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ORIGINAL ARTICLE

Use of electroconvulsive therapy (ECT) in postpartum psychosis—a naturalistic prospective study

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Abstract Postpartum psychosis (PPP) is a severe psychiatric condition requiring rapid restoration of health in view of significant risks to both mother and the infant. Electroconvulsive therapy (ECT) is often used for treatment of severe PPP. The aims of the study were to describe the indications for ECT among women admitted with PPP to a psychiatric hospital in India. It also aimed at assessing whether women with PPP who received ECT differed in their clinical history, diagnosis, severity of illness, psychopathology, drug dosage, and duration of hospital stay, compared to women who did not receive ECT. Infants of mothers who were breast-feeding their infants while receiving ECT were assessed for adverse effects. This was a naturalistic prospective study of 78 women admitted with PPP, 34 (43.6 %) of whom received ECT. Presence of catatonia, augmentation of medications, and suicidality were common indications for ECT. Catatonic symptoms were significantly higher among women who received ECT. There was no significant difference in duration of hospitalization or severity of psychopathology between women who did and did not receive ECT. Transient side effects to ECT were observed in few women, with no adverse effects noted in infants who were breast-fed. The current study supports the use of ECT as an effective and safe treatment for women with severe PPP.

Keywords Postpartum psychosis · ECT · Mother and infant

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Introduction

Postpartum psychosis (PPP) is a severe psychiatric condition which occurs in about 1–2/1,000 childbearing women within the first few weeks after delivery (Kendell et al. 1987). This condition is characterized by rapid onset of delusions, mood swings, confused thinking, and grossly disorganized behavior and can pose a grave risk to mother and infant (Sit et al. 2006). PPP is a psychiatric emergency requiring immediate and effective intervention to protect the health of the mother and the infant. Suicide and infant harm are both serious consequences of PPP (Brockington et al. 1981; Babu et al. 2008). Some women with PPP can present with catatonia and refusal to eat that makes the oral administration of medications more difficult (Gervasoni and Aubry 2008). This particular clinical condition calls for a rapid restoration of health in view of significant risks to both mother and the infant. Psychotropic medications which are used as the first-line management have some important drawbacks such as delayed onset of clinical response and secretion in breast milk (Burt et al. 2010). There is paucity of research into short-term and long-term risks associated with psychotropic exposure in breast-fed infants (Kohen 2005).

Electroconvulsive therapy (ECT) is an effective treatment modality which brings about rapid clinical improvement in conditions such as severe depression, severe mania, and schizophrenia (Weiner et al. 2001).

There are very few research studies that focus on indications, safety, and advantages of ECT in postpartum psychosis. A recent review suggest that the use of ECT as first-line treatment for PPP is a sensible choice given the concerns about medication exposure to the nursing infant (Focht and Kellner 2012).

It was observed in a chart review that ECT might be particularly important in women with severe forms of PPP

with a poor response to initial treatment with psychotropic medications (Forray and Ostroff 2007). A study from India reported that women with PPP received ECT more frequently compared to a control group of non-puerperal women with psychosis and that duration of hospital stay was not different among the groups. In this hospital-based prospective study, 60 (42 %) out of 144 women with PPP received ECT (Agrawal et al. 1997).

It is likely that PPP are often manifestations of mood disorders and mood disorders generally respond well to ECT (Jones and Craddock 2001; Yonkers et al. 2004; Weiner et al. 2001). ECT is also considered the treatment of choice in severe and refractory cases of PPP and postpartum depression (Weiner et al. 2001; Focht and Kellner 2012).

Given the recommended use of ECT in severe forms of PPP, there is a need to further our knowledge about indications, safety, and outcomes. Our naturalistic prospective study tries to address some of these issues. The aims of the study were to

1. Describe the indications for ECT in women admitted to an inpatient unit for treatment of PPP.
2. To study the differences between the group of women who received ECT and women who did not receive ECT based upon sociodemographic details, clinical details, duration of total hospital stay, and average drug dosage.
3. To assess for adverse effects of ECT on infant health among breast-feeding mothers

Materials and methods

All women who were consecutively admitted with postpartum psychosis were assessed using a semi-structured interview. Postpartum psychosis was defined in the study as any severe mental illness in a woman with the first onset of psychiatric disorder occurring within 6 months of childbirth. Illness onset within 6 months of delivery was chosen based on the earlier studies indicating this particular period to be at highest risk for childbirth-onset psychosis (Kendell et al. 1987). The study was conducted at the National Institute of Mental Health and Neuro Sciences (NIMHANS), Bangalore, India. During the study period of 18 months from March 2006 to September 2007, 78 women who met the above criteria were recruited and interviewed within the first week of admission. Informed consent for participation was obtained from the subjects and from primary caregivers. The study was approved by the Institutional Ethics Committee.

The sociodemographic details, past psychiatric history, comorbid personality, and substance use details were recorded by a semi-structured interview method. Clinical diagnosis was confirmed by two consultant psychiatrists based on the World Health Organization–International Classification of Diseases 10th edition (WHO 1992). Psychopathology was assessed within 7 days of admission and just prior to discharge by the first author using the Comprehensive Psychopathological Rating scale (CPRS) (Asberg et al. 1987). Total duration of the stay in the hospital was recorded. Infant issues that were examined in the study included breast-feeding and infant health. The assessments were done at weekly intervals. Catatonic symptoms were systematically assessed and rated using the Bush Francis Catatonia Scale (Bush et al. 1996).

Decision to treat a particular patient with ECT rested with the individual treating teams and ECT was chosen solely for clinical reasons. The authors did not have any role in the above-mentioned decision making.

Bitemporal modified ECT was administered using brief pulse stimulus (800 mA; 1 ms; 125 pulses per second). Titration method was used to assess the seizure threshold in the first ECT session and subsequent sessions were delivered using stimuli 1.5 times the threshold level. Thiopental (3–4 mg/kg) was used as an anesthetic agent and succinylcholine (0.5–0.75 mg/kg) was used as muscle relaxant. Information regarding indications for ECT as mentioned by the treating team, stimulus parameters, and seizure duration were extracted from the patient charts and ECT charts. History, physical examination, and laboratory evaluation were performed before treatment initiation to identify relative risks for ECT.

The ECT team administered treatment with a series of ECT on alternate days totaling to three times per week. Clinically adequate seizures were defined as motor seizure duration of at least 20 s or more. EEG monitoring was not done routinely, unless there was a need for higher dose of electrical stimulation. A thorough clinical and mental state examination was conducted as per the routine protocol at the NIMHANS, Bangalore, after the ECT procedure to check for side effects related to ECT.

Data analysis

Statistical analysis was performed using SPSS version 11 (SPSS, Chicago, IL, USA). Data were tabulated for frequency of use of ECT. Chi-square and independent sample *t* tests were used to analyze the differences between the ECT PPP and non-ECT PPP groups based on clinical profile, indications for ECT, differences in psychopathology, duration of total hospital admission, and average drug dosage.

Results

Table 1 summarizes the demographic and clinical details of the 78 women with PPP who received inpatient care. The

Table 1 Comparison of demographic and clinical data between ECT and non-ECT groups

Factor	Number	Received ECT	
		ECT (n=34)	NO ECT (n=44)
Age in years (mean/SD)	78	22.9 (3.6)	23.60 (3.2)
Education in years (mean/SD)	78	7.5 (4.5)	8.5 (3.8)
Residence			
Rural	63	26 (41 %)	37 (59 %)
Urban	15	8 (53 %)	7 (47 %)
Parity			
Primi	40	17 (43 %)	23 (57 %)
Multi	38	17 (45 %)	21 (55 %)
Family history of mental illness			
Present	20	11 (55 %)	9 (45 %)
Absent	58	23 (40 %)	35 (60 %)
Past history of mental illness			
Present	47	20 (43 %)	27 (57 %)
Absent	31	14 (45 %)	16 (55 %)
Onset of illness			
Acute	68	30 (44 %)	38 (66 %)
Insidious	10	4 (40 %)	6 (60 %)
Time of onset after delivery			
<4 weeks	42	20 (48 %)	22 (52 %)
>4 weeks	36	20 (56 %)	16 (44 %)
Breast-feeding			
Present	29	10 (34 %)	19 (76 %)
Absent	49	24 (49 %)	25 (51 %)
Suicidal behavior			
Present	29	12 (41 %)	17 (59 %)
Absent	49	22 (45 %)	25 (55 %)
Infanticidal behavior			
Present	24	11 (46 %)	13 (54 %)
Absent	54	23 (43 %)	31 (57 %)
Catatonia			
Present	13	10 (77 %)	03 (23 %)*
Absent	65	24 (37 %)	41 (63 %)
Diagnoses			
Mania	32	16 (50 %)	16 (50 %)
Depression	24	10 (42 %)	14 (58 %)
Non-affective Psychosis	22	8 (36 %)	14 (64 %)

*p<0.01

mean age of the women was 23 years, all women were married and average education of the women was around 8 years of schooling. The majority of the women were from a rural background (80 %) and 40 women (61 %) were primigravida. Twenty women (25 %) had a family history of mental illness and 31 women (39.7 %) had a past history of mental illness. Among the 78 women, 31 women (39.7 %) were admitted with their infants and 29 of the 31 women continued to breast-feed the infant in the hospital.

Forty-two women (53.8 %) had an onset of mental illness within 1 month of childbirth. Majority of the women had a diagnosis of mood disorder (n=56, 79.7 %), mania in 32, depression in 24, and non-affective psychosis in 22. Among the women who had non-affective psychosis, two women had paranoid schizophrenia, while the rest received a diagnosis of acute psychosis. Thirteen women (16.5 %) had catatonic symptoms and the mean score on Bush Francis Catatonia Rating Scale was 18.9 (SD=4.18).

Thirty-four (43.6 %) of 78 women with PPP received ECT. The median number of ECT was 6 (range=8) and the median electrical charge used was 120 mC (range=60). The mean duration of motor seizures was 52 s (SD=17.7). The most common clinical indication of ECT by the treating team was to augment the pharmacological treatment and the next was to treat catatonic symptoms (Table 2). Augmentation of medication was considered when the treating team required an early response to treatment and to increase the effectiveness of medication. Treatment resistance or no response to medications was considered when there was minimal response to medications after 2 weeks of hospitalization. Presence of suicidal and infanticidal behaviors was an indication for ECT in 11 (14 %) women. Side effects most commonly observed among the women who received ECT were anterograde amnesia in six (17.6 %) patients and prolonged seizures in four (11.7 %) patients. The prolonged seizure was managed with additional dose of thiopentone sodium. Among the 31 women admitted with their infants, 15 women received ECT. Ten of these 15 women continued to breast-feed their infants and none of the infants had any clinically observable adverse effects.

Table 2 Summary of clinical indicators and ECT parameters

Factor	n=34
ECT sessions (median/range)	6 (8)
Electrical charge (mC) (median/range)	120 (60)
Motor seizure duration in seconds (mean/SD)	52.2 (17.6)
Clinical indicators	
Augmentation	13
Catatonia	10
Suicidal/infanticidal behavior	7
First line	4
Failure of response to drug	6
Side effects	
Memory disturbance	6
Prolonged seizure	4

Comparison of women who received ECT, with those who did not on sociodemographic, clinical, and outcome details

There were no differences in the any of the sociodemographic factors among women who received ECT compared to those who did not. At admission, the total severity scores of psychopathology using CPRS were higher among the women who received ECT compared to those who did not receive it, though this did not reach statistical significance. Subgroup analysis of the symptoms revealed that catatonic symptoms were higher in the ECT group, which was statistically significant (Table 1). The duration of admission in the hospital was lower among women who received ECT (19 vs. 23 days) but was not statistically significant (Table 3). The two groups showed significant decrease in CPRS scores at discharge but the difference in scores between the two groups was not significant. There was no significant difference between the two groups in terms of the chlorpromazine equivalent doses of antipsychotic drugs and the use of mood stabilizers (Table 3).

Discussion

This naturalistic prospective study provides clinical details and indications for ECT among women with PPP and also compares diagnosis, psychopathology, treatment details, and outcomes between women who received and did not receive ECT. The current study indicates that majority of women with PPP had a diagnosis of mood disorder, nearly 50 % of such patients received ECT, and women receiving ECT had higher frequency of catatonic symptoms. Women with PPP who received ECT were not significantly different in terms of severity of psychopathology as measured by CPRS, clinical diagnosis, duration of hospital admission, and drug dosage. Suicidal ideation and infanticidal ideations were higher in women who did not receive ECT, though not significantly different. Both the groups had significantly improved at discharge, though there was no difference among the two groups. The naturalistic design of our study may account for the above non-significant findings. The two most commonly documented indications for ECT included presence of catatonia and augmentation of the effect of psychopharmacology. In the current study, ECT was indicated as an augmenting agent to psychotropic medication for an early or rapid response by the independent treating team. The prevalence of catatonia in our sample was high (16.5 %) and majority of them required ECT. Catatonia can present in women with postpartum psychosis (Gervasoni and Aubry 2008) and shows an early response to ECT (Thirthalli et al. 2009). Catatonia may often result in difficulties in maintaining nutrition and use of oral medication. Hence, ECT has an important role when early treatment response is needed and in the presence of catatonic symptoms (Protheroe 1961; Focht and Kellner 2012).

ECT use in our study had transient side effects in terms of cognitive symptoms and prolonged seizures. Majority of the mothers admitted with their infants continued to breast-feed and there was no report of adverse effects in the infants of mothers who received ECT. The current study adds to the existing safety profile of ECT in breast-feeding infants. The average dose of electrical charge was 120 mC, with most patients receiving five to six sessions of ECT indicating higher sensitivity of postpartum women to ECT (Sneddon and Kerry 1984; Reed et al. 1999).

The above findings support the idea of safety and effectiveness of ECT in women with PPP and for rapid restoration of mental health in women with PPP (Reed et al. 1999; Focht and Kellner 2012).

The current study is an improvement over earlier studies in using a prospective design with structured clinical assessments, psychopathology ratings at admission and discharge, reporting of specific indications for ECT, comparing psychotropic drug use between the two groups, using specific outcome measures (CPRS ratings and hospital days), and infant assessments to document adverse effects. This study elaborates on details of ECT (dose and thresholds) which is an improvement over earlier studies on the use of ECT in PPP.

Limitations

The limitations of the current study are small sample size and naturalistic method. Medication dosage and duration of hospitalization may be crude outcome variables and may be

Table 3 Comparison of outcome variables between ECT and non-ECT groups

Factor	Number	Received ECT	
		ECT (n=34)	NO ECT (n=44)
CPRS—total score			
Admission (mean/SD)	78	41.8 (8.31)	39.5 (8.22)
Discharge (mean/SD)	70	4.5 (4.47)	4.2 (3.69)
Duration of hospital admission in days (mean/SD)			
	78	19 (9.61)	23 (9.53)
Chlorpromazine equivalent dosage (mean/SD)			
	78	356 (189)	305 (142)
Mood stabilizers			
Present	13	6 (46 %)	7 (54 %)
Absent	65	28 (43 %)	37 (57 %)

CPRS Comprehensive Psychopathological Rating Scale

influenced by other factors. Timing of symptom improvement is an important indicator of treatment response that was not thoroughly evaluated in the current study.

Conclusions

The findings of the current study are that ECT is a safe and effective treatment in women with severe PPP. More prospective studies are needed among specific diagnostic groups of PPP to assess ECT response in different conditions, particularly in women with acute psychosis and to identify predictors of favorable response to ECT. Larger mother–infant pairs need to be assessed for the role of ECT in restitution and maintenance of breast-feeding and mother–infant bonding. While randomized controlled trials are a challenge in pregnant and lactating women, and are often not feasible due to ethical concerns, future studies can address some of the issues raised in the current study.

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