

# Management strategies of alteplase extravasation

A. Fournier<sup>1</sup>, M. Riand<sup>2</sup>, N. Perrottet<sup>1,3</sup>, F. Sadeghipour<sup>1,3,4\*</sup>, E. Pujol<sup>1\*</sup>

<sup>1</sup> Service of Pharmacy, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland.

<sup>2</sup> Service of Neurology, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland.

<sup>3</sup> School of Pharmaceutical Sciences, University of Geneva, University of Lausanne, Geneva, Switzerland.

<sup>4</sup> Center for Research and Innovation in Clinical Pharmaceutical Sciences, Lausanne University Hospital and University of Lausanne, Lausanne, Switzerland.

\* These authors contributed equally to this manuscript

**Purpose:** The management and evolution of an alteplase extravasation, a rare complication scarcely documented in the literature, is presented.

**Introduction:** Alteplase is a tissue plasminogen activator (tPA) that works by converting plasminogen, a precursor protein in the blood, into plasmin, an enzyme that dissolves fibrin, the primary protein component of blood clots. Produced using recombinant DNA technology, alteplase is used as a medication to treat conditions where inappropriate blood clot formation poses significant health risks, such as acute ischemic stroke, acute myocardial infarction, pulmonary embolism, and peripheral arterial occlusion.

Clinical data on alteplase extravasation in real-world settings is limited. Very recently (2024), *Hadei et al.* reported the first documented case involving a 61-year-old man who developed large purpuric plaques, hemorrhagic bullae, and necrotic ulcerations at and around the alteplase injection site within a few hours of administration. According to the authors, this was the first recorded instance of an extravasation-related side effect associated with recombinant tissue plasminogen activator (rTPA).

**Case report summary:** We report the case of an 86-year-old woman, weighing 58 kg, who presented with the sudden onset of left-sided motor hemisindrome, left hemianopia, and hemineglect after waking up in good health. Alteplase was administered shortly after initial clinical and radiological assessments had confirmed both the indication for thrombolysis and the absence of any contraindications. Intravenous alteplase was delivered through a peripheral venous line in the right cubital fossa at approximately 8:30 a.m., following both the manufacturer's instructions and our internal protocols.

The patient was diagnosed with a right Sylvian stroke caused by an M1 occlusion in the right middle cerebral artery. She met the criteria for bridging therapy and was transported to the intervention room for endovascular thrombectomy at approximately 9 a.m. A few minutes before 9:30 a.m., it was noticed that the catheter used for alteplase infusion had been incorrectly positioned, resulting in paravenous placement. At that time, almost the entire dose had been administered. At this point, the right upper limb was edematous and warm. An ice pack was immediately applied, and the catheter was removed.

Upon arrival in the recovery room after the procedure, around 11 a.m., the nurse contacted the Pharmacy Service to ensure that cold application was the appropriate treatment for the situation. A review of the extravasation handling procedures was conducted first to verify that all necessary measures were implemented including stopping the infusion immediately, noting the time, marking the extravasation area, photographing it if possible, and elevating and immobilizing the affected limb. A literature review, along with an analysis of the active ingredient's specific properties, further supported that cold application was the most effective method to deactivate the enzyme and would be optimum if applied continuously. Consequently, the Service of Pharmacy recommended to maintain ongoing cold application using a cold pack secured with a bandage to maximize the therapeutic effect. The Pharmacy Service also suggested consulting the Plastic Surgery Service to inform them of the case and

to determine the appropriate course of action should the condition worsen, as noted in the report by *Hadei et al.*

**Conclusion:** This case report, along with that of *Hadei et al.*, is among the few documenting the progression of alteplase extravasation. In our case, the outcome was relatively favorable, with no damage to the subcutaneous tissues; however, the patient did experience pain for several days. This case highlights the importance of meticulous monitoring during alteplase administration and underscores the need not to underestimate the potential risks associated with the treatment.

Published in: *Neurol Sci.* 2024 Dec 20.

Online ahead of print.

doi: 10.1007/s10072-024-07901-1.

Contact: [ella.zabouo-pujol@chuv.ch](mailto:ella.zabouo-pujol@chuv.ch)