

# ECT in a patient with a meningioma and Takotsubo cardiomyopathy

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There are few studies that look at the use of electroconvulsive therapy (ECT) in elderly patients with a comorbid meningioma or other intracranial tumour, with the dilemma being whether or not to do ECT. This case notes article examines the ECT management of an elderly lady with severe depression, coexisting Takotsubo cardiomyopathy, and an incidental finding of a frontal meningioma. The authors detail the multidisciplinary approach necessary for managing a patient with coincident psychiatric, cardiac and neurological diagnoses and the implications for practice.



The National Institute for Health and Care Excellence (NICE) in its most recent ECT guidance

document (2003) recommends the use of ECT be limited to the treatment of certain conditions, including severe depression, mania (if prolonged or severe) and catatonia. It can be used when other alternatives have failed or if the presentation is assessed as life-threatening. NICE also notes the need for an assessment of the risks and benefits of such a procedure including risks from other comorbid illnesses.<sup>1</sup>

Our index patient, like many elderly patients, had coexisting diagnoses, including a frontal meningioma and Takotsubo cardiomyopathy. The former was an incidental finding on admission, while the latter had been diagnosed and was ongoing prior to this illness episode. Patients who need ECT may have such pre-existing conditions or may develop them subsequent to ECT. Our patient is unique in that she had both diagnoses prior to treatment and went on to have successful ECT.

## Presentation

Mrs Q, a lady in her 70s, was admitted to an old age psychiatry ward following worsening low mood, nihilistic delusions, agitation and thoughts of self-harm.

She was described as anxious, agitated, muddled, and struggling to focus on conversation. She was retired and had a supportive family who were involved in her treatment during the admission.

There was a preceding four-month history of low mood and decline in mental state. Prior to index admission she had been reviewed and described as having various negative cognitions. Her cognitive state led her to see any proffered help or medication as another source of worry. Possible causes considered for her symptoms included steroid therapy, hyponatremia and depression. The patient's eventual diagnosis was psychotic depression.

Prior to this incident there was no history of mental ill health. Her medical comorbidities included Takotsubo cardiomyopathy, type 2 diabetes, left bundle branch block, hyponatremia, polymyalgia rheumatica, elevated blood pressure and hypothyroidism.

The initial treatment plan included tapering down corticosteroids (commenced for polymyalgia

and starting insulin for poorly controlled diabetes. Antidepressant medication was introduced and increased with little effect. Anxiolytic medication was also used with limited benefit. Poor oral intake was monitored using a food and fluid chart. Following her poor progress on admission, despite treatment, a second antidepressant was introduced to augment treatment. There were considerations around the issue of limited medication options due to medical comorbidities. Unfortunately, the patient was unable to tolerate antidepressant augmentation due to side-effects and continued to be low in mood with poor oral intake. There were risks of deteriorating health and she continued to express nihilistic delusions. ECT was therefore considered.

## Investigations

A computerised tomography (CT) scan of the patient's head was done on admission, on account of her presenting with features including confusion, agitation, and paranoia; with a view to ruling out an organic cause. This showed a densely calcified, left frontal spherical lesion consistent with a calcified meningioma.

### Treatment

The 2009 NICE clinical guideline on depression recommends that ECT be considered for management of life-threatening episodes of depression or following failure of other treatment modalities. It advises against the routine use of ECT in moderate depression.<sup>2</sup>

The 2013 ECT handbook,<sup>3</sup> in a chapter on ECT in physical illness, provides helpful guidance on the use of ECT in patients with coexisting medical conditions. In our management of this lady we worked in line with many of the recommended approaches, including seeking opinion from appropriate medical specialists, and involving anaesthetists in the planning for the procedure. This book also describes how ECT results in a number of structural and functional changes in the brain affecting cerebral metabolism and circulation, plasticity of the synapses and genetic expression. It posits that ECT most likely works by correcting abnormal physiology. The handbook, however, still mentions the paucity of ECT research, and we hope that our experience managing this lady, as reported here, serves as one more informative resource.

### Considerations around ECT and possible neurological complications

Fried *et al.*<sup>4</sup> describe as simplistic, a position that the presence of cerebral tumours would be an outright contraindication for ECT. In their case report they propose that a number of factors contribute to the choice for or against ECT. These factors include tumour type and location as well as response of the depression to medication and how severe the mood disorder is. They go on to posit that small, non-oedematous cerebral tumours located where they are unlikely to block cerebrospinal fluid flow, would probably not constitute a

contraindication to ECT. To the contrary Gassel,<sup>5</sup> following a review of 250 patients with meningiomas (where he focussed on three who had ECT prior to the meningioma diagnosis) advised that cerebral lesions in general and suspected intracranial tumours in particular, be considered absolute contraindications to electroconvulsive therapy. Hsiao *et al.*<sup>6</sup> in a paper on ECT and neurological disorders concluded that, overall, ECT use was safe in neurological compromise; but then went on to specify certain exceptions. These included various types of CNS structural lesions such as infective states, trauma, tumours and cerebrovascular accidents. The reasoning behind this was explained as follows: these were situations where use of ECT may result in deterioration due to it affecting intracranial pressure, cerebral circulation and the blood-brain barrier. Adverse effects in Gassel's cases<sup>5</sup> included drowsiness, confusion, slurred speech, papilloedema, extensor plantar responses, memory impairment and hemiplegia.

Preparations for ECT were made following discussion with the patient and her family. There were, however, concerns about the patient's suitability based on her medical history. A multidisciplinary approach was therefore taken. An anaesthetist reviewed, but expressed concerns about the implications of the meningioma for the ECT and also the history of Takotsubo cardiomyopathy. A neurology consult was then sent. Anaesthetic concerns were around possible risks of raised intracranial pressure around the site of the meningioma. Input was also sought from the ECT consultant for the Trust around the patient's presentation and comorbid medical conditions. Again, neurology input was recommended.

The neurologist reviewed the case and was of the opinion that the small meningioma was not a risk to the patient, noting that it had calcified from it being so slow growing. He noted that the scan had not shown evidence of raised pressure nor signs of mass effect. He therefore advised that she could go ahead with the planned ECT. He did not recommend any additional treatment – prophylactic or otherwise. A cardiology review was also requested due to the history of cardiomyopathy. The anaesthetist had concerns about relapse from ECT stress as a result of increased sympathetic output. A cardiologist reviewed the patient's echocardiogram and gave approval for ECT to go ahead. ECT was then done under the Mental Health Act. The patient had treatment in the ECT suite within the psychiatry unit. Anaesthetic and psychiatry teams were present – with the option of transfer to a physical health bed if there were complications.

Following the commencement of ECT the patient showed definite improvement a week (two sessions) into treatment – her mood became more reactive but she remained anxious at times. Following her fourth treatment she was described as being warmer, with improving mood and less anxiety – there were no physical health issues. By her eighth treatment she was described as much more reactive and pleasant. She regained capacity and was able to now consent to continue ECT informally. She completed 12 ECT treatment sessions with no neurological complications. Following her first treatment there was a short period of asystole, and subsequently during her 12th treatment; but after these there were no further cardiac complications.

### Takotsubo cardiomyopathy

This is a form of cardiomyopathy characterised by chest pain, which

is sudden in onset, elevated ST segments and echocardiography findings including apical ballooning and reduced ejection fractions. These tend to be associated with increases in catecholamines. It has also been referred to using a number of descriptive terms such as broken heart syndrome or catecholamine-induced cardiomyopathy. The causative stress may have a number of origins such as psychological or physical.<sup>7</sup>

It is unclear if there was a history of bereavement or other emotional trauma preceding the Takotsubo diagnosis (this was three years prior to the ECT). However, as the stress in Takotsubo may be medical or psychological, and this lady was reported not to have had a previous history of mental ill-health, then the most readily available hypothesis is that her Takotsubo might have resulted from her multiple physical comorbidities listed above.

While there does not appear to be a significant amount published around Takotsubo and ECT, one case report describes Takotsubo as 'a serious but transient potential complication of electroconvulsive therapy'<sup>8</sup> and others discuss it.<sup>9,10</sup>

For this lady the diagnosis of Takotsubo preceded the administration of ECT; concerns about Takotsubo pre-existing are valid as ECT has been documented to lead to the disorder where it did not previously exist.<sup>11–15</sup> It is interesting to note that in a number of these cases the patient was managed and ECT subsequently reattempted.<sup>8,11,15</sup> One review mentioned managing resultant cases by giving beta-adrenergic blockers prior to sessions.<sup>8</sup>

Prior to commencement of the sessions, a cardiology referral was made, the cardiologist reviewed and gave the go-ahead for the ECT.

During the first ECT session, there were concerns related to the

patient's cardiac reserve. However, she quickly settled and subsequent sessions were mostly uneventful. During her last session, the patient had a brief period of asystole (about 10 seconds). This was promptly managed by the anaesthetic team with good recovery. There is the possibility that this may have been related to antidepressant treatment with venlafaxine. The drug had been recently restarted; the patient had previously been on venlafaxine prior to ECT commencement. Studies have explored a possible association between cardiac symptoms and venlafaxine for patients on ECT,<sup>16–19</sup> one describing its use as safe.<sup>20</sup>

The patient was subsequently discharged and remains well at six-month follow-up from a psychiatric, neurological and cardiac point of view.

### Conclusion

This is a case of ECT use in a patient with multiple comorbidities. There are few studies that look at the use of ECT in elderly patients with a comorbid meningioma or other intracranial tumour.<sup>21–24</sup> Some have explored this in the adult population<sup>25,26</sup> and others, particularly in frontal lobe meningioma, similar to that seen in our patient.<sup>27</sup>

Indeed, some have documented ECT being administered prior to a diagnosis of a meningioma with resultant deterioration.<sup>5</sup> The consideration for physicians managing such patients would be whether or not to administer ECT? One needs to ask oneself when it is safe to use ECT despite comorbid diagnoses of considerable severity themselves. What criteria would guide such decisions when dealing with intracranial tumours for instance? Would there be considerations of size, type, progression or presence of symptoms? Do current

guidelines provide physicians with sufficient detail regarding such considerations and if not what are the recommendations?

The answer to these and other questions may help to update existing guidelines as we would obviously benefit from guidelines specific to such patients, a dearth of which has been documented.<sup>28</sup> Further studies would be needed to provide evidence about safety of this therapy in such patient groups and would have the added benefit of guiding decision makers.

An early case report recommends the use of nuance in assessing each such case for suitability with regards to ECT.<sup>4</sup> From cardiology and neurology points of view, in this case, we found that, despite a couple of incidents, we were able to effectively administer ECT to an elderly lady with pre-existing Takotsubo and a meningioma without any sequelae in the short term. This raises the possibilities around safe use of ECT in geriatric cardiology/neurology patients, many of who have coexisting mood disorders. Our patient continues to be monitored by both cardiology and psychiatry teams. This case report reiterates the need for comprehensive multidisciplinary input and review prior to, during and following ECT.

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### Declaration of interests

No conflicts of interest were declared.

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