

Cerebral Angiography using Gadolinium as an Alternative Contrast Medium in a Patient with Severe Allergy to Iodinated Contrast Medium

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ABSTRACT

We report cerebral digital subtraction angiography (DSA) using Gadolinium in a patient allergic to iodinated contrast media. A 77-year-old woman was admitted to our hospital for surgical resection of a brain tumor. Although a DSA was requested as a preoperative examination, the patient had a history of allergic reaction to non-ionic iodinated contrast medium. Therefore, DSA was performed using Gadolinium. The DSA showed no tumor stain and normal venous drainage. The patient underwent surgical resection of the tumor and was discharged with no new neurological deficit. DSA using Gadolinium was useful in a patient with an anaphylactic reaction to iodinated contrast media.

Key words: *Anaphylactoid reaction, Cerebral angiography, Gadolinium*

Cerebral digital subtraction angiography (DSA) is an indispensable examination technique for the diagnosis of cerebrovascular disease and for the determination of therapeutic strategies. However, DSA cannot be undergone where an anaphylactic reaction to the iodinated contrast medium might be life-threatening. We report cerebral DSA using meglumine gadopentetate (Gd-DTPA; Magnevist[®] Syringe, Bayer Health Care) in a patient with an allergy to iodinated contrast media.

CASE REPORT

A 77-year-old woman (40 kg) with recurrence of falcotentorial meningioma was admitted to our hospital for surgical resection of the tumor. A cerebral DSA was requested to observe the vascularity of the tumor and state of the deep venous drainage. The patient had twice previously undergone CT examinations with a non-ionic iodinated contrast medium and developed an allergic reaction both times to a non-ionic iodinated contrast medium, with generalized eruption. Hematological and laboratory examinations revealed: blood urea nitrogen, 14.5 mg/dl;

and creatinine, 0.91 mg/dl. The patient was fully informed about the potential risk of the gadolinium-containing contrast medium for cerebral DSA, namely that intraarterial injection of high dose gadolinium might induce nephropathy. Cerebral DSA with 69-kV was performed using Gd-DTPA. A right common carotid artery angiogram was obtained using 8 ml hand-injected 50% Gd-DTPA in saline (4 ml Gd-DTPA + 4 ml saline) (Fig. 1a). A left common carotid artery angiogram was obtained using 9 ml hand-injected 66% Gd-DTPA in saline (6 ml Gd-DTPA + 3 ml saline) (Fig. 1b). A left vertebral artery angiogram was obtained using 6ml hand-injected 66% Gd-DTPA in saline (4 ml Gd-DTPA + 2 ml saline). The total dose was 14 ml gadolinium (7 mmol), which corresponds to 0.175 mmol/kg. A cerebral DSA showed no tumor stain and normal venous drainage. The patient underwent surgical resection of the tumor and was discharged with no new neurological deficit.

DISCUSSION

The side effects of iodinated contrast medium are less common since the development of non-

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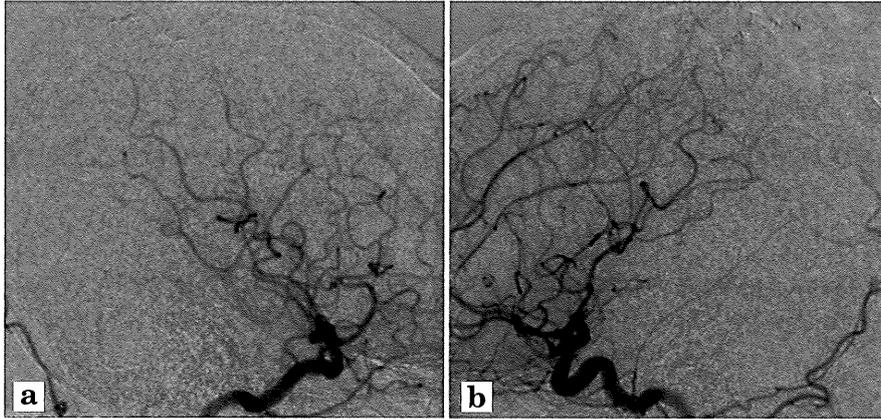


Fig. 1

- a. Lateral view of right common carotid artery angiogram with 50% meglumine gadopentetate showed no tumor stain.
 b. Lateral view of left common carotid artery angiogram with 66% meglumine gadopentetate showed no tumor stain.

ionic agents, but allergic reactions to iodinated medium are still a major complication in angiography^{1,3}). The incidence of a life-threatening reaction to non-ionic iodinated contrast medium was reported as 0.003-0.04%^{1,3}). Gadolinium is a heavy metal element that attenuates X-ray photons and therefore is potentially usable as a radiographic contrast material. The incidence of all side effects has been reported as 1-2% for gadolinium-based contrast medium and 3.0% for iodinated contrast medium, and the incidence of critical life-threatening side effects with gadolinium-based contrast medium is one-tenth that for iodinated contrast medium^{1,3}). Gadolinium-based contrast medium has been advocated as an alternative to iodinated contrast medium for DSA. However, the attenuation of X-ray photons is approximately the same for iodine and gadolinium atoms; namely, 0.5 mmol/ml of a gadolinium chelate would be equally attenuating with 63 mg I/ml²). Although Arat et al recommended undiluted gadolinium-based contrast medium to decrease contrast¹), we used diluted Gd-DTPA to reduce the total dose of Gd-DTPA due to the safety recommendation of doses up to 0.4 mmol/kg per examination and the high cost^{1,3}). Therefore, to increase contrast, we

performed DSA usually by low voltage. We could obtain images of the bilateral common carotid and left vertebral arteries with acceptable quality using Gd-DTPA. Cerebral DSA using Gd-DTPA was useful in a patient with an anaphylactic reaction to the iodinated contrast media.

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