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Reversal of Warfarin Anticoagulation with Prothrombin Complex Concentrate before Thrombolysis for Acute Stroke

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An 84-year-old woman with myasthenia gravis and atrial fibrillation presented with impaired consciousness, neglect, left hemianopsia, hemiplegia and hemianesthesia [National Institutes of Health Stroke Scale (NIHSS) score 24]. Imaging at 50 min showed right middle cerebral artery (MCA) thrombus, but no ischemic change (fig. 1a, b). She was taking warfarin [international normalized ratio (INR) 2.0], precluding thrombolysis. Mechanical revascularization was unavailable hence consent was obtained to reverse anticoagulation with prothrombin complex concentrate (PCC). Fifteen minutes after PCC (40 ml dose, 1,000 IU factor IX activity), the INR was 1.2 and i.v. tissue plasminogen activator (tPA) was administered. Computed tomography (CT) at 24 h showed thrombus resolution and infarct limited to the lentiform nucleus with no filling defect on CT angiogram (fig. 1c, d). She was discharged at day 7 to a rehabilitation center (NIHSS score 6). At 8 weeks, her NIHSS score was 4.

PCC contains factors II, VII, IX, X, protein C and protein S and causes rapid reversal of warfarin-induced coagulopathy [1]. Routine use of PCC in acute stroke is not recommended due to the thrombotic risk estimated between 1–2% [2]. However, proximal MCA occlusions are unlikely to recanalize spontaneously, and outcome following persistent occlusion is poor. PCC has been used to reverse warfarin-associated coagulopathy prior to tPA in animal models [3] and may reduce secondary hemorrhagic transformation [4]. Recombinant factor VIIa has been used in similar situations in humans [5], but carries a greater thrombotic risk [6] and is less effective for hemostasis [7], making PCC a potentially favorable option.

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Fig. 1. **a** Proximal right MCA hyperdensity (arrow) indicating acute thrombus. **b** No acute ischemic parenchymal change on admission. **c** CT angiography showing resolution of right MCA occlusion on day 1. **d** Small infarct in the right posterior lentiform nucleus on day 1 (arrowhead).

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