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AJNR Am J Neuroradiol 1987, 8 (5) 911-912

<http://www.ajnr.org/content/8/5/911.citation>

This information is current as
of June 24, 2025.

Leiomyosarcoma Metastatic to the Brain: CT Features and Review

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Leiomyosarcoma is an uncommon tumor that rarely metastasizes to the brain. It has been suggested that improved chemotherapy—resulting in improved survival rates—may have changed the metastatic pattern of this tumor, with an increasing frequency of cerebral metastasis. We present two histologically proven cases of leiomyosarcoma, one with a metastatic lesion in the cerebrum and the other in the cerebellum. In both cases, the metastatic lesion was of uniformly high attenuation on CT and demonstrated remarkable homogeneous enhancement. These findings are nonspecific, and are similar to those seen in meningioma. Cerebral angiography was of considerable value in one of the cases by helping to define intraaxial location of the tumor.

Case Reports

Case 1

A 30-year-old woman presented with a 2-week history of pleuritic pain, followed 4 months later by development of skin nodules, which, when biopsied, revealed a spindle-cell neoplasm consistent with leiomyosarcoma. Chest X-ray showed large pleural effusions associated with multiple pulmonary and pleural masses. Echocardiography revealed a large left atrial mass that was excised when increasing shortness of breath and congestive heart failure developed. Several days later, she developed symptoms and signs of right cerebellar dysfunction. Cranial CT showed a well-circumscribed superficial mass in the right cerebellar hemisphere that was of relatively high attenuation and demonstrated intense, nearly homogeneous enhancement. Cerebral arteriography revealed an avascular intraaxial mass (Fig. 1), which, when excised, was of identical histology to the skin nodule and the atrial mass.

Case 2

A 50-year-old woman presented in December 1980 with fatigue and lethargy of 2 weeks' duration. Physical examination revealed hepatomegaly; multiple hepatic masses were apparent on abdominal sonography. Abdominal CT showed the masses to be of heterogeneous texture, with large areas of decreased attenuation consistent with necrosis. Laparotomy and liver biopsy revealed a spindle-cell neoplasm consistent with leiomyosarcoma. The patient was treated with Cytosan, Adriamycin, and DTIC. Liver size was reduced and she

did well until June 1983, when she presented with right arm weakness and slight aphasia. Cranial CT showed a superficial, well-demarcated mass in the left temporoparietal area; this was of high attenuation and showed intense, nearly homogeneous, contrast enhancement (Fig. 2). Radiation therapy was started and resulted in significant decrease in tumor size.

Discussion

Leiomyosarcomas are uncommon malignant tumors of smooth muscle origin. They usually arise from smooth muscles of the uterus, alimentary tract, and the blood vessels. As with other soft-tissue and bone sarcomas, they tend to metastasize hematogenously, with the principal target site being the lung, although other organs such as the liver and the peritoneal surface are commonly involved [1–4]. Lymphatic spread sometimes occurs. Less common areas of metastasis include soft tissues [5], bone [1, 6, 7], and spleen [1]. These tumors rarely metastasize to the central nervous system. Willis [8] in his detailed treatise was unable to find any "clear and fully described instances of metastasis in the brain from leiomyosarcoma." Adachi et al. [9] described a 74-year-old woman with leiomyosarcoma originating in the thyroid gland, who at autopsy 1 month after diagnosis had multiple small metastatic nodules in the cerebral cortex. Sato et al. [10] described a 42-year-old woman with a leiomyosarcoma of the thigh and parietal skull in whom the skull lesion caused death because of its deep extension into the cerebral cortex. Gercovich et al. [11] described a 37-year-old woman with a leiomyosarcoma of the right thigh with metastasis in the brain and lungs proven by necropsy. McLeod et al. [12] described the CT findings in 118 patients with leiomyosarcoma and found the liver to be the most common area of metastasis, with no metastases at all to the central nervous system.

In both patients reported here, the metastatic tumor in the brain was of uniformly high attenuation and showed almost homogeneous enhancement. The CT features observed in our patients are nonspecific and may be seen in other conditions, such as meningioma. In the first case, a cerebral angiogram showed an avascular intraaxial mass without any angiographic features to suggest meningioma. The diagnosis

Received July 24, 1985; accepted after revision October 8, 1985.

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AJNR 8:911–912, September/October 1987 0195–6108/87/0805–0911 © American Society of Neuroradiology

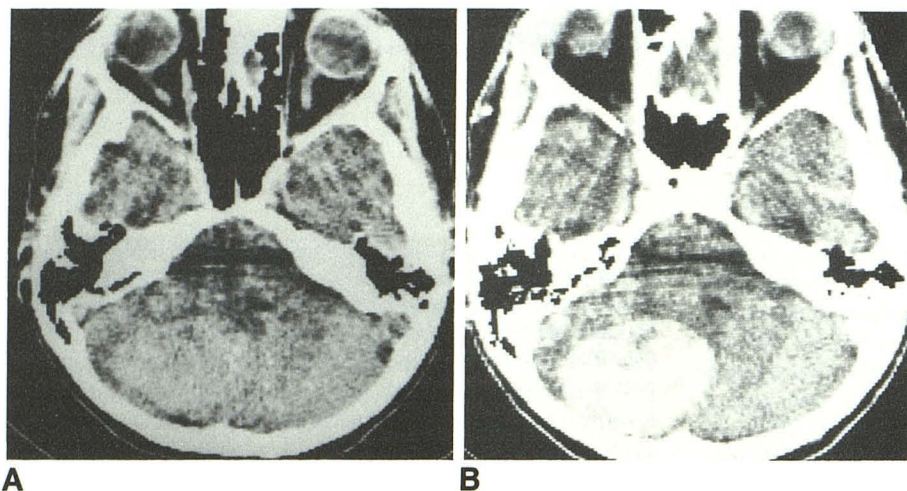


Fig. 1.—High-attenuation superficial mass (A) demonstrating intense, almost homogeneous enhancement (B).

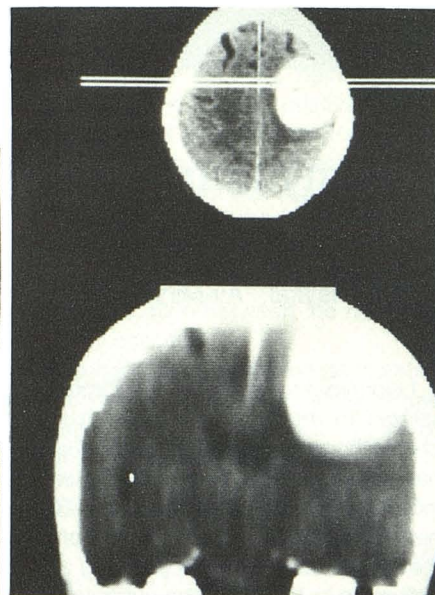


Fig. 2.—Axial and coronal image reformation shows superficially located high-attenuation mass with intense, almost homogeneous enhancement. Small area of nonenhancement in center possibly represents necrosis.

of metastatic leiomyosarcoma to the brain should be considered in the proper clinical setting, since it has been suggested [11] that the patient's survival, prolonged by the use of combination chemotherapy for soft-tissue sarcomas, presumably results in wider dissemination of the tumor, leading to a new pattern of metastatic dissemination.

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