



LETTER

Reduction of metallic coil artifacts in CT angiography with metal artefact reduction (MAR) algorithm



Keywords Metal artifact reduction algorithm (MAR); Computed tomography (CT); Arterial embolization; Arterial pseudoaneurysm; Image quality

Dear Editor,

Embolization with metallic coil is a therapeutic option for ruptured visceral aneurysm or pseudoaneurysm [1]. However, metallic coils generate artifacts that may make interpretation of computed tomography (CT) images difficult should these patients require further CT examination. Metal artifact reduction (MAR) algorithms have been

developed for CT imaging but rarely applied to abdominal CT specifically [2]. We report herein the use of MAR algorithm in a patient with a ruptured pseudoaneurysm of the cystic artery with prior embolization with coils for whom the application of MAR algorithm helped reach the correct diagnosis.

An 84-year-old man was referred for acute pancreatitis with hematemesis, melena and elevated serum liver enzymes. Background analysis revealed that the patient had undergone embolization with metallic coils (Penumbra coil 400[®], Penumbra) of a pseudoaneurysm of the cystic artery three years before after cholecystectomy. The patient underwent CT angiography after intravenous administration of 120 mL of iodinated contrast medium at a concentration of 350 mg/mL. CT angiography images were reconstructed as two separate imaging sets using standard filtered back projection and the O-MAR[®] algorithm

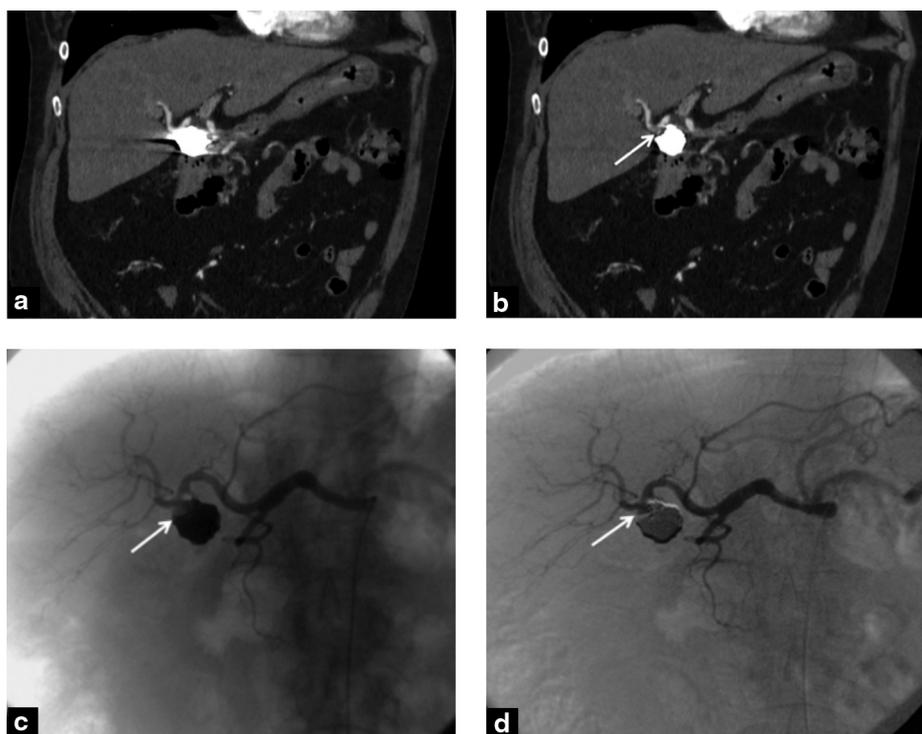


Figure 1. Eighty-four-year-old man with cystic artery pseudoaneurysm who had previously undergone cystic artery embolization with metallic coils; a: CT image obtained in the coronal plane during the arterial phase after intravenous administration of contrast material without O-MAR[®] algorithm shows metallic artifacts; b: CT image obtained in the coronal plane during the arterial phase after intravenous administration of contrast material with O-MAR[®] algorithm reveals an aneurysmal neck recanalization (arrow) that was not seen without O-MAR[®]; c, d: Nonsubtracted (c) and subtracted (d) angiography images of the common hepatic artery confirm aneurysmal neck recanalization (arrows).

(Philips Healthcare) and further analyzed. The analysis of CT angiography images obtained with the O-MAR[®] algorithm revealed an aneurysm neck recanalization of the cystic artery, which was not seen on the standard images obtained without the O-MAR[®] algorithm (Fig. 1A, B). The patient underwent angiography of the hepatic artery that confirmed the presence of blood flow in the pseudoaneurysm (Fig. 1C, D). After embolization of the pseudoaneurysm with 5 metallic coils (Azur[®], Terumo,) follow-up CT angiography at 6 months, with O-MAR[®] algorithm, showed a complete occlusion of the pseudoaneurysm and right hepatic artery. At nine-month follow-up, no rebleeding was reported.

Our observation reveals that the use of O-MAR[®] algorithm improves image quality and diagnostic value of CT angiography in patients who had previously undergone arterial embolization with coils. A few studies have shown that MAR algorithms also improve the quality of body CT angiography images in patients who previously had undergone visceral artery embolization with coils [2–4]. In our patient, the use of the O-MAR[®] algorithm, by reducing image noise, enabled the visualization of aneurysmal neck recanalization, which was not seen on standard images because of metallic artifacts. However, further studies are needed to fully determine the actual added value of MAR algorithms in patients with repeat gastrointestinal bleeding after arterial embolization with coils.

Contributions

A. David: conceptualization, resources, writing-original draft, writing-review & editing, visualization.

A. Ray: resources, writing-original draft.

P.L. Hermet: resources, writing-original draft.

F. Quieffin: resources, writing-original draft.

G. D'Assignies: conceptualization, resources, writing-original draft, writing-review & editing, visualization

Disclosure of interest

The authors declare that they have no competing interest.

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