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Celebrating 35 Years of the AJNR

March 1982 edition

Review **Blood-Brain Barrier:**
Phenomenon of Increasing Importance to the Imaging Clinician

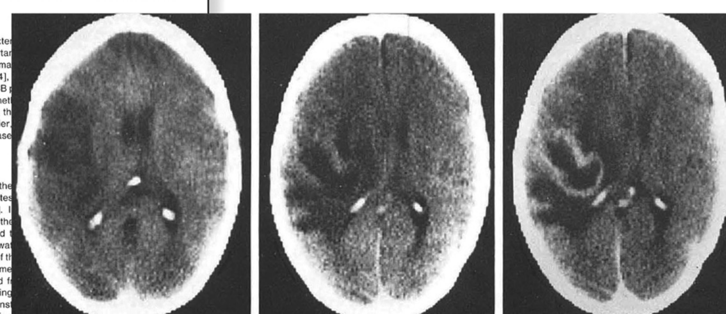
Michael R. Sage[1]

Research during the past decade has greatly exter
blood-brain barrier (BBB) and its functional importar
ance of the barrier has been recognized for ma
radionuclide imaging of cerebral abnormalities [4],
graphic (CT) images also reflect changes in the BBB
processes. For optimum application of imaging met
should have a knowledge of the normal BBB and th
may alter it. Our current understanding of the barrier,
and the mechanisms of alterations by major disease

Concept of the Blood-Brain Barrier

In most nonneural tissues, the endothelium of the
and allows free passage of ions and nonelectrolytes
albumin between blood and interstitial fluid [3]. I
situation is very different. The endothelial cells of the
the movement of many molecules from the blood
stances, fail to equilibrate with the brain tissue wa
conditions [1]. This has given rise to the concept of th
is now known to be a complex physiologic phenome

Historically, the concept of the BBB developed f
venous injections of certain dyes resulted in staining
brain, except for the choroid plexus, remained uns
and Krauss [8] noted that the brain was not staine
while many other tissues were saturated with the bile pigment. In contrast, Goldmann [9] noted that trypan blue introduced directly into the cerebrospinal fluid (CSF) did produce staining of the nervous system tissues. There appeared to be a barrier preventing the escape of dye from cerebral blood vessels into the brain but this barrier could be circumvented by direct injection into the CSF.



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CT Recognition of Optic Nerve Sheath Meningioma: Abnormal Sheath Visualization

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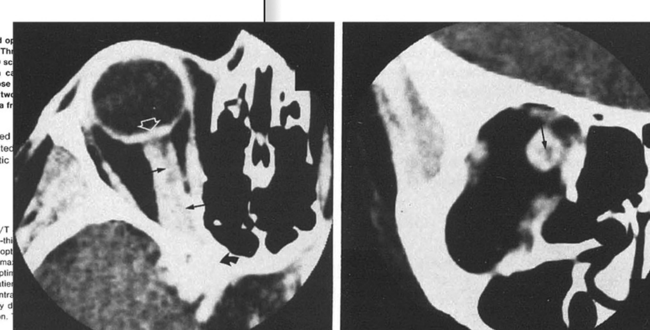
Walter E. Gager[3]
Gerald J. Harris[3]

Optic nerve sheath meningiomas and op
entiate by computed tomography (CT). Thr
giomas were studied with a CT/T 8800 sc
intravenous contrast material. In each ca
identified by CT. A soft-tissue mass arose
and the entire sheath was enlarged in two
guishing optic nerve sheath meningioma fr

The optic nerve/sheath is enlarged
meningioma. We have used computed
tumors by identifying abnormal optic
meningiomas.

Materials and Methods

CT studies were performed with a CT/T
three patients evaluated, 5- and 1.5-mm-thi
with the gantry parallel to the axis of the opt
1.5 mm thick), the patient's head was ma
localizer scan was used to determine optin
avoid artifacts from dental fillings. All patier
consisting of 200 ml of 30% iodinated contra
and the remaining 100 ml infused slowly d
before intravenous contrast administration.
960–1150 mAs, and 120 kV.



Results

In the three patients studied, abnormal tissue was identified adjacent to the optic nerves. This tissue was slightly hyperdense with respect to the optic nerves after intravenous contrast enhancement in two patients and densely calcified in one patient. In one patient the abnormal tissue appeared as a soft-tissue mass lateral to the optic nerve at the orbital apex (fig. 1). In two patients the abnormally dense tissue circumferentially enveloped the optic nerve (figs. 2 and 3). Two of three patients had anterior clinoid hyperostosis and tumor extension into the chiasmatic cistern. At surgery, optic nerve sheath meningiomas correlating with the abnormal tissue visualized on the CT scans were found in two patients. In the third patient (fig. 2), the intracranial part of the sheath meningioma was removed, but the orbit was not explored and a postoperative scan showed the intraorbital tumor unchanged.

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