septa and non-fatty nodular areas require careful assessment. Imaging findings may overlap with those of benign lipomatous tumors.

The presence of non-fatty components alone is not evidence of malignancy. A small study comparing superficial spindle cell lipomas with superficial atypical lipomatous tumors demonstrated that non-fatty areas can also be prominent in spindle cell lipomas. Therefore, heterogeneity alone cannot distinguish benign from malignant lesions. [3]

Treatment and clinical behavior

Surgical excision is generally sufficient for pleomorphic lipoma, and local recurrence is rare. An accurate histopathological diagnosis is therefore important to prevent unnecessarily extensive treatment resulting from confusion with a malignant lipomatous tumor. CT and MRI examinations at the 10-year follow-up showed no evidence of local recurrence at the previous lesion site. [2]

Radiology Pearl

When we encounter heterogeneity within a fat-containing mass, we should avoid two errors: dismissing the lesion simply as a “lipoma” and interpreting non-fatty components as direct evidence of malignancy.

In this case, our diagnostic journey began with a radiographic appearance suggesting fat content, expanded with the recognition of non-fatty components on CT and MRI, and culminated in the histopathological diagnosis of pleomorphic lipoma.

References

1. Shmookler BM, Enzinger FM. Pleomorphic lipoma: a benign tumor simulating liposarcoma. A clinicopathologic analysis of 48 cases. *Cancer*. 1981;47(1):126–133. PMID: 7459800.
2. Ohshima Y, Nishio J, Nakayama S, Koga K, Aoki M, Yamamoto T. Spindle Cell Lipoma and Pleomorphic Lipoma: An Update and Review. *Cancer Diagn Progn*. 2023;3(3):282–290. doi:10.21873/cdp.10213.
3. Kawaguchi M, Kato H, Kobayashi K, et al. Differences in MRI findings of superficial spindle cell lipoma and atypical lipomatous tumor/well-differentiated liposarcoma. *Br J Radiol*. 2023;96(1143):20220743. doi:10.1259/bjr.20220743.