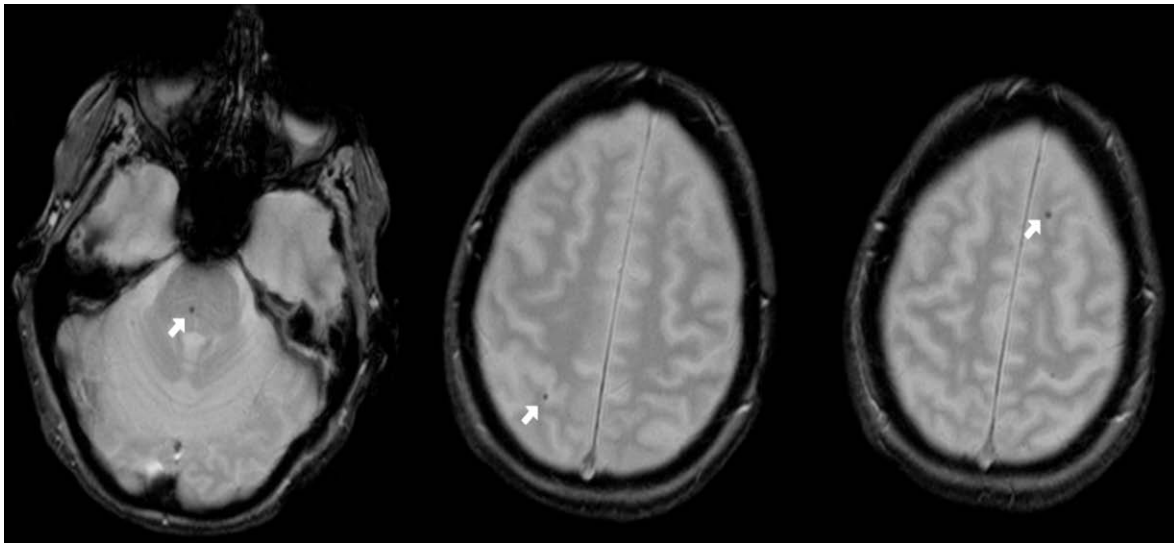


MAGNETIC SUSCEPTIBILITY IN A PATIENT WITH A METALLIC HEART VALVE

Mohammad Almansori,¹ Sandeep Naik² and S. Nizam Ahmed³

Departments of Internal Medicine,¹ Radiology and Diagnostic Imaging,² and Neurology,³ University of Alberta, Edmonton, Alberta, Canada

Pak J Neurol Sci 2008; 3(1):40-41



T2-gradient-echo images showing multiple small cortical foci of susceptibility artifact (arrows) supratentorially and a single lesion in the pons

DIAGNOSIS

A 62-year-old woman underwent magnetic resonance imaging (MRI) of the brain for investigation of repeated falls and imbalance. The study revealed multiple tiny peripheral foci of T2 susceptibility on the gradient-echo sequence. These lesions were spherical and homogeneous. These did not have a typical distribution of hemorrhagic lesions and demonstrated a very rounded and homogeneous morphology. The distribution was unusual for hemorrhagic foci and there was no evidence of calcification on CT studies. This patient had three mitral valve operations; the first was a replacement with Lillehei-Kaster prosthesis and the other two with St. Jude prostheses.

COMMENT

Metallic foci have a characteristic appearance on MR imaging. If microscopic, the fragments are not visible on conventional spin-echo sequences. However, their metal content induces inhomogeneities in the local magnetic field. Gradient-echo sequences exploit this phenomenon, resulting in visible areas of “blooming” artifact manifesting as areas of low signal. Other substances, such as air, hemosiderin and calcification can be the source of similar artifacts. However, metallic foci, unlike the other substances, can be associated with a hyperintense halo, which were evident in our patient. There was no evidence of calcification or air on CT studies, and the distribution, uniform contour and relative homogeneity of these lesions argue against old blood products as their etiology.

Embolic fragments from cardiac valve prostheses have been described by multiple authors as having a similar appearance to the abnormalities in our patient. Wingerchuk et al and Naumann et al were among the first to describe metallic emboli relating to cardiac valve prostheses.^{1,2} In a recent study by Van Gorp et al different prosthetic valves (Bjork-Shiley Convexo-Concave valves, Medtronic-Hall valves, St Jude valves and Edwards Duromedics valves) were described to have an association with such artifacts.³

Keeping this differential diagnosis is paramount when suspecting cerebral microhemorrhages, which may have a similar appearance. Some physicians maybe deterred from using anticoagulation even if clinically indicated, if such emboli are misinterpreted as micro-hemorrhages. In our case, although definitive diagnosis is not possible apart from biopsy or autopsy, the imaging appearances would strongly favor metallic emboli from the patient's cardiac valve prosthesis rather than microhemorrhages.

REFERENCES:

- 1 Wingerchuk, D. M., Krecke, K. N. and Fulgham, J. R. (1997) Multifocal brain MRI artifacts secondary to embolic metal fragments. *Neurology* 49, 1451-1453
- 2 Naumann, M., Hofmann, E. and Toyka, K. V. (1998) Multifocal brain MRI hypointensities secondary to embolic metal fragments from a mechanical heart valve prosthesis: a possible source of epileptic seizures. *Neurology* 51, 1766-1767
- 3 van Gorp, M. J., van der Graaf, Y., de Mol, B. A., Bakker, C. J., Witkamp, T. D., Ramos, L. M. and Mali, W. P. (2004) Bjork-Shiley convexoconcave valves: susceptibility artifacts at brain MR imaging and mechanical valve fractures. *Radiology* 230, 709-714