

MINI-FOCUS ISSUE: HEART FAILURE

BEGINNER

IMAGING VIGNETTE: CLINICAL VIGNETTE

Extended Pseudo-Subarachnoid Hemorrhage Post-Percutaneous Coronary Intervention



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ABSTRACT

We report the case of an extended pseudo-subarachnoid hemorrhage (PSAH) related to contrast intracerebral diffusion from blood-brain barrier breakdown on periprocedural percutaneous coronary intervention right corticofrontal ischemic stroke. PSAH is a rare and complex phenomenon, and it is important to differentiate PSAH from subarachnoid hemorrhage to avoid inappropriate treatment with potentially severe consequences. (**Level of Difficulty: Beginner.**)

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An 83-year old woman was referred for worsening angina pectoris (Canadian Cardiovascular Society grade III). Her history included severe coronary artery disease with multiple previous angioplasties and chronic occlusion of the distal left anterior descending artery. She also had stage 4 chronic kidney disease (estimated glomerular filtration rate 24 ml/min/1.73 m²).

Coronary angiogram showed significant progression of coronary artery disease with a critical de novo lesion mid right coronary artery (**Figure 1A**). There was a no-reflow phenomenon occurring during percutaneous coronary intervention (PCI) with a 3.5 × 22 mm drug-eluting stent (**Figure 1B**) leading to severe hemodynamic impairment and high-degree atrioventricular block. Treatment with glycoprotein IIb/IIIa inhibitor injection, norepinephrine support, and right ventricular simulation achieved Thrombolysis In Myocardial Infarction flow grade 2.

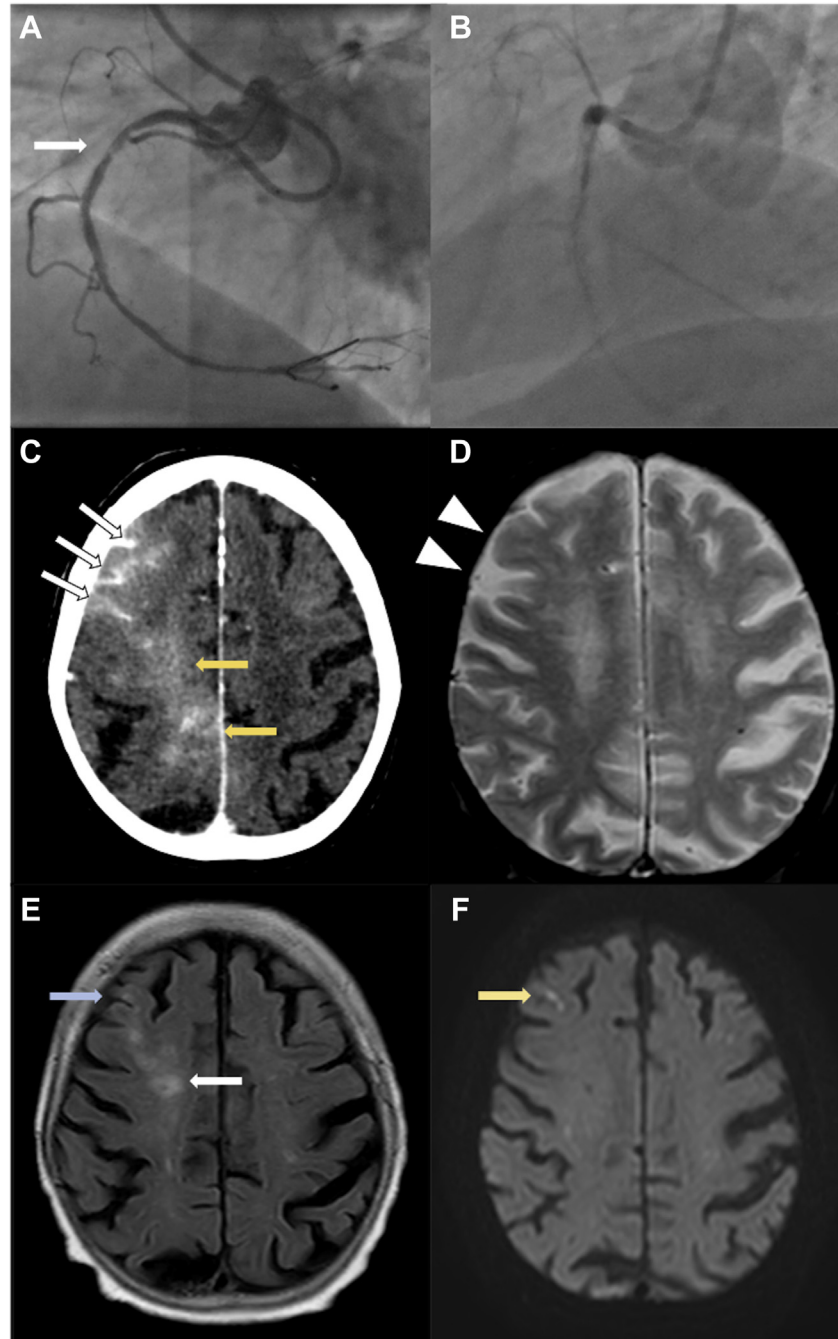
Six hours post-PCI, we noted an altered consciousness with Glasgow Coma Scale of 12 and a left hemiparesis. The patient was not febrile and showed no signs of active infection or meningitis. Emergency unenhanced computed tomography (CT) scan revealed hyperdense material filling the subarachnoid space in the frontal lobe, indicating a massive subarachnoid and intracerebral hemorrhage (**Figure 1C**). Surprisingly, the patient underwent a full recovery of neurological disorders at 48-h follow-up contrasting with the persistence of hyperdense material at repeated CT scan. Because of this clinical and radiological discordances regarding the intensity of the initial suspected hemorrhage, cerebral magnetic resonance imaging (MRI) was performed. This showed no evidence of subarachnoid or intracerebral hemorrhage in either gradient-echo or fluid-attenuated inversion recovery acquisitions (**Figures 1D and 1E**). Axial diffusion-weighted imaging MRI identified a right frontal ischemic stroke spot (**Figure 1F**), which led to the final diagnosis: extended pseudo-subarachnoid hemorrhage (PSAH) related to contrast intracerebral diffusion from blood-brain barrier breakdown on

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

Manuscript received May 7, 2020; revised manuscript received June 11, 2020, accepted June 24, 2020.

FIGURE 1 Pseudo-Subarachnoid Hemorrhage Post PCI



(A) De novo mid right coronary artery stenosis (white arrow). (B) No-reflow phenomenon after direct drug-eluting stent placement. (C) Axial nonenhanced computed tomography scan showing extensive hyperdense material filling the subarachnoid space (white arrows) and the brain parenchyma (yellow arrows) in the frontal lobe leading to the initial diagnosis of acute subarachnoid and intracerebral hemorrhage. (D) Axial gradient echo T2 magnetic resonance imaging (MRI) showing no hypointense signal excluding acute subarachnoid hemorrhage (heads arrows). (E) Axial fluid-attenuated inversion recovery MRI sequence confirming the absence of subarachnoid hemorrhage (blue arrow) and the pre-existing vascular centrum semiovale leukoaraiosis (white arrow) in the same area as the pseudo-subarachnoid hemorrhage. (F) Axial diffusion-weighted imaging MRI showing a frontal ischemic stroke spot (yellow arrow) leading to the final diagnosis of pseudo-subarachnoid hemorrhage related to massive contrast intracerebral diffusion by blood-brain barrier breakdown after periprocedural ischemic stroke.

ABBREVIATIONS AND ACRONYMS

CT = computed tomography

MRI = magnetic resonance
imaging

PCI = percutaneous coronary
intervention

PSAH = pseudo-subarachnoid
hemorrhage

periprocedural PCI ischemic stroke. At discharge, the left ventricular ejection fraction was 45% with inferior hypokinesia and an absolute increase in cardiac troponin of 175 times upper reference limit.

PSAH is an uncommon phenomenon mimicking acute subarachnoid hemorrhage, which can lead to the wrong diagnosis with serious consequences. PSAH has been reported in cases of severe cerebral edema, leptomeningeal diseases, bilateral subdural hematomas, or iatrogenic etiology by iodine injection (1). Whereas it usually concerns only few sulci (2), the intensity and extension in our patient was remarkable. The massive contrast media leakage indicated blood-brain barrier breakdown related to a procedural ischemic stroke. Furthermore, chronic kidney disease may be a major factor in PSAH severity by reducing renal contrast clearance. Acute impairment of kidney function induced by hemodynamic impairment during PCI and contrast medium nephropathy can contribute to the persistence of PSAH on CT scan (3). The current case illustrates the value of multimodal MRI, in particular diffusion-weighted imaging to detect acute ischemia, to confirm the diagnosis in suspected PSAH.

AUTHOR DISCLOSURES

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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KEY WORDS ischemic stroke, no-reflow phenomenon, percutaneous coronary intervention, pseudo-subarachnoid hemorrhage