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Managing stroke through covid 19 and beyond.

Introduction

Hospital admissions for acute stroke and transient ischaemic attack have declined by between 12-40% worldwide since the outbreak of COVID-19 pandemic (Nogueira et al., 2021; Padmanabhan et al., 2021; Rinkel et al., 2021). It is possible that this is due to stroke incidence declining, but it is likely attributable to delays in patients seeking medical care. This is concerning, as rapid diagnosis and treatment of stroke are fundamental to reducing rates of disability, the need for institutional care and mortality rates from complications of stroke. Stroke is a now well-documented clinical manifestation of COVID-19, as the virus causes widespread inflammation and prothrombotic coagulopathy. Thromboembolic events are therefore being observed in populations not previously considered to be at risk of stroke (Ma et al., 2021).

Rapid diagnosis and treatment

Almost all aspects of stroke care have been impacted by the pandemic, including discharge timelines, life after stroke, mental health and wellbeing, and stroke research (Stroke Association, 2020). Stroke services have adapted continually to the changes caused by COVID-19 to ensure that patient care is delivered as safely as possible. The acute stroke care pathways remains fundamentally unchanged, with priorities firmly focused on rapid diagnosis and treatment, prompt and ongoing

rehabilitation and secondary prevention (National Institute for health and Care Excellence, 2019) (summarised in Figure 1).

Figure 1. Overview of stroke pathway

It is crucial to improve rapid recognition of symptoms and diagnosis by both patients and healthcare professionals. This is particularly important at present, as many patients are reluctant to engage with healthcare services due to fear of COVID-19 exposure, or because they do not want to further burden resources (Paulucci et al, 2021). Such patients thus may need extra encouragement to seek emergency care. The pandemic has been associated with a global decline of 13–50% in thrombolysis and thrombectomy rates, two vital therapies for stroke (Nogueira et al, 2021; Yavagal et al, 2021), which is possibly related to hospital avoidance behaviours, staff redeployment and lack of access to specialised stroke units.

However, in the UK, thrombolysis and thrombectomy rates have remained stable compared with pre-pandemic levels (Tiedt et al, 2020; Kwan et al, 2021), potentially as a result of quieter emergency departments, leading to faster access to treatment (Public Health Scotland, 2021). Despite this, only 13% of ischaemic strokes in Scotland are thrombolysed (NSS Information and Intelligence, 2019), which is considerably below the National Stroke Development Programme target of 20% (Stroke Association, 2019). To address this, the NHS has begun to centralise hyper-acute stroke care into a small number of well-equipped hospitals (Douiri et al, 2021). Additionally, the launch of national thrombectomy services aims to increase provision rates ten-fold, potentially saving thousands of lives over the next decade and enabling an additional 1600 stroke patients to live independently (Stroke Association, 2019). However, there is still a long way to go in fully implementing these services. Scotland only began the process in November 2020 as a result of delays from COVID-19. Meanwhile, although 24 centres are established in England, the intervention radiologist workforce would need to more than double to meet demand, and only one centre is currently able to offer a 24-hour service (Royal College of Physicians, 2016).

COVID-19-related stroke

The extent to which COVID-19 may increase the risk of stroke, and in which demographic groups this is more likely to occur, is not yet known. Small case studies suggest that COVID-19 is causing younger patients to present with stroke (Fifi and Mocco, 2020), while further work is currently being undertaken at Edinburgh University (2021) analysing COVID-19 status, vaccine status and stroke rates among

of all adults living in the UK to help understand if the virus does indeed increase the likelihood of stroke in different groups of people, and by how much. Meanwhile, the Sentinel Stroke National Audit Programme and Scottish Stroke Care Audit will evaluate the interactions between COVID-19 and cardiovascular conditions, and the impact of these conditions on long-term recovery (Public Health Scotland, 2021).

Stroke unit and post-discharge care

Recommendations state that patients with stroke should receive specialist stroke unit care, but this target has been poorly achieved over the last 5 years (National Institute for Health and Care Excellence, 2019). During the pandemic, stroke unit admissions within 4 hours increased by 9.1% (Douiri et al, 2021). This is likely reflective of the reduction in admissions for both stroke and general emergencies, which increased bed capacity within secondary care. For those admitted, overall satisfaction regarding inpatient care was often high, with patients recognising increased staff efforts (Stroke Association, 2020). However, this did not extend to the discharge process.

Discharge from hospital is a key transitional stage for patients who have experienced stroke. It offers the opportunity to put crucial support mechanisms in place to facilitate ongoing improvement and promote independence. Yet, during the pandemic, many discharges were rushed and 45% of patients reported feeling abandoned after leaving hospital (Stroke Association, 2020). Patients were often discharged earlier in their recovery, resulting in patients not receiving essential early stroke-specific rehabilitation or a home assessment, leading to a lack of structured

support mechanisms (Oxford Academic Health Science Network, 2020). The ramifications of this have yet to be fully explored.

Ongoing Stroke rehabilitation

The COVID-19 pandemic has magnified pre-existing challenges in stroke rehabilitation service delivery. Intensive, well-programmed stroke rehabilitation can reduce hospital readmission rates from 65% to 3%, with patients who miss out on early rehabilitation having a significantly higher rate of long-term disability and risk of secondary problems, such as infections and falls (National Institute for Health and Care Excellence, 2013). Post-hospital discharge rehabilitation services have been severely impacted by COVID-19, with 55% of patients reporting appointments and therapies being cancelled or postponed (Stroke Association, 2020). Group-based inpatient and outpatient sessions were suspended to adhere to social distancing measures and, nearly 18 months since the first wave, community nurses continue to report issues with access to care homes, leaving residents increasingly isolated with minimal or no stroke rehabilitation provision (Oxford Academic Health Science Network, 2021).

However, these are not new problems. Rates of stroke rehabilitation were inadequate before the outbreak of the COVID-19 pandemic, and many stroke professionals and charities believe that returning to pre-pandemic levels of service will be insufficient to support survivors of stroke (Oxford Academic Health Network, 2021). Restarting face- to-face contact and therapy will be the initial step on the route to recovery, but the focus must be on service expansion (through remote rehabilitation where appropriate), increased community provision, 7-day per week

access to services and a reduction in paper-based communication and data collection.

Secondary prevention

Approximately 11% of patients who have experienced an ischaemic stroke will experience stroke recurrence within 1 year, while 26% will experience recurrence within 5 years (Mohan et al., 2011). Treatment of hypertension remains one of the most important interventions for secondary prevention of ischaemic stroke.

Comorbidity optimisation should be initiated before hospital discharge, while medication strategies include antiplatelet therapy, anticoagulants and antihypertensives (National Institute for Health and Care Excellence, 2013).

For patients who have experienced a COVID-19-related stroke, randomised control trials are underway to investigate the optimal antithrombotic strategy (Vahabizad et al, 2020) to treat coagulopathy and prevent future stroke events. There are now cohorts of younger patients without established cardiovascular risk factors who have experienced a hypercoagulable state (an increased tendency to develop blood clots) as a result of infection with COVID-19. It is unknown whether these patients will now need to undergo a lifetime of antithrombotic therapy, and whether long COVID affects recovery or stroke recurrence rates. Robust long-term study is required before sound recommendations for these patients are possible.

Conclusion

Rapid diagnosis and treatment of stroke, along with prompt ongoing rehabilitation and secondary prevention, remain key priorities for stroke care. The COVID-19 pandemic has been incredibly challenging for NHS services and, while satisfaction

with acute care has been high, patients have reported reduced support following discharge from hospital. Furthermore, patients who would not previously have been considered at risk are presenting with stroke following infection with COVID-19, representing a new challenge for acute and chronic stroke management services. Ongoing, comprehensive evaluation of newly- initiated interventions is critically important to monitor for any negative effects, assess long-term patient outcomes, benchmark services across the UK and ensure continuous quality improvement.

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