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Safety Considerations of ECT in the Presence of a Retained Intra-pelvic Surgical Needle: A Case Report

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Abstract

Electroconvulsive Therapy (ECT) is a well-established treatment modality for a wide range of psychiatric conditions, including severe major unipolar or bipolar depressive episodes, schizophrenia, and catatonia. However, safety related to ECT in patients with retained foreign bodies is limited, especially regarding intra-abdominal or intra-pelvic objects. We document a case of a patient with severe, refractory depression who was deemed eligible for ECT after failing multiple trials of pharmacological treatment and transcranial magnetic stimulation (TMS). This patient was found to have a retained surgical needle in the left hemipelvis found on X-ray and confirmed on CT. Regardless, she received an extended course of ECT with no adverse abdominal or pelvic symptoms. This case may further demonstrate the safety profile of ECT in patients with retained foreign bodies, specifically in the abdominal or pelvic cavity. However, more data and individualized determinations of clinical risk are required to confirm safety in this patient population.

Keywords: ECT, Intra-pelvic foreign object, forced respiration, case report.

Introduction

Electroconvulsive Therapy (ECT) is a well-established treatment modality for a wide range of psychiatric conditions, including severe major unipolar or bipolar depressive episodes, schizophrenia, and catatonia. The safety of ECT for these conditions has been extensively studied, and the risks associated with the procedure are well characterized. Acute cardiopulmonary events are documented as the most frequent complications, including arrhythmia, respiratory distress, and aspiration [1]. Despite these studies, safety related to ECT in patients with retained foreign bodies is limited. Historically concerns regarding the presence of cranial metallic objects (cMO) have centered on theoretical potential for metal heating leading to localized damage to brain tissue or generation of an epileptic focus. Case reports, however, describe no complications to date in patients receiving ECT with retained intracranial foreign bodies, and no absolute contraindications are reported in available literature [2].

The literature surrounding extracranial foreign bodies, however, is much more limited, particularly regarding intra-abdominal and intra-pelvic dwelling objects. Despite theoretical potential risks secondary to transient procedural increases in intra-abdominal pressure, little research has been conducted to guide these cases. To our knowledge, this is the first case report documenting successful long-term ECT in a patient with a retained intra-abdominal or intra-pelvic foreign body, demonstrating excellent treatment tolerability without adverse effect.

Case Report

This was a 50 year old woman with a history pertinent for recurrent, severe Major Depressive Disorder (MDD) and insomnia, as well as comorbidities of migraine with aura, hypertension, chronic kidney disease, and chronic low back pain. Surgical history was notable for cervical disc replacements secondary to degenerative disease, laparoscopic sleeve gastrectomy, and total abdominal hysterectomy for uterine fibroids. She presented for evaluation after a long history of episodically variable depressed mood, anhedonia, concentration deficits, and feelings of worthlessness; symptoms had been present for approximately ten years prior to presentation and arose within the context of military, familial, and occupational stressors. Numerous psychotropic trials of sufficient duration and dose were completed, including SSRIs, SNRIs, bupropion, buspirone, stimulants, non-benzodiazepine hypnotics, and first generation H1 antagonists. The patient additionally completed several courses of psychotherapy and a trial of transcranial magnetic stimulation (TMS). These therapies had varying efficacy, with many medications proving to have negligible effect or intolerable side effect profiles for the patient, or would prove efficacious until new stressors emerged, such as family dynamics or the COVID-19 pandemic and associated lockdown. TMS showed some improvements in overall mood, but this effect was transient and symptoms recurred over the subsequent months. Mood symptoms worsened, culminating in a suicide attempt using a combination of prescribed cyclobenzaprine and over-the-counter eye drops containing tetrahydrozoline hydrochloride. Given her treatment-resistant, persistent, and worsening depression, she was considered a candidate for ECT, and initial work-up was obtained, including CBC, CMP, EKG, head imaging, chest x-ray, and spinal x-ray imaging.

During initial work-up, three-view lumbar spine imaging (Figure 1) revealed mild degenerative changes and a “curvilinear, needlelike metallic foreign body in the left pelvis.” A follow-up CT abdomen-pelvis (Figure 2) confirmed this finding of a curvilinear metallic body in the left hemipelvis, most compatible with a retained surgical suture needle. She denied any abdominal pain or other GI symptoms.

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On directed questioning, the patient noted having been advised previously of "a wire" in her abdomen that had been seen previously on an incidental single-view anterior-posterior plain film four years prior. However, no additional workup or evaluation had been completed at that time, and she denied ever being advised that the object was likely retained from prior surgery.

Figure 1: *Lumbar spine x-ray imaging reveals anterior-posterior (A) and lateral (B) views showing mild degenerative changes in the lumbar spine and a curvilinear metallic radio-opaque foreign body in the left pelvis consistent with a retained surgical needle.*

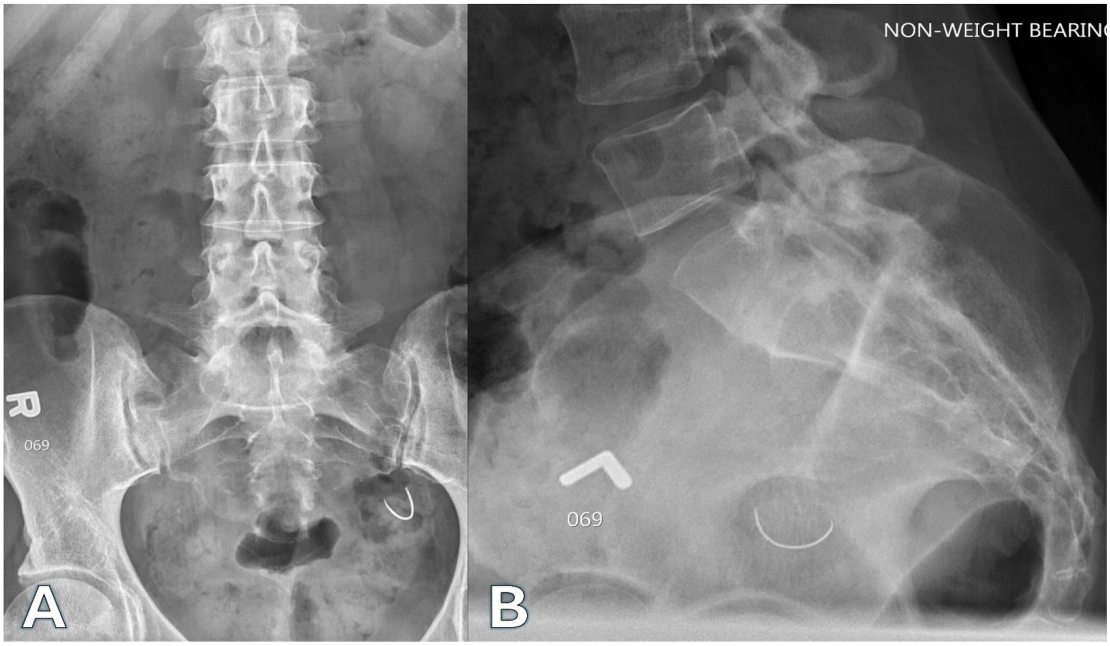

Figure 2: *Computed Tomography abdomen-pelvis reveals evidence of hysterectomy and a curvilinear metallic density structure in the left hemipelvis.*

During risk-benefit review of proceeding with ECT, concern was noted for the potential risks associated with increases in intra-abdominal pressures either displacing the needle or provoking spontaneous damage of nearby structures. General Surgery was consulted for this finding and confirmed with the patient the likelihood of this being a retained surgical needle from her hysterectomy six years prior. The possibility of future erosion into surrounding structures was also reviewed, however it was determined that the object's placement and position posed no immediate contraindication to proceeding with ECT at that time. Following this discussion, the patient indicated that given the severity of her depression she would prefer to avoid postponing ECT. She discussed her concern that awaiting removal of the foreign body would delay her psychiatric care, and was advised that she could follow up with general surgery at any point in the future for object removal.

The patient was counseled on routine monitoring during treatments to include new abdominal or pelvic pain, presence of blood during toileting, or any additional new symptoms to suggest complication related to the object. In addition, routine review of complete blood counts was maintained to monitor for surreptitious bleeding. An ECT index series was initiated via right unilateral stimulation using the Thymatron System IV (Somatics, LLC) and a combination of propofol anesthetic with succinylcholine paralytic. Over the course of treatment, the patient was transitioned to bitemporal stimulation and the anesthetic was transitioned to methohexital. Overall improvements

in symptomatology were noted with marked recovery of mood, energy, and diminished anxiety, and she was subsequently transitioned to maintenance treatments. At the time of publication she had received over 70 treatments with no gastrointestinal, abdominal, or pelvic symptoms suggesting complication.

Discussion

To our knowledge, this is the first reported case of ECT performed in the presence of an indwelling foreign object in the intra-abdominal or intra-pelvic area. Literature examination is notable for a 2014 systematic review of cases of Cranial Metallic Object (cMO) in twenty-four patients, and it was determined that ECT was safe to administer, only requiring modified electrode placement in 10 cases [2].

Literature review of possible intrabdominal surgical contraindication to ECT is notable for one case of aortic aneurysm in an 89-year-old woman with history of melancholic depression successfully treated with ECT [3]. A retrospective review of medical records of patients with unrepaired abdominal aortic aneurysm successfully receiving ECT for severe depressive symptoms outlined 8 cases (5 men, 3 women) between the ages of 67 and 83. All treatments were completed between January 1, 1995, and June 30, 2007, with no reported complication or rupture [4].

Contemporary modified ECT with muscle paralytics is associated with lower overall increases in intra-abdominal pressure relative to historic unmodified treatments. Even in this setting, however, transient abdominal pressure changes are observed for a variety of reasons, including but not limited to residual muscle activity during convulsion, possible peri-procedural airway obstruction, and body position during treatment. While these increases are variable and poorly characterized in the literature, these likely represent transient changes which are much less significant than intra-abdominal pressure variances occurring during routine daily activities such as coughing, sneezing, and straining.

In support of the anticipated safety and absence of surgical contraindication of ECT in the reported case, additional literature review was conducted. While available literature remains limited, a 1987 experimental animal model study by Hahn, et al, of eleven dogs under anesthesia was reviewed. This protocol was intended to better characterize the effects of abdominal pressure increases, and investigated the effect of forced expiration in the presence of a specialty horizontal sutures in the upper abdominal wall designed to measure pressure. During forced respiration, pressure across these sutures increased only with highest pressures of forced respiration. Lower pressure forced respirations showed no significant difference compared to normal respirations, and the expiratory load depended primarily on body position rather than the forced pressure [5]. The findings of this study may suggest that in settings of relatively low intra-abdominal pressure changes, such as those observed during ECT using muscle paralytics, risks are relatively similar to those observed during normal respiration.

Ultimately clinical consideration in concert with limited literature suggested overall safety for ECT, even in the setting of an intra-abdominal foreign object designed to pierce soft tissue. Limitations to extrapolate our current findings include both the site (e.g. if the foreign object was positioned closer to vital intrapelvic organs such as arterial branches or the urinary bladder), the length or diameter of the intra-abdominal foreign object, or inherent potential for tissue damaged based on object characteristics (e.g. a scalpel blade or suture needle versus surgical gauze or blunt instrument). Furthermore, the extrapolation of data from Hahn's animal study to the case at hand holds significant limitations, not the least of which are the challenges in equating abdominal wall pressure changes during respiration to intra-abdominal pressure changes during positional changes or abdominal muscular contractions. However, this report shows that it may be safe to complete ECT sessions in presence of intra-abdominal foreign objects, particularly when guidelines mandating use of muscle paralytics are followed and an individualized risk assessment is based upon the object's specific location. More case reports and further studies may be needed for similar presentations, and further human studies should be considered to address the effect of increased intra-abdominal pressure during ECT as it relates to post-surgical patients.

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Consent: The patient provided consent for publication

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