

"It's a small, small world." Although it has been many years since I first heard that Disney staple, never before has it been as true as in the current era of rapid transportation and instant communication. On a lecture tour last year to India with Max Fink, M.D., I became aware of an Indian Supreme Court case involving electroconvulsive therapy (ECT). Unequaled in efficacy for the treatment of severe and psychotic depression, catatonia, and other psychotic disorders, ECT remains mired in controversy throughout the world. The following commentary by Dr. Chittaranjan Andrade and coauthors is thoughtful and illuminating. East meets West. —A.J.G.

Commentary

The Dilemma of Unmodified Electroconvulsive Therapy

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Electroconvulsive therapy (ECT) was introduced in 1938, in an era in which antidepressant and antipsychotic drugs were unknown.^{1,2} Today, over 6 decades later, despite the availability of a large number of psychopharmacologic agents for the treatment of depression and psychosis, ECT remains an important method of treatment in psychiatry. This is because ECT can be life-saving in catatonic, suicidal, or otherwise severely disturbed patients,² because it is of exceptional benefit to patients with psychotic depression,³ and because it can be therapeutic⁴⁻⁶ as well as prophylactic⁷ in patients who do not respond to antidepressant or antipsychotic drugs.

While depression is the primary indication for ECT,^{1,2} the treatment may also be useful for patients with severe or drug-refractory schizophrenia^{5,6} or mania.⁸ ECT has also been (uncommonly) used with varying degrees of success for experimental indications such as delirium, Parkinson's disease, obsessive-compulsive disorder, tardive dyskinesia, neuroleptic malignant syndrome, refractory epilepsy, and other disorders.^{1,9}

ECT results in a central, electroencephalographically recordable seizure and a peripheral, visually apparent convulsion. There is an enormous body of literature on the neurobiological effects of ECT. While we do not know for certain which effects mediate the therapeutic actions of the treatment, we do know that ECT remains effective even if the peripheral convulsion is abolished,^{10,11} but not if the central seizure is inhibited.¹² Therefore, efforts to attenuate the peripheral convulsion were made as early as 1940¹³; succinylcholine-modified ECT, however, was not described until 1952.¹⁴

DISADVANTAGES OF UNMODIFIED ECT

Why would clinicians want to modify ECT by abolishing the peripheral convulsion? For one, the convulsion looks barbaric and encourages the myth that ECT is a barbaric treatment.¹⁵ More importantly, Western research conducted during the 1940s and 1950s suggested that the convulsion is associated with an approximately 20% to 40% risk of multiple (mean = 2.2–2.5) subclinical vertebral body compression fractures, most commonly affecting the middle thoracic vertebrae. The risk was observed to be greater in males, in young subjects, and in old subjects; apparently, greater muscularity led to more violent convulsions, and greater osteoporosis was associated with more fragile bones.¹⁶⁻¹⁸ Similar results were obtained from other research teams; for example, data from the former Soviet Union¹⁹ suggested that the risk of vertebral fractures with unmodified ECT could be even higher. Such fractures did not appear to be associated with pain or other symptoms in 30.6%¹⁸ to 89.3%¹⁷ of patients, did not require orthopedic intervention,¹⁸ and did not result in orthopedic or neurologic sequelae in a pentylenetetrazol-treated cohort assessed at a 10-year follow-up²⁰; nevertheless, morbidity avoided is safety promoted. Toward this goal, it was observed that, in a subsample of patients who

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had received a muscle relaxant prior to ECT, the incidence of spinal fractures was dramatically reduced.^{17,18}

In this context, it is worth noting that unmodified ECT is uncommonly associated with other risks, such as dislocation of various joints, muscle fiber or ligament tears, cardiac arrhythmias, aspiration of secretions into the respiratory tract, hemorrhage at various sites, and anxiety.²¹ Dewald et al.¹⁸ reported that nonspinal musculoskeletal events, such as mandibular dislocation and humeral fracture or dislocation, occurred in 3.5% of patients. The precise prevalences of the other complications of unmodified ECT are unknown.

THE TRANSITION OF UNMODIFIED TO MODIFIED ECT

There does not appear to be a clear record of the global transition of ECT from unmodified to modified forms. However, the first guidelines from the Royal College of Psychiatrists,²² the first guidelines from the American Psychiatric Association,²³ the first important textbook on ECT,² and the first consensus guidelines on ECT²⁴ recommended the modified procedure and did not consider unmodified ECT as an option under any circumstances.

Unmodified ECT Continues to Be Administered

The transition from unmodified to modified ECT is not complete. During the last 2 decades or so, there have been reports of unmodified ECT from the United Kingdom,²⁵ China,²⁶ Nigeria,²⁷⁻²⁹ India,³⁰⁻³³ Japan,³⁴ Russia,³⁵ and Thailand.³⁶ It is very likely that unmodified ECT is still practiced in many developing countries, especially those in which the medical infrastructure is weak. In India, most academic centers, major psychiatric facilities, and psychiatric facilities in large urban conglomerations in the country presently practice modified ECT; however, some smaller centers and some centers in small urban areas continue to offer unmodified ECT. There were 263 respondents to our 1991 postal survey of the then 915 medical members of the Indian Psychiatric Society.³⁷ Of the 215 respondents who practiced ECT, only 44.2% always administered modified treatments, while 24.2% invariably administered unmodified treatments. While more recent data are unavailable, experience suggests that the transition to modified ECT continues but remains incomplete in India.

Why Unmodified ECT Is Still Practiced

Why is unmodified ECT still administered in India? Patients who are conscious feel suffocated and panic when they receive succinylcholine because the muscle relaxant paralyzes all voluntary muscles, including the muscles of respiration. It is therefore necessary to administer anesthesia before ECT. However, the administration of anesthesia introduces its own risks, making the pres-

ence of an anesthesiologist necessary. Unfortunately, it is difficult to call in anesthesiologists in many parts of India because these specialists are few and are monopolized by surgeons. Furthermore, involving anesthesiologists pushes the cost of ECT beyond the reach of a large segment of the population. Some Indian psychiatrists therefore administer unmodified ECT.

Is such practice of unmodified ECT ethical? This question must be answered through a risk-benefit analysis. On the one hand, modified ECT reduces musculoskeletal risks, pre-ECT anxiety, and the other but uncommon adverse effects of unmodified ECT. On the other hand, modified ECT could be beyond the means (or the reach) of a large segment of Indian society, and introduces the risks associated with anesthesia.

NEW DATA ON UNMODIFIED ECT

Recent studies have provided fresh insights. We³² studied the charts of 1835 patients who had received a total of 13,597 unmodified ECT treatments between 1980 and 1990, both years inclusive; of these, just 332 treatments had been modified. Twelve patients (0.7%) experienced fractures with unmodified ECT. These patients experienced pain that subsided with analgesic medication within 1 week to 3 weeks. No patient experienced any other musculoskeletal, vascular, or other complication traditionally associated²¹ with unmodified ECT. Ten of the patients with fractures were followed-up for 3 months to 8 years; none had pain, disability, or any other musculoskeletal sequelae. We noted that unmodified ECT had been uneventfully administered to patients with ischemic heart disease, valvular heart disorders, cardiac conduction disorders, pulmonary disease, organic stupor, pregnancy, and other states in which the administration of anesthesia could have posed risks.

In this study,³² we found that anxiety preceding unmodified ECT occurred in 7.5% of patients. Although modified and unmodified ECT have not been directly compared in this regard, our experiences and those of others (A. Nelson, Moscow, written communication, 2003) suggest that more patients develop fear during a course of unmodified ECT than with modified treatments. Perhaps, patients recall more of the unmodified procedure, and the rare occasions of subconvulsive stimulation with the unmodified procedure, if recalled by the patient, could also be a source of distress.

As only 50 patients had been radiologically examined in this study,³² an opinion was expressed that the very low incidence of fractures with unmodified treatments may have represented the tip of the iceberg.³⁸ We therefore prospectively investigated the subject in a center in which unmodified ECT was routinely practiced because of the unavailability of anesthesiological support.³³ We recruited 50 consecutive patients treated with unmodified ECT and

obtained anteroposterior and lateral radiological views of the thoracolumbar spine before and after a course of 6 unmodified ECT treatments, and after every complaint of severe backache. We found that 1 patient (2%) experienced an avulsion at pars-interarticularis at the fifth lumbar (L5) vertebra with subluxation of the left L4-L5 facet joint. No other patient had any clinical or radiological abnormality resulting from the unmodified treatments.

These 2 Indian studies^{32,33} suggest that musculoskeletal risks with unmodified ECT may be strikingly less than those reported in the Western literature.¹⁶⁻¹⁸ Why this is so is a moot point. Perhaps, Indian subjects are slighter in build and are therefore less vulnerable to violent convulsions and adverse musculoskeletal consequences. Perhaps, the stimulus intensities used in these Indian studies were lower and elicited milder convulsions; this speculation is supported by our observation that the incidence of spinal fractures in a rodent model of unmodified ECT is directly proportionate to the magnitude of the stimulus applied.³⁹ And, perhaps, the ECT teams in these 2 studies were more skilled at the application of physical restraints to attenuate the violence of the convulsion. This speculation is supported by experiences with sheet restraints at Hillside Hospital, New York, during the 1950s; the use of such restraints substantially lowered the fracture rate with unmodified ECT (M. Fink, New York, written communication, 2003).

In a separate context, Ohaeri et al.²⁸ obtained serial measurements of 8 acute phase proteins in order to detect possible occult or subclinical internal tissue damage in 8 patients who had been prescribed unmodified ECT. The measurements were made before, during (twice), and after the ECT course. Ohaeri et al.²⁸ found that levels of C-reactive protein, alpha-2-macroglobulin, ceruloplasmin, factor B, C-4 protein, C-3 protein, transferrin, and alpha-1-antitrypsin were not raised by ECT. They concluded that unmodified ECT does not result in occult internal tissue damage.

THEORETICAL AND PRACTICAL MATTERS

Ethical Issues

Returning to the question about the ethics of unmodified ECT: the few practitioners in India who continue to administer unmodified ECT accept that modified ECT is the ideal; however, they argue that there can be situations in which the expected gains with ECT could outweigh the risks with unmodified treatments. In these situations, unmodified ECT may be preferable to no ECT. When taking into consideration the ground realities in which these practitioners work, their arguments are reasoned. If a patient who is stuporous or suicidal requires ECT as an emergency intervention, is it more ethical to leave the patient's life in jeopardy because an anesthesi-

ologist is not immediately available to supervise ECT? If a patient is psychotically depressed in a town in which the anesthesiologists are burdened with surgical caseloads, is it more ethical to allow the patient to suffer for weeks to months, receiving a drug regimen that is less effective, because the anesthesiologists do not have time for minor procedures such as ECT? If a patient who lives below the poverty line suffers from an illness that is drug-resistant, would it be more ethical to allow him to continue to suffer because he cannot afford the extra expense that the use of anesthesia necessitates? Perhaps not!

Similar views have been expressed in Western literature: unmodified ECT may be acceptable when an anesthesiologist cannot be called in at a time of urgency, or when patients refuse injections, have thrombosed veins, or cannot receive anesthesia or a muscle relaxant because of a medical contraindication.^{40,41}

The Issue of Efficacy

Certain psychiatrists who administer unmodified ECT add that, in their experience, unmodified treatments are more effective than modified treatments. These are shaky grounds to support an argument for unmodified ECT because such views lack empirical support; yet, they evoke an interesting question: does the use of barbiturate anesthesia result in an anticonvulsant action⁴² that attenuates the therapeutic effect of the ECT stimulus or the therapeutic characteristics of the central seizure? Kendell⁴³ reviewed the literature comparing modified and unmodified ECT and concluded that the literature suggests that the 2 forms of treatment are equally effective; a (poorly conducted) study, however, suggested an advantage for unmodified treatments as well as for treatments that were delivered with a muscle relaxant but without anesthesia.⁴⁴ One therefore wonders whether better designed studies, conducted using present day methods, would yield similar results. These arguments, of course, may not stand up when anesthetic agents, such as etomidate, ketamine, or alfentanil, that have less anticonvulsant activity are used.⁴²

Benzodiazepine-Modified ECT?

Some psychiatrists who administer unmodified ECT do so after first injecting a benzodiazepine intravenously³⁷; this is safer than administering anesthesia, and it ensures that unmodified ECT is not administered to a conscious patient. The benzodiazepine may also have a small muscle relaxant effect. The advantages of such benzodiazepine premedication are questionable. True, the patient is unaware of the application of the electrodes and of the limb restraints and will not experience the disconcerting flash of light that some patients report when the optic pathways are stimulated before loss of consciousness.⁴⁵ However, the use of a benzodiazepine as premedication could raise the ECT seizure threshold,⁴⁶ make the admin-

istered stimulus less suprathreshold, and otherwise interfere with the quality of the ECT seizure; this could impact adversely on the efficacy of the administered treatment, especially when the electrode placement is unilateral.⁴⁷ A mitigating argument is that, as we have demonstrated at our center (C.A., S. Sudha, N. Nandakumar, et al.; unpublished data, 2003), barbiturate anesthesia itself markedly raises the seizure threshold; therefore, the benzodiazepine may not necessarily compromise the efficacy of ECT any more than barbiturate anesthesia might. In our 1991 survey, 11.6% of respondents indicated that they used intravenous diazepam as ECT premedication; however, virtually no clinician administered unilateral treatments.³⁷

LEGAL ISSUES

Cannot psychiatrists themselves administer the anesthesia and the muscle relaxant?⁴⁸ Until about a decade and a half ago, at least in many centers in India, this was indeed usual practice. Then, in 1986, the consumer movement in the country became active as a result of an Act of Parliament. Practitioners subsequently became apprehensive that, in the event of an anesthesia-related mishap, they would be penalized by the legal system for not having recruited a specialist for what might validly be considered a specialist procedure. Psychiatrists in India, now, seldom administer anesthesia themselves. In contrast, in Russia, vigorous attempts are being made to train and privilege psychiatrists to administer anesthesia for modified ECT.^{35,49}

Civil Rights Activism

Civil rights activists have now thrown their hats into the ring. During 1998, a public interest writ petition was filed in the High Court of Bombay at Panaji in Goa, India. The petition stated that the Institute of Psychiatry and Mental Health at Goa had for several years been administering only unmodified ECT. The petition requested the court to direct the Institute to administer only modified ECT. The final order of the court was passed on October 14, 1998. It accepted the statement of the advocate general representing the respondents. This statement concluded that the Hospital Authority would "as far as possible give modified ECT to patients, and would also decide whether the unmodified form of ECT should be continued or not depending upon the medical advice."⁵⁰

In October 2001, a nongovernmental organization for the rights of the mentally ill filed a writ petition, this time in the Supreme Court of India. The Government of India, important subsidiaries thereof, and the governments of the states of the country were named as the respondents. The petition addressed a large number of issues related to the care and treatment of the mentally ill and, *inter alia*, sought a blanket prohibition of the practice of unmodified ECT. The Delhi Psychiatric Society, the Indian Association of

Private Psychiatrists, and the Indian Psychiatric Society sought to be impleaded in the case. These professional organizations, citing much the same reasons as those described earlier, accepted that the practice of modified ECT should be the general rule, but considered that, at times, unmodified ECT is a necessary evil, and to deny its practice would take away a potent option of treatment for the needy patient when all other options had been closed. The Court has held several hearings to date, but the issue of unmodified ECT has yet to be taken up, and the likely date of final judgment in the overburdened Indian legal system remains distant and uncertain.

The civil rights activists who wish to outlaw the practice of unmodified ECT may be shutting the door for the effective treatment of a number of patients who do not have access to or cannot afford modified treatments. Readers who find this hard to believe are reminded that India, while far better developed than most countries in the continents of Africa and Asia, nevertheless has large economic and geographic subpopulations to which even the barest minimum standards of health care cannot be assured. Under these circumstances, a suboptimal form of ECT could be better than no treatment, especially when recent data suggest that unmodified ECT is less suboptimal than earlier believed.⁵¹ Regrettably, the Indian Psychiatric Society does not have an official position on unmodified ECT, nor has it issued treatment guidelines in this regard.

PROFESSIONAL VIEWS

Professional views on unmodified ECT range from supportive, albeit in restricted contexts,^{40,41,52-55} to condemnatory.^{25,35,56-59} The Bombay Psychiatric Society guideline on ECT⁶⁰ describes the procedures for both modified and unmodified ECT, acknowledges that unmodified ECT continues to be practiced in several countries, but offers no opinion about the desirability or undesirability of unmodified ECT.

Our own stance is deliberately conservative. We believe that there are several categories of patients for whom modified ECT is unquestionably safer; for example, these include muscular patients, the elderly, those with skeletal disorders, and those with hypertension. We also believe that modified ECT is, in general, a safer and more aesthetic procedure than unmodified ECT, and one that is less likely to rouse indignant emotions in the public breast. Finally, we believe that there are extenuating circumstances in which unmodified ECT may be better than no ECT. While these extenuating circumstances have been described earlier in this article, we consider that the decision to administer unmodified ECT must be made in exceptional circumstances and on a case by case basis, and never as a routine practice unless the safety of the procedure is clearly established through empirical research.

WHERE DO WE GO FROM HERE?

In the context of the recent literature^{32,33} and the continued use of unmodified ECT in India and elsewhere in the world,²⁵⁻³⁶ a disquieting and likely controversial conclusion is that it may be necessary to again objectively compare the benefits and risks of modified and unmodified ECT, as well as patients' experiences with and subsequent attitudes toward these 2 forms of treatment. In an era of evidence-based medicine, only when the results of such research become available can truly informed, scientifically, ethically, and in the immediate context, judicially valid opinions be expressed.⁶¹

Drug names: alfantanil (Alfenta and other), diazepam (Valium and others), etomidate (Amidate and other), ketamine (Ketalar and others), succinylcholine (Quelicin, Anectine, and other).

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