Malignant nodular hidradenoma is a rare skin appendageal tumor, and its imaging findings have not been previously described. We experienced the case of a large malignant nodular hidradenoma of the left upper arm in a 71-year-old woman. MRI revealed a large, lobular, poorly circumscribed, soft tissue mass at the left upper arm, and the mass showed homogeneous enhancement. 18F-FDG PET/CT showed hypermetabolic activity in the left upper arm mass with a maximal standard uptake value of 19.

**Index words:** Skin, neoplasms
Skin, MR
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Skin appendageal tumors are generally diagnosed according to their histology, and imaging examinations are not routinely performed. However, when a large soft tissue mass exists and malignancy is suspected, then imaging may be helpful to scrutinize the nature of the tumor. Malignant nodular hidradenoma is a rare aggressive malignant tumor of the eccrine sweat glands. Approximately 50 cases had been documented up to the year 2004 in the English literature, and most cases have been reported in the pathology literature with only limited clinical and radiological information (1). We present here the radiological findings of a malignant nodular hidradenoma of the upper arm in a 71-year-old woman.

**Case Report**

A 71-year-old woman presented with a recurrent tumor of the left upper arm. The lesion was first noted 50 years earlier as a small, bean-sized, cutaneous nodule, and it had been stable for 46 years. About 4 years before...
admission, the nodule began to slowly grow and the patient was treated at a private clinic. An incisional biopsy was then performed and the diagnosis of benign sweat gland tumor was made. Two years later, the nodule began to rapidly enlarge with ulceration and hemorrhagic discoloration. At the time of admission, a superficial 12 × 10 × 4 cm mass lesion was palpated on the postero-lateral aspect of the left upper arm (Fig. 1). The tumor was elastic and firm and it was not associated with any motor or sensory disturbance.

Plain radiographs demonstrated a lobular soft tissue mass at the distal part of the upper arm. No bony abnormality in the adjacent humerus was found.

**Fig. 2.** Conventional radiography showed a multilobular soft tissue mass at the distal part of the upper arm. No bony abnormality in the adjacent humerus was found.

**Fig. 3.** The axial T1-weighted (A) and fat-suppressed T2-weighted (B) images showed an ill defined mass (arrow) in the subcutaneous tissue of the upper arm. The mass was hypointense to muscle on the T1-weighted image and hyperintense to muscle on the fat-suppressed T2-weighted image. The axial fat-suppressed T1-weighted image (C) after intravenous administration of gadolinium demonstrated homogeneous enhancement (arrowhead). The underlying adjacent musculature was involved.

**Fig. 4.** The fused PET-CT image showed an area of hypermetabolism (arrow, Standard Uptake Value = 19) corresponding to the soft tissue mass in the left upper arm.
mass with no internal calcification. No definite change such as erosion, periosteal reaction or invasion was noted in the adjacent bone (Fig. 2). The MR images showed a soft tissue mass in the subcutaneous layer of the lateral epitrochlear region, and the mass extended to the adjacent muscular layer. The tumor’s margin was poorly defined and the lesion was nearly homogenous in appearance. The mass showed an intermediate to low signal intensity on the T1-weighted images, and near uniform intermediate to high signal intensity on the fat-suppressed T2-weighted images. On the fat-suppressed T1-weighted MR images with contrast enhancement, the mass demonstrated diffuse enhancement without any areas of necrosis (Fig. 3). The fused PET-CT showed hypermetabolic activity in the mass with a maximal standard uptake value of 19. This finding was suggestive of a malignant lesion. No other sites of abnormal focal FDG uptake were apparent on the whole-body PET-CT scan (Fig. 4).

The patient underwent an excisional biopsy and split-thickness skin grafting. The histopathologic study showed an ill-defined, epithelial neoformation that was formed by lobules of clear polygonal cells at both the deep dermis and the subcutaneous tissue. There was a second group of smaller cells that had a basaloid aspect, and a few of them showed slight atypia (Fig. 5). The final pathologic analysis confirmed the diagnosis of malignant nodular hidradenoma. No evidence of lymph node metastases or distant metastases was found.

Discussion

Malignant nodular hidradenoma is a rare aggressive malignant tumor of the eccrine sweat glands. Several synonyms for malignant nodular hidradenoma have appeared in the literature: clear-cell hidradenocarcinoma, malignant clear-cell hidradenoma, solid-cystic adenocarcinoma, malignant acrospiroma, malignant clear-cell myoepithelioma and clear-cell eccrine carcinoma (1). This tumor’s incidence has been reported to be 6% of all the eccrine gland carcinomas (2). The tumor usually presents as a solitary painless papule or nodule, with a slow growing course, on the head, trunk or distal extremities, and sometimes there are multiple tumors (3). The usual age of occurrence is older than 50 years with an equal sex distribution. The prognosis for the 5-year survival after excision is less than 30% (1, 3). Malignancy can occur de novo in normal skin or it can develop within a pre-existing benign eccrine tumor (4-6). Considering the very long history of our patient, we believe the tumor started as a benign tumor and it then turned into a malignant one.

Histopathologically, the tumor cells usually have characteristic vacuolated cytoplasm (clear-cell change) owing primarily to glycogen accumulation; however, another possibility is that such cells are expressing myoepithelial differentiation, based on the focal coexpression of keratin and actin in some tumor cells (1, 3). Another characteristic feature of malignant nodular
hidradenoma is the presence of ductal lumina lined by epithelial cells or eosinophilic cuticles, and these structures are histologically analogous to the eccrine sweat duct (1).

Any reported MRI findings of benign hidradenoma are extremely rare, and only a few cases have been reported on. Reier et al. (7) reported on a plantar eccrine acrospiroma that was 1 cm in diameter, and this revealed a solid enhancing nodule. Maldjian et al. (8) reported that clear cell hidradenoma showed a complex cystic appearance with fluid levels that suggested hemorrhage and there were enhancing mural soft tissue nodules. Tsurumaru et al. (9) reported that clear cell hidradenoma showed a solid and cystic appearance with fluid levels and an enhancing solid component. To the best of our knowledge, the MRI appearance of malignant nodular hidradenoma has not been previously described. The tumor in our case was revealed to be a large sized, multilobular and poorly circumscribed mass with homogeneous enhancement. The cut surface of the resected specimens showed solid nests of neoplastic cells that featured basoloid and clear cells along with higher cellularity, and this corresponded to the homogeneous enhancement on the contrast-enhanced MR images.

The value of the MR in this case was therefore similar to that in most soft tissue tumors, that is, to help define the extent of the tumor and to aid in the planning of surgery rather than providing a specific preoperative diagnosis of the tumor. In our case, PET-CT has been shown to be useful in differentiating malignant from benign lesions and for excluding distant metastasis.

The best treatment to achieve cure is wide and deep excision. Recurrence is common after incomplete excision. Metastases typically appear first in the regional lymph nodes, lung and bone. Radiotherapy is not effective in controlling recurrence or metastatic tumors. Chemotherapy has been used sporadically for residual metastatic disease, although its value has not been confirmed (1, 3, 6).

In summary, malignant nodular hidradenoma typically affects adult patients as a painless mass of the extremities at the time of presentation. Malignant nodular hidradenoma may manifest on MR images as a multilobular and poorly circumscribed mass with homogeneous enhancement that involves the adjacent muscle. Despite the relative rarity of this tumor, it should be included in the differential diagnosis when finding subcutaneous masses in the extremities of adult patients.

References

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