ECT IN TWO ELDERLY PATIENTS WITH COVID-19: WEIGHING UP UNKNOWN RISKS IN UNPRECEDENTED TIMES

Robyn H. McCarron, Ruchika Rathee, Sharon Yang, Chandran Thavachelvi

The COVID-19 pandemic has created an unprecedented situation demanding a rapid response to a barrage of unknown risks. Issues around infection control, resource allocation and treatment delivery have threatened the viability and accessibility of Electroconvulsive Therapy (ECT) services. Additionally, there are unquantified risks around the delivery and effect of ECT in patients who have had COVID-19. We discuss two cases where ECT was restarted in older-adults who had had symptomatic COVID-19. We consider the importance of clinical assessment, multi-speciality team involvement, and comprehensive risk assessment in making high stakes treatment decisions around ECT in patients with COVID-19. Although more research and international multi-speciality collaboration is required to develop evidence-based guidance, it is vital that we maintain equitable access to safe, effective and potentially life-saving ECT during this pandemic.

Key words: ECT, COVID-19, older peoples mental health, risk, pulmonary embolism

Robyn H. McCarron, MA, MB, BChir, MRCPsych[1,2]
Ruchika Rathee, MBBS, MD[1]
Sharon Yang, MA, MSci, MB, BChir[1]
Chandran Thavachelvi, MBBS, MBA, MRCPsych[1]

[1]Cambridgeshire and Peterborough NHS Foundation Trust, UK
[2]Department of Psychiatry, University of Cambridge, Cambridge, UK

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Contributors: Dr Eladia Ruiz-Mendoza, Dr Paul Reed, Dr Ben Underwood

Corresponding author
Robyn McCarron
Cambridgeshire and Peterborough NHS Foundation Trust, Cavell Centre, Peterborough. PE3 9GZ
Phone: +441733776000;
E.mail: robyn.mccarron@cpft.nhs.uk

Introduction

The assessment and management of risk is central to mental health practice (Felton & Stickley, 2018; Royal College of Psychiatrists, 2016). The COVID-19 pandemic has created an unprecedented situation demanding a rapid response to a barrage of unknown risks.

The viability and accessibility of Electroconvulsive Therapy (ECT) during this crisis in concerning (Colbert, McCarron, Ryan & McLoughlin, 2020; Espinoza, Kellner & McCall, 2020; Sienaert, Lambrichts, Popleu, Van Gerven, Buggenhout, & Bouckaert, 2020; Tor, Phu, Koh & Mok, 2020). Electroconvulsive Therapy is an effective and lifesaving treatment for psychotic and affective disorders, especially in older adults (Sienaert et al., 2020). However, the high transmissibility (Li et al., 2020) of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) alongside aerosol generation during anaesthesia (Peng, Ho, & Hota, 2020) poses significant infection control challenges for ECT services. Consequently, ECT services face new challenges in terms of patient and staff safety, resource allocation, processes of care and treatment modification (Espinoza et al., 2020; Sienaert et al., 2020).

Whilst adaptations can and must be made to reduce infection risks and maintain ECT provision (Colbert et al., 2020; Sienaert et al., 2020; Tor et al., 2020), ECT teams face unknown risks around treating patients with COVID-19. The extent of COVID-19's pathophysiology is not fully known, but there are emerging neurological (Kwong, Mehta, Shukla, & Mehta, 2020), neurovascular (Morassi et al., 2020), neuropsychiatric (Rogers et al., 2020) and haematological (Bikdeli et al., 2020) consequences that potentially raise the risks associated with ECT (Flexman et al., 2020). This is in addition to the more obvious risks associated with ECT anaesthesia and the COVID-19 respiratory disease, especially in the elderly and those with pre-existing conditions (Flexman et al., 2020; Greenland, Michelow, Wang, & London, 2020).

Recent neuroanaesthesia recommendations (Flexman et al., 2020) suggest that SARS-CoV-2 positive patients should not have ECT. Patients with previous COVID-19 should only undergo ECT if they were asymptomatic. However, these recommendations were developed without psychiatric input. As this crisis evolves, we will increasingly have to make high stakes

treatment decisions around initiating/restarting ECT in patients who have recovered from symptomatic COVID-19. We urgently need multi-speciality collaboration in developing evidence-based ECT guidelines for COVID-19 (Espinoza et al., 2020). Here we present two cases with contrasting outcomes where ECT was restarted in high-risk older adults following symptomatic COVID-19.

Case Report

Written informed consent was gained to report these cases.

Case 1

An 86-year-old woman with a 48-year history of treatment-resistant schizoaffective disorder. She required multiple admissions despite depot medication and maintenance ECT (M-ECT). Her medical history included hypertension, hypothyroidism, subarachnoid haemorrhage, ventricular ectopics, osteoporosis, two previous hip fractures and glaucoma. She scored 6 (moderately frail) on the Clinical Frailty Scale (CFS) (Rockwood et al., 2005).

She was legally detained in hospital due to rapid deterioration in her mental state characterised by paranoid delusions, disengagement and life-threatening refusal of food and drink. Following this admission, she was treated acutely with twice-weekly inpatient ECT (having had over 300 ECT treatments), Paliperidone depot 100 mg/month and Nortriptyline 25 mg/day. Her mental state improved following four inpatient bitemporal ECT treatments at 200%.

In the third week of admission she developed a cough. On review her vital signs were respiratory rate 20 bpm, SpO2 96% in air, heart rate 81 bpm, blood pressure 138/88 mmHg, and temperature 38.7 ^{o}C. Haematological investigations were abnormal for high CRP (198 mg/L), lymphopenia (0.5 10^9/L) and hypoalbuminaemia (29 g/L). In line with national guidelines to isolate and test patients displaying symptoms of COVID-19 (NHS England, 2020; Public Health England, 2020a), oropharyngeal and nasopharyngeal swabs were sent for real-time PCR for SARS-CoV-2. She tested positive, was isolated in her room, and treated with supportive care and antipyretics. Her ECT treatment was suspended due to temperature and respiratory concerns.

Her mental state deteriorated with increasing paranoid delusions and declining oral intake. Recovery from COVID-19 was determined following national guidance (Public Health England, 2020b) and over 48 hours of stable vital signs. Fifteen days after the first symptoms of COVID-19 she restarted ECT. This was following geriatric, anaesthetic and psychiatric review of her physical and mental health, medical and psychiatric risks, and specifically her recovery from COVID-19. Repeat COVID-19 testing was negative. ECT was delivered using a Thymatron-IV® system (Somatic, LLC, Lake Bluff, IL, USA) using propofol and suxamethonium anaesthesia. Bitemporal ECT was delivered at 200% stimulus intensity (frequency 70Hz, duration 8s, pulse width 1ms, current 910mA, charge 1021.8mC) producing a seizure of 11 s clinically, EEG endpoint 21 s.

Four days after her fifth ECT treatment she became acutely unwell with sudden onset of breathlessness, respiratory rate 30 bpm, SpO2 84% in air, heart rate 96 bpm, blood pressure 176/88 mmHg, and decreased consciousness. She required 3-4L of oxygen and Dalteparin was started for a suspected pulmonary embolus (PE). Her D-dimer was significantly raised at 14970 ng/ml. Radiological investigations were not performed because she was too medically and psychiatrically unwell to be safely transferred. She was treated based on clinical suspicion in line with latest British Thoracic Society guidance (2020). Her Padua risk score (Barbar et al., 2010) had been two (scoring for age and acute infection) as she had remained mobile throughout her admission and did not have other risk factors for blood clots. Consequently, there was high clinical suspicion that the PE was a direct consequence of COVID-19 coagulopathy.

Treatment escalation was discussed with the patient, her relative and the medical team. It was unanimously agreed for her to remain on the psychiatric ward. Specialist palliative care input was obtained pre-emptively to support the team with symptom management should she deteriorate further. Her physical health precluded ECT in the foreseeable future and her legal detention was rescinded. She received supportive care on the ward before being transferred to an appropriate residential care setting with psychiatric support.

Case 2

A 68-year-old man with a history of Obsessive Compulsive Disorder. His medical history included hypothyroidism, glaucoma and hypogonadotropic hypogonadism following successful treatment for testicular seminoma. He scored 2 (well) on the CFS (Rockwood et al., 2005).

Following a sudden bereavement he developed severe depression with psychotic symptoms. Despite intensive community support and trials of sertraline, venlafaxine, olanzapine and benzodiazepines his mental state and oral intake declined, and he was legally detained in hospital. During admission, he was treated with an acute course of twice-weekly ECT, mirtazapine 30mg/day, sertraline 200mg/day, olanzapine 7.5mg/day, temazepam 20mg/day and diazepam 2-5mg maximum three times/day. His mental state improved with 9 sessions of bitemporal ECT (increasing to a dose of 75%) and medication. After 11 weeks he became febrile (temperature 38.9 ^{o}C, respiratory rate 18 bpm, SpO2 100% in air, heart rate 100 bpm, blood pressure 154/69 mmHg). In line with national guidelines (NHS England, 2020; Public Health England, 2020a) he was isolated and oropharyngeal and nasopharyngeal swabs were sent for real-time PCR for SARS-CoV-2. He tested positive. Haematological investigations were abnormal for raised CRP (25 mg/L) and mild lymphopenia (0.9 10^9/L). He was treated with antipyretics and ECT was suspended due to persistent fever. With isolation, health anxieties, and the suspension of ECT his mental state deteriorated.

Twelve days after his first fever he had over 48 hours of stable vital signs and was fit to restart ECT. This was following geriatric, anaesthetic and psychiatric review focussing on his physical and mental health, medical and psychiatric risks and recovery from COVID-19. Repeat COVID-19 testing was negative. He received his tenth session of bitemporal ECT at 100% stimulus intensity (frequency 70Hz, duration 8s, pulse width 0.5ms, current 910mA, charge 510mC). His seizure lasted 12s clinically, EEG endpoint 13s.

His mental health improved with no new medical

concerns. After his tenth ECT treatment his legal detention was rescinded, and he continued his inpatient treatment voluntarily. After completing 12 ECT treatments he was well enough to be discharged with intensive community support to continue his recovery.

ECT procedures

In the absence of national and international ECT-specific COVID-19 guidelines, adaptations to ECT procedures were decided locally (**table 1**). In the region ECT services were condensed from two sites to one, due to staff and resource availability. The number of patients electing to have ECT decreased, but both acute and maintenance ECT remained available. Prior to each treatment, patients' vital signs including SpO2 and temperature were assessed. There was no routine testing of asymptomatic patients for COVID-19.

The number of people in the ECT suite was minimised. Adequate ventilation was ensured. All surfaces and equipment were disinfected between patients. ECT was delivered using manual ventilation without modifications to the anaesthetic protocol. The patients who had recovered from COVID-19 were last on the ECT list to facilitate deep cleaning of the ECT suite and equipment following their treatment.

Personal protective equipment (gloves, FF3P masks, fluid resistant gown and visor) was worn by the ECT team throughout their patient contact. In line with local and national policy at this time routine, regular COVID-19 testing was not performed on staff members. However, none of the ECT team developed symptoms or tested positive for COVID-19 as part of a national healthcare worker voluntary testing programme.

Table 1. *Adaptations made to ECT practice and procedures in response to COVID-19*

Level of intervention	Adaptations made by our service	Additional potential adaptations
Service structure	Reduction from two sites to one site for ECT clinics	Suspension of maintenance ECT
	Reduction in the numbers of patients electing to have ECT	
Assessment of patient fitness for ECT	Risk assessment for ECT considers risk of contracting and transmitting COVID-19	Regular COVID-19 testing of all patients prior to ECT
	Temperature and SpO2 monitoring of all patients prior to ECT	Withhold ECT to patients with COVID-19
	Enhanced multi-speciality assessment of fitness for ECT following COVID-19	
Management of patients during ECT clinics	Patients with COVID-19 treated last on list	Separate ECT clinics for community patients and inpatients
		Separate ECT clinics based on geographical location
ECT team	Skeleton staff	Regular COVID-19 testing of all ECT team members
	Appropriate personal protective equipment worn	ECT team members live and work in isolation 'bubble'
ECT delivery	Only essential staff present during anaesthetic and ECT delivery procedures	Use of glycopyrrolate to decrease respiratory secretions
	Appropriate ventilation of ECT room	Avoidance of bag valve mask ventilation
	Enhanced disinfection of ECT equipment between patients	
	Regular deep cleaning of the ECT suite	

Discussion

Electroconvulsive Therapy is an effective, essential and lifesaving treatment (Colbert et al., 2020; Espinoza et al., 2020; Sienaert et al., 2020). With the psychological impact of the COVID-19 pandemic, its disruption on mental health services and care delivery, and potential neuropsychiatric consequences of the disease, we should be anticipating a demand in the need for ECT services (Holmes et al., 2020; Flexman et al., 2020; Galea, Merchant & Lurie, 2020). With this, and the spread of SARS-CoV-2, it is inevitable that ECT services internationally will be faced with patients who have current or previous COVID-19.

The first issue we must face is how to continue to provide accessible ECT services and correct the misperception of ECT as an elective procedure (Colbert et al., 2020; Espinoza et al., 2020; Sienaert et al., 2020). To maintain our ECT service we had to condense it. ECT services may need to collaborate to ensure regional availability. However, it is vital to ensure patients have access to adequate transport, social and financial provision to access regional services. Given the uncertain timescale of this pandemic it is crucial that both acute and maintenance ECT be available, as they were here. Where this is not possible there needs to be a policy for regular review of patients missing M-ECT with rescue ECT as needed (Sienaert et al., 2020).

Some services have instigated regular COVID-19 testing of patients undergoing ECT (Sienaert et al., 2020; Tor et al., 2020). We took a different approach based on clinical assessment of fitness for ECT with testing of individuals displaying symptoms. More research is needed to determine the effectiveness of each approach. However, given concerns around the false negative rate of COVID-19 tests, ECT services would be wise to treat all patients as assumed COVID-19 positive for infection control purposes. These cases, and the experiences of ECT services internationally (Tor et al., 2020), suggest that it is possible to provide ECT and successfully prevent transmission to the ECT team.

Additional uncertainty exists around when to restart ECT in patients whose treatment was suspended due to symptomatic COVID-19 (Flexman et al., 2020). It is vital that we thoroughly consider the balance of medical and psychiatric risks in each case based on the latest evidence. Given the emergent complex pathophysiology of COVID-19 we would advise seeking specialist medical and anaesthetic opinions on all patients requiring ECT following COVID-19, as described in our cases. However, we must be mindful that for some patients not doing ECT is a high risk and potentially fatal decision. A lower threshold for restarting treatment may be needed in more severe and high-risk psychiatric presentations. Indeed, there may be cases where patients are so psychiatrically unwell that suspending ECT treatment due to symptomatic COVID-19 is not a feasible option. Indeed Braithwaite, McKeown, Lawrence and Cramer (2020) have demonstrated that patients who are acutely unwell with COVID-19 can still be successfully treated with ECT.

The patients in our cases had normal vital signs and had been medically cleared prior to ECT but had different outcomes. This raises questions around what should be included in a COVID-19-era pre-ECT medical assessment. There is mounting evidence

around COVID-19 coagulopathy and the prognostic role of D-dimer (British Thoracic Society, 2020; Garcia-Olivé, Sintes, Radua, Capa, & Rosell, 2020; Tang, Li, Wang, & Sun, 2020). Retrospectively it may have been prudent to include D-dimer in our assessments of the patients' fitness for ECT. Similarly, we need to be mindful to consider COVID-19 as a risk factor for venous thromboembolic disease (British Thoracic Society, 2020; Danzi, Loffi, Galeazzi, & Gherbesi, 2020; Garcia-Olivé et al., 2020) in psychiatric patients who previously would not have met the thresholds for venous thromboembolism (VTE) prophylaxis. Our local VTE risk assessment has been modified to reflect this whilst new national (British Thoracic Society, 2020) and international (Bikdeli et al., 2020) guidelines are developed.

A further question raised by these cases is whether ECT was a contributing factor in case 1's PE. Although PE is a rare complication of ECT (Mamah, Lammle, & Isenberg, 2005; Singh & Wahi, 2008), it is emerging as an increasingly common consequence of COVID-19 (Danzi et al., 2020; Garcia-Olivé et al., 2020). The timescale of case 1's deterioration four days after her ECT treatment makes it unlikely that the ECT was a causal factor in this. Indeed, the difference in outcomes in these two cases may reflect general prognostic factors in COVID-19 rather than factors in how COVID-19 moderates the risks of ECT. Case 1 was older and frailer than case 2 and had higher CRP and hypoalbuminaemia. However, it is vital we remain alert to COVID-19 related ECT complications and develop procedures for reporting and responding to them.

With COVID-19 we are in the acute stage of what may become a chronic condition. We hope that the reporting of these two ECT cases may be of benefit to those weighing up similar unknown risks in these unprecedented times.

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