

Acute diffuse and transient thyroid swelling after intravenous thrombolysis for acute ischemic stroke

A case report

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Abstract

Rationale: Intravenous thrombolysis is the primary therapy for acute ischemic stroke (AIS), but it has some complications, including symptomatic intracranial hemorrhage, orolingual angioedema, and extracranial bleeding. However, thyroid disorders associated with thrombolysis are very rare.

Patient concerns: A 56-year-old man developed acute pain and neck swelling after thrombolysis with recombinant tissue plasminogen activator.

Diagnoses: Ultrasound revealed a diffusely enlarged thyroid with linear hypoechoic areas throughout the entire gland, resembling a “cracked” appearance.

Interventions: The patient was treated conservatively with cold packs and observed closely. Follow-up ultrasound was made.

Outcomes: A few hours later, pain and swelling disappeared completely. A repeat ultrasound revealed complete recovery of thyroid volume and aspect on the next day.

Lessons: After intravenous thrombolysis for AIS, several life-threatening complications, such as hemorrhage and orolingual angioedema, also can cause neck swelling. Urgent intubation and surgery may be required. However, the rare complication, acute diffuse thyroid swelling, is self-limiting and nonfatal and conservative treatment is sufficient. Neck ultrasound is helpful in rapidly distinguishing these complications.

Abbreviations: AIS = acute ischemic stroke, FNA = fine needle aspiration, NIHSS = National Institutes of Health Stroke Scale, rt-PA = recombinant tissue plasminogen activator, US = ultrasound.

Keywords: acute ischemic stroke, intravenous thrombolysis, thyroid swelling, ultrasound

1. Introduction

Intravenous thrombolysis with recombinant tissue plasminogen activator (rt-PA) is a routine option in the systemic therapy for acute ischemic stroke (AIS). Symptomatic intracranial hemorrhage is the most severe and life-threatening complication. Less frequent complications are orolingual angioedema and extracranial bleedings.^[1] Apart from these known adverse events, several other rare and unfamiliar complications should also be attended. Here, we reported a rare case of acute diffuse thyroid swelling

following intravenous thrombolysis, which was resolved spontaneously within a few hours.

2. Case report

A 56-year-old man presented to the emergency department with left arm weakness for one hour. Neurological examination revealed left arm hemiparesis. The National Institutes of Health Stroke Scale was 4. Cranial contrast-enhanced magnetic resonance imaging showed the right middle cerebral artery M1-segment bifurcation plaque with neovascularization, indicating an unstable plaque. Head computed tomography excluded an intracranial hemorrhage. He was treated emergently with weight-adapted rt-PA (0.9 mg/kg). He had no history of hypertension, diabetes mellitus, or allergies.

Almost 30 minutes after rt-PA perfusion, the patient suffered from acute pain and neck swelling and rt-PA was discontinued immediately. Neck palpation revealed a tender and diffuse goitre. No signs of respiratory distress were observed. Cervical ultrasound (US) showed diffusely enlarged thyroid with a nearly 2.5-fold increase. The pattern revealed diffuse linear hypoechoic areas throughout the entire gland, which is similar to a “cracked” gland appearance (Figs. 1 and 2A). Neither isolated hypoechoic mass suggesting hematoma nor active bleeding was observed on US. Owing to no signs of airway obstruction, he was treated conservatively with cold packs and observed closely. One hour

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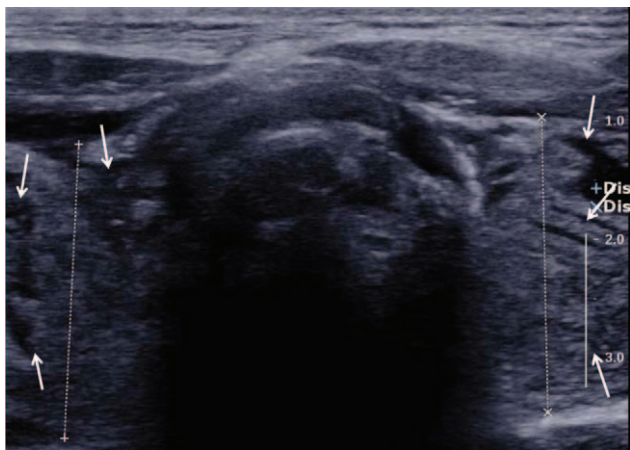


Figure 1. Almost 30 minutes after thrombolysis, transverse ultrasound of the thyroid showed diffusely swollen thyroid with linear hypoechoic areas (arrows) throughout the entire gland, forming a "cracked" gland appearance.

later, pain and swelling were gradually relieved. His symptoms were obviously improved on the next day. Follow-up US showed that the thyroid size and echotexture completely recovered (Fig. 2B). Three days later, the strength of his arm gradually improved and he was discharged. The patient signed a written informed consent.

3. Discussion

Intravenous thrombolysis with rt-PA is an effective treatment for AIS and has been approved in most countries. However,

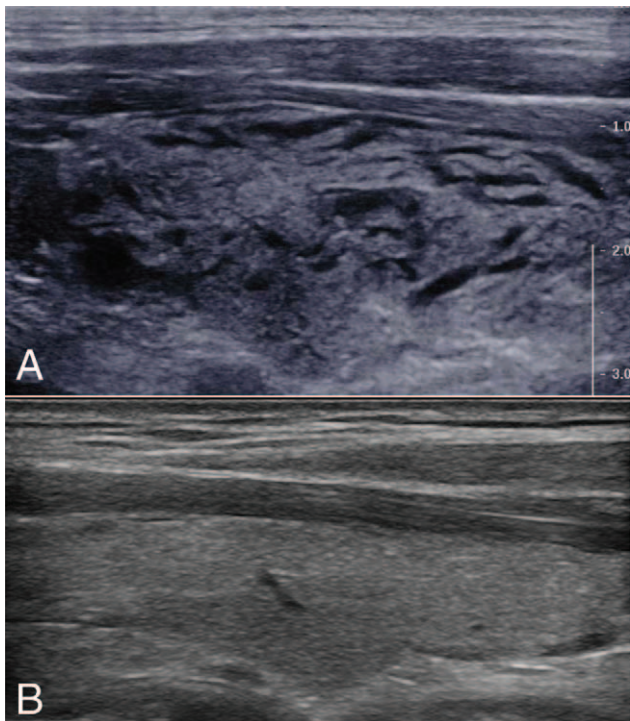


Figure 2. Longitudinal ultrasound of the left thyroid lobe. (A) Almost 30 minutes after thrombolysis, the gland was enlarged with a nearly 2.5-fold increase in volume. (B) On the next day, the thyroid volume and echotexture completely recovered.

unfortunately it has a number of adverse effects and complications, among them, symptomatic intracerebral haemorrhage is the most serious and life-threatening one, occurring in 2 to 7% of patients.^[2] Orolingual angioedema is one of the rare complications reported in 1 to 5% of patients.^[3] Thyroid diseases associated with thrombolysis are extremely rare. To date, only 2 cases of thyroid hemorrhage following thrombolysis have been reported.^[4,5] This is the first case report of acute diffuse and transient thyroid swelling complicating intravenous thrombolysis for acute ischemia stroke.

Acute diffuse swelling of the thyroid is very rare. To our knowledge, only 11 cases have been reported in the literature over the past 40 years. Among them, 10 cases occurred after fine needle aspiration (FNA) and only 1 case occurred after subclavian vein catheterization.^[6–8] All patients developed thyroid swelling during or within 2 hours after FNA or within a few minutes after the catheterization. Acute pain and neck swelling are the primary presentations. No signs of bleeding or airway obstruction were observed. The entire thyroid gland was diffusely enlarged with a 1.5- to 5-fold increase in volume. The swollen thyroid recovered to the original volume between 1 to 20 hours.

Intrathyroidal hemorrhage was firstly suspected, but was rapidly excluded because of hyperacute swelling and quick reversibility. Parenchymal hemorrhage or hematoma often requires several days to weeks to resolve. Transient thyroid edema is indicated. US supported the hypothesis and showed the hypoechoic areas interspersed throughout the entire gland, forming a characteristic "cracked" appearance. Vasodilation and diffuse capillary leak may be the potential mechanisms. Van den Bruel et al^[9] reported a case of acute transient thyroid swelling in a patient with medullary carcinoma and speculated that a potent vasodilator, calcitonin gene-related peptide, caused the observed phenomenon. In our patient, we used rt-PA for the treatment of AIS. rt-PA can produce the protease plasmin, which liberates bradykinin from high-molecular-weight kinogen.^[10] Bradykinin stimulates the release of vasodilators and increases vascular permeability, causing vasodilation and capillary leakage, which might be responsible for the phenomenon in the present case.

Thyroid swelling resolved spontaneously within 24 hours in all cases. Cold packs, diclofenac, paracetamol, or hydrocortisone were used empirically in some cases. This did not seem to change the natural process or duration of the complication. In addition, no bleeding or airway distress occurred. The self-limiting and nonfatal complication indicates that close observation and reassurance are sufficient. After intravenous thrombolysis for AIS, several life-threatening complications, such as thyroid hemorrhage and orolingual angioedema, also can cause neck swelling. In these situations, urgent intubation and surgery may be required. Thus, it is vital to exclude these potential lethal complications. Ultrasound is helpful in rapidly identifying diffuse edema from local hematoma.

4. Conclusion

Acute diffuse and transient thyroid swelling is extremely rare and characterized by acute attack, fast recovery, and a characteristic "cracked gland" US pattern without airway obstruction or bleeding. After excluding hematoma, orolingual angioedema and other lethal causes of neck swelling, close observation, and follow-up US are preferred.

Author contributions

Data curation: Lihong Shi, Caixin Yan.

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