Complete Ring on Noncontrast CT Could Indicate Aging Hemorrhage

I enjoyed the article by Braun et al. [1] in the November/December 1982 issue of AJNR. I agree that the appearance of a complete ring on noncontrast computed tomographic (CT) scans is of clinical utility in most cases. However, I believe there is a distinct exception to this rule, and, as the exception often proves the general utility of a valuable sign, I would like to share the exception with you.

The authors state that no cases of infarction or hematoma demonstrated a complete ring on unenhanced scans. I have seen a complete dense ring on unenhanced scans during the aging process of hemorrhages occurring within the basal ganglia. Two representative cases are illustrated.

In case 1, acute right basal ganglionic hemorrhage was noted initially. Ring enhancement was seen 16 days later (figs. 1A and 1B). A follow-up study 37 days after hemorrhage demonstrated a complete ring on the noncontrast scan (fig. 1C), with ring enhancement demonstrable in the same location after contrast infusion (fig. 1D).

Case 2, a 75-year-old woman, was seen at an outpatient hospital with severe hypertension, a dense right hemiparesis, and aphasia. CT was not performed during her 1 month stay at that institution. However, in view of severe hypertension and the acute nature of her neurologic ictus, a diagnosis of hypertensive hemorrhage was entertained. The patient was transferred to our hospital and CT was performed 7 weeks after the clinical stroke. The noncontrast scan (fig. 2A) showed a complete ring with central hypodensity. The postinfusion study (fig. 2A) demonstrated enhancement in the location of noncontrast ring.
cation of the noncontrast ring. We presumed the diagnosis of aging hemorrhage, although I suppose a resolving basal ganglionic infarct without hemorrhage could have been considered. While no CT follow-up is available, the patient showed improvement in neurologic deficit over the next several months with rehabilitative therapy only.

I believe that caution should be used before biopsing lesions solely on the basis of a complete ring without contrast enhancement if the lesions involve the lateral basal ganglia. In most instances, a clinical history and earlier CT scans will suggest the correct diagnosis of hemorrhage, and serial CT scans may be obtained to follow such cases to resolution.

One more word of caution. Patients who arrive in the CT unit for scanning may have recently had other contrast injections (e.g., for excretory urography). Persistence of faint enhancement might create a false appearance of a complete ring on noncontrast scans. Before relying on such a sign, previous intravenous contrast injection should be carefully excluded. Neither of the cases described above had such previous injection.

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REFERENCE