Airway management in a patient with severe angioedema after thrombolysis for ischemic stroke

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A 65-year-old man with a history of hypertension (on captopril therapy) and TIAs presented with sudden onset of left hemiparesis, ipsilateral hemineglect, hypoesthesia, and severe dysarthria. His initial NIH Stroke Scale (NIHSS) score was 10. A CT scan of the head provided unremarkable results, but a CT angiogram of the brain showed complete obstruction of the right middle cerebral artery (MCA).

The patient was administered alteplase 120 minutes after symptom onset. After the infusion, the patient showed remarkable improvement, and his NIHSS score decreased to 3. The stroke team was called 30 minutes later when the patient started experiencing trouble speaking and breathing. Physical examination showed considerable swelling of the lips and tongue, suggestive of orolingual angioedema (OA). IV antihistaminics (promethazine, 25 mg; ranitidine, 50 mg) and corticosteroids (methylprednisolone, 50 mg) were administered, but the patient continued to experience respiratory distress. The critical care team decided to perform endotracheal intubation for airway protection but could not visualize the larynx via direct laryngoscopy (DL). As oxygen saturation declined, a laryngeal mask (LM) was placed with some difficulty, and ventilation and oxygenation were achieved. A flexible bronchoscopy was performed on the same day, and the patient was found to have severe tongue swelling but a clear larynx. CT of the face and neck ruled out lingual hematoma. On subsequent days, he was treated with antihistaminics and corticosteroids with minimal improvement. Because edema was still unresolved on the fifth day, tracheostomy was performed, and the patient was weaned from mechanical ventilation. Approximately 2 weeks later, the tracheostomy tube was removed, and neurologic examination showed only moderate dysarthria. LM placement and tongue swelling are shown in detail in figure 1.

DISCUSSION

The incidence of OA in alteplase-treated acute ischemic stroke patients has been reported as 1.3%–5%.^{1–3} A statistical correlation between angiotensin-converting enzyme inhibitor (ACEi) use and OA has been reported, and there is noticeable prevalence of hemilingual edema contralateral to MCA strokes that mainly involve the insular cortex of either hemisphere.¹ OA incidence among acute myocardial infarction patients treated with alteplase is much lower,² supporting the theory that the insular cortex might play an important role in OA pathophysiology.

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Figure 1 Laryngeal mask placement and tongue swelling

(A) Laryngeal mask placed (solid blue arrow) and (B) enlarged tongue (thin green arrow).

The pathophysiology is not completely understood, but one of the hypotheses posits that alteplase stimulates kinin cascades by increasing plasmin production and direct complement activation,³ which can be potentiated by bradykinin accumulation following ACEi use. Alteplase is currently believed to have low immunogenicity and does not seem to lead to massive IgE production.

OA is usually a benign complication, but a few case reports have described patients who required endotracheal intubation^{4,5} or cricothyroidotomy (CTD).^{6,7} Lingual hematoma should be ruled out as an underlying cause for tongue swelling. There are no well-described treatments for this condition; only empirical trials of antihistaminics and corticosteroids with frustrating results and a lack of evidence-based data have been reported.^{2,4} Notably, subcutaneous and IM epinephrine should be avoided because it can cause unpredictable blood pressure elevation.

Patients should be promptly provided oxygen supplementation and be monitored closely to detect early signs of airway obstruction. There should be a low threshold for early intubation, as DL becomes extremely difficult with further swelling.

Because OA mostly affects the mouth and pharynx without major laryngeal compromise, an LM should be the first alternative if DL fails. Positioning an endotracheal tube through the nose by using a flexible bronchoscope is also possible, but availability and promptness could be major limiting factors.

Bedside CTD is a possible last option. It is theorized that patients treated with alteplase have drug-induced blood dyscrasia, but this thrombolytic has a half-life of 6–7 minutes and a high affinity for fibrin, which implies that it primarily acts on organized thrombi. Two previous case reports described 3 patients who underwent CDT for airway compromise with only minimal bleeding.^{6,7}

Figure 2 Sequence of treatment steps for airway management

We propose a sequence of treatment steps (figure 2) for airway management in this situation. Neurologists should be aware of this rare complication, and that prompt airway management can be lifesaving.

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DISCLOSURES

The authors report no disclosures relevant to the manuscript. Go to neurology.org/cp for full disclosures.

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