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CORRESPONDENCE

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To the Editor:

In analysing the results of a survey of electroconvulsive therapy (ECT) practice in Metropolitan New York community hospitals in 1997, Prudic *et al*. (2001) focus their attention on the psychological side-effects of ECT, and in so doing, ignore the reasons why ECT is given. ECT is the treatment for severe psychiatric illnesses unresponsive to medications, with the goal of remission of illness. The authors analyse the responses to their enquiry with an idiosyncratic cognition deficit index, a measure that over-values the transient memory effects of ECT.

Practitioners who reported their use of brief pulse stimulation, unilateral electrode placement, seizure threshold (ST) titration, formula-based dosing, and single treatments received low (favourable) scores on the index; those who used bilateral ECT (75% facilities, 90% of the patients), age-based dosing without ST titration, multiple treatments, and sinusoidal currents received high (unfavourable) scores. Sixteen of 59 facilities (27%) received unfavourable scores; seven facilities (12%) received favourable scores, and 33 facilities received modal scores.

The reporters opine that ECT practice in one-quarter the facilities is inconsistent with a standard that they variously cite as the reports of the American Psychiatric Association Task Force of 1990, of 2000, and the Royal College of Psychiatrics of 1995. Since the survey was done in 1997 in the US, only the APA 1990 report could apply. But the 1990 APA report did not establish unilateral electrode placement, or ST titration, or formula-based dosing as 'standards'. It specifically eschewed a recommended practice, recognizing that patients vary in their needs and the range of useful ECT techniques to be great. The APA report described clinical practices with supporting essays on the conditions under which one technique of ECT or another was being used. It emphasized the merits of brief pulse currents and noted the disadvantages of multiple-monitored ECT, but did not argue that there was no place for alternating current devices or for multiple seizures.

For two decades Sackeim and his co-workers have studied the impact on cognition of technical aspects of ECT. They discussed ST titration and dosing for right unilateral (RUL) ECT in 1987, but their major report appeared in 1993 (Sackeim *et al*. 1987, 1993). In 1993, they cited RUL ECT with ST titration and dosing at 2·5 times the measured ST to be clinically effective. They used this dosing schedule in a multi-site study of the relief of unipolar depressed patients. On improvement, the patients' treatments were continued with one of three medications: placebo, nortriptyline alone, or nortriptyline and lithium combination – the last two treatments monitored by serum levels.

Sadly, the clinical results were disappointing (Sackeim *et al*. 2001). Of 290 depressed patients who completed the index course of ECT, only 159 met remitter criteria, a success rate of 55%. In all 90·3% of the patients were treated with RUL ECT. The 6-month relapse rate with continuation medication was 84% with placebo continuation, 60% for nortriptyline alone and 39% for the combination medications. Most relapses occurred within 6 weeks. The patients were inadequately treated in their index ECT courses, relieving their depressed mood only transiently, providing too big a hurdle for the continuation treatments to sustain a benefit. Such poor results caution treating clinicians that the RUL techniques are impractical.

Other dosing studies also show poor remission rates. Sackeim *et al*. (2000) divided 80 depressed patients into four cells of 20 patients each, treating cells with RUL ECT at 1·5, 2·5 and 6·0 times titrated ST. Only those treated at 6·0 times ST approximated the improvement rate of another cell treated with BT ECT at 2·5 times ST. They could not distinguish the results in the two samples statistically, deducing an equivalence in efficacy for RUL ECT and BT ECT. But the sample sizes were much too small to

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allow this conclusion and their equivalence remains unproven (Fink *et al*. 2001).

McCall *et al*. (2000) randomly assigned depressed patients to either titrated RUL ECT at 2·25 times seizure threshold or to a fixed energy of 403 mC. The measured ST resulted in dosing from 2·25 to 12·6 times ST. Improvement on depression scales and scores on memory tests were measured. As energies above the titrated ST rose, so did the improvement rates, and so did the errors on the memory tests. The effects on memory increased exponentially, suggesting that the presumed advantage of RUL ECT over BT ECT is lost with the higher energies.

Prudic, Olfson and Sackeim would have us believe that their method of ECT practice is an accepted standard of practice. Not so. Richard Abrams, the author of the standard textbook *Electroconvulsive Therapy* (Abrams, 1997), argues against titration measurement of seizure thresholds and dosing for RUL ECT (Abrams, 2002). Charles Kellner, the Editor of the *Journal of Electroconvulsive Therapy*, argued for a modal treatment based on bifrontal electrode placement (Kellner, 2001). Testing of bifrontal placement is ongoing with reports of efficacy equal to that of BT ECT and lesser effects on cognition (Bailine *et al*. 2000; Delva *et al*. 2000). Neither does the new edition of the American Psychiatric Association establish the criteria used in the cognition deficit index as recommended practice (APA, 2000). Conditions in which BT ECT and multiple treatments are appropriate are described.

The studies of RUL ECT and ST titration and dosing are limited to patients with major depression. But, ECT is increasingly applied in other populations, for whom BT ECT is the accepted treatment. Almost all the clinical studies in patients with manic depressive illness, schizophrenia, catatonia, neuroleptic malignant syndrome, and manic delirium report the use of BT ECT (Fink, 1999). Practitioners, other than those working under research protocols, would be foolhardy to use RUL ECT for these conditions.

Prudic, Olfson and Sackeim recommend a poorly effective form of ECT as a standard treatment. The low antidepressant activity of RUL ECT in the report by Sackeim *et al*. (2001), a study by the same group of authors, is in striking contrast to the efficacy of BT ECT cited in our textbooks and in the recent CORE studies.[1] From 80% to 95% of patients with major depression remit their illness within six BT ECT (O'Conner *et al*. 2001, Petrides *et al*. 2001).

The authors are to be commended for doggedly testing memory function in RUL ECT, seeking to improve its clinical relevance. Unfortunately, they have failed to demonstrate its clinical merits, and their formulation cannot be accepted as a standard form of ECT.

Whether ECT practice in the New York metropolitan area was, or was not, optimal in 1997 cannot be judged by this report.

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[1] CORE is the consortium of ECT research centres of the Medical University of South Carolina (C. Kellner, Principal Investigator), Long Island Jewish Hillside Hospital (G. Petrides, PI), Mayo Clinic (T. Rummans, PI) and University of Texas at Dallas (M. Husain, PI). Their studies are supported by grants from the National Institute of Mental Health.

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To the Editor:

The report of Prudic and colleagues (2001, **31**, pp. 929–934) on the results of a mailed questionnaire survey of ECT practices at a sample of New York City Metropolitan area hospitals is in the best tradition of professional self-evaluation, as exemplified by the influential survey conducted by Pippard & Ellam (1981) in the United Kingdom.

The present report is marred, however, by the intrusion of the authors' own beliefs concerning the cognitive risks of ECT. The ECT practice at each hospital is assigned a 'cognitive deficit' score based on weights assigned to four variables: the stimulus wave-form used (sine-wave or brief pulse), treatment electrode placement (right unilateral or bilateral), the number of seizures administered per session (single or multiple), and the stimulus dosing strategy employed (fixed-dose, formula-based, or titration-based).

I have no quarrel with the authors' implied preference for the cognitive advantages to the patient of the brief pulse stimulus, right unilateral placement, and single seizures per session, which are all well-established in the literature (Abrams, 1997). However, I take strong exception to the cognitive weighting factors they assign to stimulus dosing method (titration = 0, formula-based = 1, fixed-dose = 2) because of the implication that these weights not only represent a consensus of the literature and expert opinion (which the authors also invoke), but accurately reflect the clinical importance to the patient of the cognitive risks attributable to dosing method, and do so independently of stimulus wave-form and treatment electrode placement.

In the practice of medicine, we are first concerned with therapeutic efficacy, and then with side-effects, but Prudic and colleagues have got this reversed. Although the cognitive advantages of titration-based dosing have not been proven, the therapeutic advantages of fixed-dose and formula-based dosing have (Abrams, 2002*a*). For brief-pulse right unilateral ECT, a high fixed dose exerts far more powerful antidepressant effects than does a titrated dose (McCall *et al*. 2000). Moreover, the best antidepressant result reported in the literature for brief-pulse right unilateral ECT (89% improvement after six treatments) was achieved with formula (age)-based dosing, and without any detectable effects on verbal memory (Pettinati *et al*. 1990; Pettinati, 1994).

The putative cognitive advantage of titration-based dosing rests on the claim that it is the extent of dosage above the seizure threshold that determines cognitive side-effects (Sackeim *et al*. 2000). Yet, this study was unable to detect a four-fold titrated dosage difference relative to seizure threshold among brief-pulse, right unilateral, low-, moderate- and high-dose stimulation groups on several important anterograde memory tasks – including delayed word and picture recall, delayed free recall, and reacquisition on a selective reminding test – that were sufficiently sensitive to detect electrode placement effects.

Finally, there is no published research demonstrating that any dosage levels so far administered during brief pulse unilateral ECT cause memory disturbances that are still detectable

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even 2 weeks after a course of treatment (e.g. Sackeim *et al*. 1993). And, the single study showing persistent (at 6 months) amnesic effects of bilateral brief pulse ECT (Weiner *et al*. 1986) appeared only in conference proceedings, was never published in a peer-reviewed journal, omits critical methodological details such as stimulus parameters and dosages (Abrams, 2002*b*), and was not confirmed on careful replication (Calev *et al*. 1991).

From the patient's perspective, which often tends to be ignored in these discussions, it is striking that 71% of those who received the most intense form of treatment – high-dose bilateral ECT – nevertheless reported their subjective impression that their memory functioned better after ECT than at any previous point in their life (Sackeim *et al*. 2000).

Prudic and colleagues have introduced a value-judgement on the cognitive risks of stimulus dosing methods that is supported neither by the literature nor expert opinion; they have placed their own preferred method ahead of all others and passed judgement accordingly. This will not advance the practice of ECT in New York State or anywhere else.

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The Authors reply:

We thank Dr Abrams and Dr Fink for their comments on our article, 'Electroconvulsive therapy practices in the community' (Prudic *et al*. 2001). The major point of our paper was that there was considerable heterogeneity in the nature of ECT practices employed in hospitals in the New York City metropolitan region. Neither Dr Abrams nor Dr Fink disputes this, as the evidence was straight forward.

Both Dr Abrams and Dr Fink objected to our cognitive deficit index, which weighted electrode placement (bilateral *v*. right unilateral ECT), stimulus waveform (sine-wave *v*. brief pulse), number of seizures elicited in a session (multiple *v*. one), and stimulus dosing strategy (fixed *v*. formula-based *v*. titrated). Dr Abrams agreed with us that use of bilateral ECT, sine-wave stimulation, and multiple seizures in a session would likely enhance short- and/or long-term cognitive deficits. He objected to the fact that stimulus dose titration was weighted as least likely to produce cognitive deficits.

The weighting of factors in the cognitive index score was not arbitrary. The members of the American Psychiatric Association (APA) Task Force on ECT were surveyed for this publication, and completed a questionnaire addressing a host of patient and treatment technique factors that they felt would either enhance efficacy and/or magnify cognitive side effects. The level of agreement was high with κ values

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above 0·90. In terms of stimulus dosing, there was unanimity that titrating electrical dosage relative to the patient's seizure threshold was optimal in both guaranteeing efficacy and limiting cognitive side effects. Indeed, the 2001 APA report states:

> 'Because of limited success in predicting the wide individual differences in seizure threshold on the basis of patient or treatment factors, empirical titration provides the most precise method for quantifying seizure threshold' (page 159).

This report goes on to note the limitations of formula- and fixed-dose methods:

> Error in the formula-based estimate may result in administration of either barely suprathreshold stimulation, which may be ineffective with right unilateral ECT, or markedly suprathreshold threshold stimulation, aggravating short-term cognitive side effects with either right unilateral or bilateral ECT (Enns & Karvelas, 1995; Shapira *et al.* 1996). In addition, when the value obtained from a formula grossly underestimates seizure threshold, a subconvulsive stimulus will be administered and the practitioner will engage in a form of empirical titration. … The problems in the use of formula-based dosing apply even more so to the use of a high fixed dose. Given the marked individual differences in seizure threshold, with a high fixed dose some patients may be treated with an electrical intensity that exceeds seizure threshold by 10- or 20-fold. Such a dosing strategy is likely to aggravate cognitive side-effects without gains in efficacy relative to more moderate dosing. Alternatively, in rare patients with exceptionally high initial seizure threshold, use of a fixed dosing strategy can result in barely suprathreshold stimulation. Use of a high fixed dosing strategy should be reserved only for patients with sufficiently serious concomitant medical conditions that avoidance of subconvulsive stimulation is a priority (pp. 160–161).

Both Dr Fink and Dr Abrams argue from the assumption that fixed dose or formula-based methods had a better guarantee of efficacy, the primary aim in using ECT, over and above the degree of cognitive deficit. We are able to provide preliminary observations to evaluate this assertion using a prospective sample of patients treated in the same NY Metropolitan region surveyed for our paper (unpublished data). These patients were treated in community settings according to the treatment practices chosen by their ECT providers, and not driven by a research protocol. Although these patients had major depression, many of them would not meet criteria for inclusion in the research samples cited in the letters, largely due to co-morbidities, and, hence, would more closely resemble the patients about whom Dr Fink expressed concern. In this preliminary sample of approximately 400 patients treated at eight facilities, the efficacy of ECT was not influenced by variation in the use of electrical waveform (sine wave *v.* brief pulse), electrode placement, or stimulus dosing procedure. In fact, the efficacy of titrated, right unilateral, brief pulse ECT was equal to that of fixed dose, bilateral, sine wave ECT, as was the efficacy of any other combination of treatment factors. Across the sample, the rate of response, defined as a drop in Hamilton Rating Scale for Depression (24-item) scores of at least 60% from baseline and a final score less than 10 was only about 45%. This finding highlights a difference repeatedly seen in medicine between efficacy results in controlled research settings and effectiveness in community settings.

The lack of predictive value of treatment technique factors for clinical outcome in community settings did not extend to the area of long term adverse cognitive effects. The sample showed a clear difference in the extent of amnesia for personal memories 6 months after ECT, favouring unilateral over bilateral electrode placement. This effect held despite the fact that the instrument used to assess personal memories, the Autobiographical Memory Interview – Short Form, is a much abbreviated version of a standard instrument which assesses this form of amnesia following ECT (Sackeim *et al.* 1993, 2000). This finding supports similar indications raised earlier in research samples (Weiner *et al.* 1986; Sackeim *et al.* 2000).

In conclusion, we can say that the use of ECT in community settings is characterized not only by a wide variation of practices, but by some surprising and important outcomes as well.

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