Stroke thrombolysis in a 97-year-old woman with COVID-19 pneumonia

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Introduction

The risk of acute stroke may be increased in patients with COVID-19 infection. Large vessel thromboses have been reported even in young critically ill COVID-19 patients. The mechanisms include viral-induced cytokine storm, procoagulant state leading to thromboembolism, endothelial dysfunction, and direct vessel wall invasion. The absence of established stroke risk factors in this nonagenarian supported COVID-19 infection as the aetiology of her stroke. To date, she is the oldest COVID-19 stroke patient to receive stroke thrombolysis. There is currently no upper age limit or contraindication to stroke thrombolysis in COVID-19 patients, although increasing age and frailty are known poor prognostic factors in both COVID-19 and stroke patients.

Discussion

COVID-19 infection may increase the risk of acute ischaemic stroke (Planinc et al, 2020). In addition, COVID-19 patients with comorbidities, including stroke, have worse outcomes

Case report

A 97-year-old Caucasian woman presented to the emergency department with a 1-day history of confusion, coughing and decreased mobility, and loss of voice for 1 week. Her past medical history included a right hip hemiarthroplasty, cervical spondylosis, urethral stricture and lichen planus. Medications on admission were lactulose, nitrazepam and co-dydramol. She lived alone, assisted by carers visiting her four times daily. She mobilised with a Zimmer frame, with a modified Rankin score of 3 and a Clinical Frailty Scale score of 6.

On examination, her respiratory rate was 20 breaths/minute, saturating 94% on 4 litres of oxygen, blood pressure 158/74 mmHg, heart rate 90 beats/minute and temperature of 38.7°C. She had reduced breath sounds, coarse crepitations and transmitted noise in her lungs.

Her blood tests revealed C-reactive protein 305 mg/litre, D-dimer 2091 ng/ml, troponin 449 ng/litre, haemoglobin 90 g/litre, white blood count 4×10^9/litre and platelets 155×10^9/litre. Her electrocardiogram showed sinus rhythm with no acute changes. Her chest X-ray on admission (Figure 1) showed left upper and bi-basal infiltrates. A COVID-19 swab was performed which confirmed the diagnosis of COVID-19 pneumonia.

She was started on intravenous fluids and antibiotics (co-amoxiclav and clarithromycin) to cover bacterial infection, dexamethasone 6 mg twice a day and enoxaparin 40 mg once daily for prophylaxis for venous thromboembolism.

On days 1–4, she improved clinically, no longer requiring oxygen to maintain saturations; her antibiotics were switched to oral and discharge planning was started. On day 5, she was found slumped in her chair with acute left-sided weakness. Her Glasgow Coma Scale score was 14 (E4, V4, M6), blood glucose level was 7.7 mmol/litre and blood pressure was 135/81 mmHg. Computed tomography of her head showed no acute haemorrhage. She scored 15 on the National Institute of Health Stroke Scale, indicating a right partial anterior circulation ischaemic stroke. Her next of kin was informed and agreed to stroke thrombolysis. She received a bolus of tissue plasminogen activator within 90 minutes of the stroke emergency call.

She was isolated in the hyperacute stroke unit for close monitoring post thrombolysis. Her condition deteriorated with a National Early Warning Score of 8, saturating 85% on 15 litres/minute of oxygen, heart rate 171 beats/minute and respiratory rate 25 breaths/minute. Her electrocardiogram showed fast atrial fibrillation. Her Glasgow Coma Scale dropped to 9 (E4, V1, M4). She was treated with digoxin, intravenous tazocin and fluids. Her chest X-ray showed worsening pneumonia (Figure 1) and she died on day 6.

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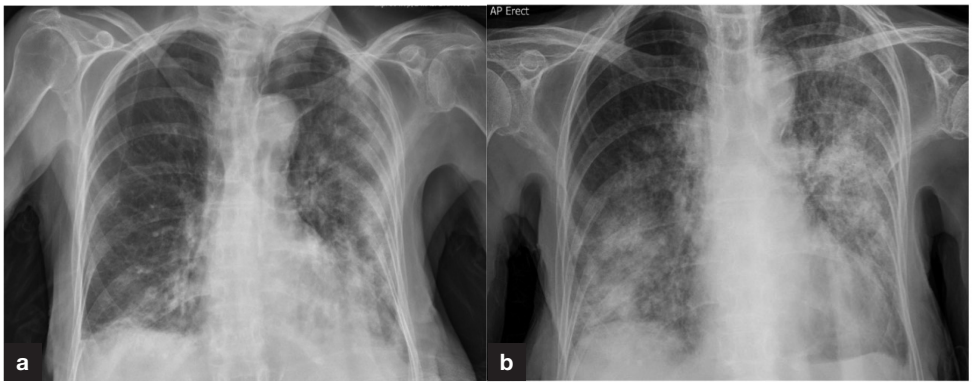

Figure 1. Chest X-ray (a) on day 0 confirmed COVID-19 infection and (b) day 6 (post thrombolysis).

(Knight et al, 2020). To the best of the authors' knowledge, this is the oldest COVID-19 patient to receive stroke thrombolysis reported to date.

Studies have shown age as an important prognostic factor in predicting mortality: the 4C COVID-19 mortality score (Knight et al, 2020) and the SOAR stroke score (Myint et al, 2014) both highlighted increasing age as a strong predictor of inpatient mortality in COVID-19 and stroke patients respectively. Moreover, inpatient COVID-19 disease outcomes including mortality were better predicted by increasing frailty than either age or comorbidity (Hewitt et al, 2020).

Previously, five reported cases of younger patients (aged 53–77 years) with COVID-19-related stroke treated with thrombolysis demonstrated uncertain or unfavourable outcomes (Co et al, 2020; Sangalli et al, 2020). COVID-19 infection is not a contraindication for stroke thrombolysis, and there is no upper age limit cut off.

The absence of established stroke risk factors in this moderately frail patient, the sequence of COVID-19 pneumonia and subsequent inpatient stroke supported COVID-19 as the aetiology of the acute stroke (Planinc et al, 2020). The mechanisms of COVID-19-related stroke include viral-induced cytokine storm, procoagulant state leading to thromboembolism, endothelial dysfunction, and direct vessel wall invasion (Planinc et al, 2020).

There is very limited literature on the survival rates of patients with COVID-19-related stroke receiving thrombolysis. Old age and frailty are poor prognostic indicators in COVID-19 and stroke outcome. Further studies may be needed to inform guidelines for thrombolysis in older and more frail COVID-19 stroke patients.

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Learning points

- COVID-19 may cause acute stroke in older patients without vascular risk factors through viral-induced cytokine storm, procoagulant state leading to thromboembolism, endothelial dysfunction, and direct vessel wall invasion.
- Old age, stroke and frailty are poor prognostic indicators for patients with COVID-19.
- COVID-19 is not a clear contraindication for stroke thrombolysis in older patients.
- The outcome of stroke thrombolysis in older, frail COVID-19 patients who have a stroke appears to be poor.

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