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Pregnancy and Electroconvulsive Therapy: A Multidisciplinary Approach

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Abstract

Objective—To scrutinize a series of pregnant women treated with electroconvulsive therapy (ECT) at a tertiary treatment center and combine this data with a literature review to refine the treatment guidelines for ECT during pregnancy.

Methods—A retrospective chart review of mentally ill pregnant patients treated with ECT since the establishment of a formal women's mental health program.

Results—A total of eight pregnant women treated with ECT were identified from 01/2012–08/2014. Information was extracted from the medical record from a total of 30 ECT treatments across this group. Subjects received an average of 3.75 ECT treatments (range 1–7). All women were diagnosed with a mood disorder (either unipolar or bipolar), and five of the eight women had suicidal ideation. The treatment team for ECT was consistent across all treatments. Two women experienced significant complications following the initial treatment: 1) an acute episode of complete heart block; and 2) acute onset of mania following ECT. Obstetrical complications included two women with pre-term delivery – one secondary to premature rupture of membranes. No other complications or adverse outcomes were recorded. The five women with suicidal ideation had symptom resolution, and significant symptom improvement was noted in six of the eight women.

Conclusions—Electroconvulsive therapy is a safe and effective treatment during pregnancy and of particular benefit in the acute treatment of suicidal ideation.

Keywords

electroconvulsive therapy; pregnancy; psychiatry

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A. Introduction

The treatment of maternal mental illnesses during pregnancy represents a complex clinical decision that potentially encompasses multiple subspecialties. Knowledge, education, and experience with individual treatment options typically vary across the subspecialties involved. Treatment options include psychotropic medications, psychotherapy, electroconvulsive therapy (ECT), and complementary and alternative methods. The majority of literature has focused on the use of psychotropic medications versus non-pharmacological interventions and seldom includes more than a perfunctory discussion of ECT [1–3].

Since its clinical introduction in 1935, ECT has been used to treat a variety of psychiatric illnesses, including unipolar and bipolar depression; acute suicidal ideation with plan; mania; catatonia; and psychosis. Arguably, ECT is the most effective treatment for depression with remission rates as high as 87% [4,5]. Similar response rates are seen for mania [6,7]; while, response rates for schizophrenia are lower [8]. Treatment guidelines in psychiatry typically do not list ECT as a first, second, or even third line treatment option. For example, the Sequenced Treatment Alternatives to Relieve Depression (STARD) trial did not include ECT as a treatment option [9], and the Texas Medication Algorithm Project (TMAP) lists ECT as a fourth line option [10,11]. Similarly, several recent reviews of treating mental illness in pregnancy consider ECT as a ‘tertiary’ intervention to be considered when other treatment options have failed [12–14].

A review paper examined the 339 published cases of ECT in pregnancy from 1941 to 2007, with the majority of cases focusing on the safety and obstetrical outcomes associated with the use of ECT with limited discussion of efficacy [15]. Studies reporting efficacy found a response rate of 84% (n=37) for depression in pregnancy [16–42] and a 61% remission (n=21) in primary psychotic disorders, such as schizophrenia or schizophreniform disorder [20,24,36,43–49]. These rates are comparable to those of non-pregnant patients [4,8].

Despite its effectiveness, practitioners and patients are often hesitant to utilize ECT in pregnancy. The all too common negative portrayal of ECT in the media, lack of education about the procedure and effectiveness, and limited access to facilities that provide ECT in pregnancy all contribute. The efficacy of ECT in the treatment of mental illness underscores its potential value in pregnancy and inclusion as a viable treatment option early in the risk/benefit assessment. In the current report, we add eight additional cases/series (total of 30 ECT treatments) of ECT in pregnancy conducted by the same treatment team with an emphasis on integrating these experiences with the literature to better define management strategies for pregnant women receiving ECT and comment on the role of fetal heart rate (FHR) assessment in this setting.

B. Methods

a. Case Series

This study was approved by the Institutional Review Board of the University of Arkansas for Medical Sciences (UAMS). All charts of the ECT service at UAMS were reviewed to identify all pregnant women treated with ECT from January 2012 to August 2014. Each

subject was provided information about available treatment options in pregnancy including the risks and benefits of each treatment option. Informed consent for ECT was provided by each subject. The sociodemographic, psychiatric, medical and obstetrical histories were reviewed. Details for each ECT treatment including details of each procedure, seizure duration, and fetal heart surveillance (if performed) were abstracted from the individual records. Labor and delivery and neonatal records were available for women that delivered at UAMS.

b General ECT Procedure

All treatments were performed within the ECT suite of the UAMS Psychiatric Research Institute. All ECT treatments were provided by a uniform team composed of an anesthesiologist, attending psychiatrist, and ECT staff. ECT was performed with a Mecta Spectrum 5000Q device using a brief pulse current of 800 mA. All treatments were performed with right unilateral electrode placement. Subjects were monitored with electroencephalography during and after stimulation. Seizure activity was confirmed centrally using EEG and peripherally. A maximum of three treatments were administered each week, typically Monday, Wednesday, and Friday. The performing psychiatrist determined the appropriate anesthetic agent and dosing regimen for each case reported. In most cases, fetal heart rate was recorded before and after the procedure, however the type of fetal heart rate assessment (handheld obstetric doppler vs fetal heart rate monitor) and duration of monitoring were not specified.

C. Results

A total of eight cases were identified. The mean maternal age was 28.4 years. The primary clinical indications included: 1) Depression with suicidal ideation (n=2); 2) Depression without suicidal ideation (n=3); 3) Mood disorder with suicidal ideation (n=1); 4) Mixed phase of bipolar illness with suicidal ideation (n=1), and 5) Depressed phase of bipolar illness with suicidal ideation (n=1). Three subjects completed all ECT treatments while in the hospital, and two subjects initiated ECT as an inpatient but completed the treatment course as an outpatient. Three women initiated and continued ECT treatments as an outpatient. One woman underwent ECT in the first trimester, four in the second trimester, and three in the third trimester. The majority of subjects (7/8) were intubated during the procedures.

A total of 30 ECT treatments were conducted in these eight women. Two women only had a single ECT procedure. Fetal heart rate was documented in approximately 50% of the treatments: 1) before and after ECT treatment (n=12); 2) after ECT only (n=5); and 3) before ECT only (n=1). All fetal heart rates were documented as ‘within normal limits’ or ‘unremarkable’. The details of the individual treatments are summarized in Table 1.

a. Complications

Subject E received her initial ECT treatment at 21 2/7 weeks gestation with central seizure duration of 19 seconds. She demonstrated hypomanic symptoms the following day and did not receive further ECT treatments. Her obstetrical care was complicated by preterm labor,

preterm rupture of membranes at 30 weeks gestation, and preterm delivery at 30 1/7 weeks gestation. While she had risk factors (African American race and major depressive disorder) for preterm delivery, her previous five deliveries were at term.

Subject G received ECT at 29 weeks gestation with no complications. She was a primigravida who went on to have a spontaneous preterm delivery at 36 3/7 weeks gestation. The infant was born with a fetal anomaly of right club foot and right 5^{th} toe displacement that had been detected on ultrasound prior to initiation of ECT.

Subject H had a known past medical history of second degree heart block and underwent ECT at 31 4/7 weeks gestation. Following the ECT procedure, she had an asymptomatic episode of complete heart block and was treated with a single injection of atropine followed by transfer to the medical intensive care unit. She was subsequently observed and discharged without any adverse outcome. Daily fetal heart rate assessment was obtained throughout her ward admission and twice daily non-stress tests were obtained during her medical intensive care unit admission – all being within normal range. This adverse effect was deemed secondary to anesthesia with methohexital. No further ECT treatments were administered. She was recommended to follow up with psychiatry, cardiology and obstetrics; but did not follow up after this treatment. She did not deliver at UAMS, and her birth information is not available.

No other complications were identified. Subjects A–D and F had ECT procedures without complications. Subjects A, B, D, and F had uncomplicated term deliveries. Subjects C and H did not delivery at UAMS and birth information was not available.

b. Effectiveness

Six of the eight women receiving ECT demonstrated clinical improvement of depression and all five women with suicidal ideation demonstrated resolution. Inadequate follow up data for Subject H precludes any conclusions regarding efficacy or complications.

D. Discussion

Our case series demonstrated two notable findings. The first and most notable finding from our case series is the variability in ECT procedures. Despite a uniform team of physicians and staff familiar with ECT, psychiatry, and pregnancy; there was sparse uniformity of ECT treatments and fetal heart rate assessment. Second, no consistent pattern of ECT-related complications was demonstrated in the three subjects with complications. Notably, preexisting conditions accounted for two of the non-optimal outcomes – a known fetal anomaly and a previously identified second degree heart block.

Anderson and Reti's literature review of ECT in pregnancy reported an array of adverse events potentially related to ECT use in pregnancy including: transient fetal arrhythmias, maternal status epilepticus, hematuria, preterm labor, vaginal bleeding, abdominal pain, and placental abruption [15]. Of these, transient fetal arrhythmias were the most commonly reported [15].

In our study, 18 of the 30 ECT treatments had some degree of FHR assessment, but the specifics were not documented. At our institution, it is usual practice to obtain a fetal nonstress test before and after invasive procedures on pregnant women ≥ 24 weeks gestation. However, as evidenced by a lack of data, this was either not performed or not documented on several ECT procedures. The available data only provides two pieces of information regarding fetal status—the fetus had cardiac activity and the heart rate at that moment in time was normal.

The role of FHR monitoring during non-obstetric procedures is not well defined. It is generally accepted that in the previable period (< 24 weeks gestation), auscultation of the fetal heart rate before and after a procedure is acceptable. However, after 24 weeks when fetal intervention is possible (i.e. cesarean delivery and subsequent neonatal resuscitation), intraoperative fetal monitoring in the setting of non-obstetric procedures during pregnancy can be considered per ACOG suggestion [50]. In a large systematic review of maternal and fetal outcomes after non-obstetric surgery during pregnancy, only 3.5% of cases were complicated by labor and subsequent delivery, and there was no mention if any of these deliveries were emergent deliveries performed secondary to fetal distress [51].

ECT appears to be less invasive than a surgical procedure, and there has been only one documented case of fetal loss directly related to ECT (secondary to status epilepticus) [56]. Otherwise, ECT is only associated with transient, spontaneously resolving bradycardia of no known clinical significance. In our literature review, fetal heart rate decelerations immediately postictal were observed in four cases [38,41,52,53]. A single case reported late FHR decelerations that required tocolytic therapy [34], and De Asis et al described a prolonged FHR bradycardia that began after 120 seconds of seizure activity in the setting of a prolonged seizure of 201 seconds, which ultimately normalized after the seizure was pharmacologically terminated [54]. The occurrence of an irregular FHR post ECT typically resolves spontaneously in less than 15 minutes [17,55]. The vast majority of cases did not report prolonged bradycardia leading to emergent interventions and/or fetal demise [17,34,38,41,52–55]. In our study, we cannot comment on FHR monitoring, only that at the time of FHR assessment, there was no bradycardia.

Based on the available data, we recommend performing FHR monitoring at ≥ 24 weeks gestation when possible. When FHR monitoring is performed and a transient bradycardia is seen, patients should be reassured this is not clinically significant. If a prolonged bradycardia is seen, then basic resuscitative measures (oxygen supplementation, intravenous hydration, left lateral decubitus positioning) and prolonged FHR monitoring should be undertaken and the labor and delivery unit notified. If FHR monitoring is not available (e.g. an outpatient ECT clinic with no proximate labor and delivery unit), patients should be counseled that the fetal risk is minimal.

Preterm labor is the most frequent obstetrical complication reported with ECT treatment with an incidence of 3.5% [15, 53, 57–59]. Notably, two of the six women with obstetrical outcomes from our series did deliver preterm. Pregnant women with mood disorders are known to have higher rates of preterm labor, and women receiving ECT likely have a serious mental illness. It is unlikely that mental illness alone accounted for this high rate of preterm

delivery as both subjects had other risk factors for preterm delivery. If this rate persists in a larger sample size or is demonstrated in other studies, closer scrutiny of the potential long-term impact of ECT would be warranted. The small sample size precludes causative inference but warrants attention moving forward.

Vaginal bleeding has been reported following ECT in pregnancy, but it typically self-resolved with monitoring and did not require urgent/emergent delivery [44,60,61]. Empirically, ECT should be used with caution in pregnant women who have vaginal bleeding. Similarly, patients with placenta previa, chronic abruption, or a subchorionic hematoma should be closely monitored if ECT is the optimal treatment.

Two recent case series described three adverse events not previously reported- stillbirth, hip dysplasia and fetal supra ventricular tachycardia [62, 63]. These three events were not considered directly related to ECT [62,63]. The presence of a causal relationship between ECT and obstetrical complications remains obscure; however, the clinical efficacy of ECT underscores the need to develop procedural and monitoring guidelines for use during pregnancy.

In our study, one patient with a known history of maternal second degree heart block had an episode of asymptomatic complete heart block following ECT—an adverse event not previously reported. She recovered and had an otherwise uneventful hospital course. As both methohexital and ECT are associated with heart block, it cannot be determined if one or both contributed to this case of maternal heart block.

Preprocedure medications, anesthetic agents, and fetal heart rate monitoring all varied among the subjects in our case series underscoring the need for guidelines for the use of ECT in pregnancy. Guidelines for the use of ECT in pregnancy have been previously published, but none are universally accepted [64–66]. In Miller's comprehensive review in 1994; initial guidelines for the use of ECT in pregnancy include: a pelvic examination prior to ECT, avoidance of unnecessary anticholinergic medications, uterine tocodynamometry pre and post ECT, avoidance of excessive hyperventilation, and monitoring for vaginal bleeding [64]. Furthermore, empiric agreement in the literature warrants left lateral decubitus positioning to reduce the potential for hypotension or impaired uterine blood flow and intubation after the 1st trimester to reduce the risk of aspiration.

The use of medications for ECT in pregnancy, including anesthetic agents, is reasonably consistent in the literature. In addition to holding women NPO the night prior to treatment, a histamine 2 (H2) blocker is typically given. The safety of H2 blockers, as well as Proton Pump Inhibitors (PPIs), during pregnancy has been scrutinized [67–69] and no adverse effects are demonstrated. Notably, our case series had unexplained variations and/or changes in the pre-ECT medications. The standard induction agents in pregnancy are methohexital and propofol due to their rapid onset of action and rapid clearance from the fetal circulation with no evidence that either pose a risk to pregnancy. However, De Asis et al reported a case in which methohexital induction may have led to a prolonged seizure with subsequent fetal bradycardia. Propofol was used for the following ECT treatment with shorter seizure duration and no transient fetal bradycardia. Other case reports have used thiamyal without

reports of fetal bradycardia [37]. As shown in the table, methohexital was used as the induction agent in 7/8 patients with a single subject receiving propofol.

Transient hypertension is not uncommon after ECT treatments. All patients undergoing ECT are monitored immediately post procedure for approximately 30 minutes with vital signs every 15 minutes until discharge. Short periods of mild to modest elevations in blood pressure ($121 < SBP < 160$, $80 < DBP < 110$) will not adversely affect a pregnancy. If there is sustained hypertension and/or severe elevations in blood pressure, management of the blood pressure should precede continuation of ECT. One case of transient severely elevated blood pressure that was followed by vaginal bleeding secondary to abruptio placenta has been reported [61]. We did not identify any cases of elevated blood pressure warranting intervention in our chart review. The current evidence does not support major concern and gestational hypertension is not an absolute contraindication for ECT. As with all ECT treatments, blood pressure monitoring post treatment should be done.

Patients with epilepsy are eligible candidates for ECT [70], and ECT has even been shown to effectively treat status epilepticus [71]. Pregnant women with preeclampsia are at risk of having seizures; however, the role of ECT in women with preeclampsia and mental illness is not defined.

The management of the common side effects, such as headaches and muscle aches, of ECT during pregnancy should be conservative and utilize treatment options based on prior use and reproductive safety data. As these identical symptoms also occur throughout pregnancy, we would recommend the same conservative therapies: time, rest, and judicious use of acetaminophen. Nausea is also a common side effect of ECT, and antiemetics that can be utilized as needed.

The goal of treating severe mental health disorders during pregnancy is to balance the risk and benefits of available treatment options. Electroconvulsive therapy affords a highly efficacious option that may be preferable to pharmacotherapy during pregnancy. Obtaining adequate data to develop evidence-based guidelines will require collaboration across multiple sites. The role of FHR monitoring in ECT needs to be further elucidated. Consistent procedures and an added level of caution for women with hypertension, preeclampsia, chronic abruption, unexplained vaginal bleeding, epilepsy and preterm labor are reasonable recommendations to optimize the safety of ECT during pregnancy pending definitive studies.

In summary, the foundation of the risk/benefit assessment for treatment options during pregnancy is based on the premise that maternal mental illness poses a risk to the mother and/or fetus. If the goal of treatment is the rapid resolution of such maternal symptoms and minimizing risk to the fetus, then it is reasonable to consider ECT much earlier in the treatment course – particularly in women with suicidal ideation.

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Table 1

Treatment Summary

Subject	Age (years)	Diagnosis	Treatment Number	Gestational Age	Anesthesia		Length of Seizure		FHT*		Birth Outcome
					Induction Agent	Other Medications	EEG	Peri-pheral	Pre	Post	
A	21	Unipolar depression									Full Term Delivery
			1	12 4/7	Methohexital 60mg	Esmolol 80mg Labetalol 10mg Ondansetron 4mg Propofol 60mg Succinylcholine 90mg Lidocaine 20mg	81	46	Not obtained	Not obtained	
			2	12 6/7	Methohexital 60mg	Esmolol 40mg Labetalol 10mg Propofol 30mg Succinylcholine 80mg Acetaminophen 1000mg Sodium citrate/citric acid oral solution 30mL	46	33	Not obtained	Not obtained	
			3	13 2/7	Methohexital 60mg	Esmolol 30mg Ondansetron 4mg Propofol 70mg Succinylcholine 80mg Lidocaine 20mg	70	51	WNL	WNL	
			4	13 6/7	Methohexital 60mg	Esmolol 30mg Ondansetron 4mg Propofol 40mg Succinylcholine 90mg Famotidine 20mg Sodium citrate/citric acid oral solution 30mL Lidocaine 20mg	76	50	WNL(146)	WNL(150)	
B	35	Unipolar depression									Full Term Delivery
			1	15	Methohexital 100mg	Succinylcholine 80mg Sodium citrate/citric acid oral solution 30mL	95	95	WNL(140)	WNL(140)	
			2	15 2/7	Methohexital 100mg	Succinylcholine 80mg Sodium citrate/citric acid oral solution 30mL Acetaminophen 1000mg Ondansetron 4mg	86	43	Not obtained	WNL(144)	
			3	15 4/7	Methohexital 100mg	Succinylcholine 80mg Sodium citrate/citric acid oral solution 30mL Acetaminophen 1000mg Ondansetron 4mg	64	42	Not obtained	WNL	
			4	16	Methohexital 100mg	Succinylcholine 80mg Sodium citrate/citric acid oral solution 30mL Acetaminophen 1000mg	81	46	Not obtained	WNL(143)	

Subject	Age (years)	Diagnosis	Treatment Number	Gestational Age	Anesthesia		Length of Seizure		FHT*		Birth Outcome
					Induction Agent	Other Medications	EEG	Peri-pheral	Pre	Post	
						Ondansetron 4 mg					
			5	16 2/7	Methohexital 100mg	Succinylcholine 80mg Sodium citrate/citric acid oral solution 30mL Acetaminophen 1000mg Ondansetron 4 mg	66	48	Not obtained	Not obtained	
			6	16 4/7	Methohexital 100mg	Succinylcholine 100mg Sodium citrate/citric acid oral solution 30mL Acetaminophen 1000mg Ondansetron 4mg	69	44	Not obtained	Not obtained	
			7	17	Methohexital 100mg	Succinylcholine 80mg Acetaminophen 1000mg Ondansetron 4mg	86	47	Not obtained	Not obtained	
C	30	Unipolar depression									Not available
			1	15	Methohexital 70mg	Propofol 80mg Glycopyrrolate 0.2mg Succinylcholine 90mg LIdocaine 20mg	61	59	WNL(145)	WNL(144)	
			2	15	Methohexital 70mg	Propofol 50mg Ondansetron 4mg Succinylcholine 90mg Lidocaine 60mg Famotidine 20mg	51	48	WNL(139)	WNL(138)	
			3	16	Methohexital 70mg	Propofol 50mg Glycopyrrolate 0.2mg Ondansetron 4mg Succinylcholine 90mg	76	63	WNL(140)	WNL(135)	
			4	16	Methohexital 70mg	Propofol 50mg Glycopyrrolate 0.2mg Ondansetron 4mg Succinylcholine 100mg	64	33	WNL(145)	WNL(147)	
			5	16	Methohexital 70mg	Propofol 50mg Glycopyrrolate 0.4mg Ondansetron 4mg Succinylcholine 100mg	53	50	WNL(140)	WNL(141)	
D	20	Unipolar depression									Full Term Delivery
			1	18	Methohexital 80mg	Propofol 40mg Glycopyrrolate 0.2mg Succinylcholine 110mg Lidocaine 20mg Esmolol 50mg Sodium citrate/citric acid oral solution 30mL(br/Acetaminophen 1000mg Ondansetron 4mg	41	41	WNL(147)	Not obtained	

Subject	Age (years)	Diagnosis	Treatment Number	Gestational Age	Anesthesia		Length of Seizure		FHT*		Birth Outcome
					Induction Agent	Other Medications	EEG	Peri-pheral	Pre	Post	
			2	18	Methohexital 80mg	Propofol 100mg Glycopyrrolate 0.2mg Succinylcholine 110mg Lidocaine 20mg Esmolol 40mg Sodium citrate/citric acid oral solution 30mL(br/Acetaminophen 1000mg Ondansetron 4mg Dexamethasone 4mg Promethazine 12.5mg	74	65	WNL(156)	WNL(145)	
			3	19	Methohexital 80mg	Propofol 150mg Glycopyrrolate 0.2mg Succinylcholine 110mg Lidocaine 20mg Esmolol 30mg Sodium citrate/citric acid oral solution 30mL(br/Acetaminophen 1000mg Ondansetron 4mg Dexamethasone 4mg Promethazine 12.5mg Ephedrine 5mg	43	43	WNL(152)	WNL(154)	
E	39	Bipolar I Disorder with mixed episode									Preterm labor, premature rupture of membranes, preterm delivery
			1	21 2/7	Propofol 120mg	Glycopyrrolate 0.2mg Succinylcholine 100mg	19	17	Not obtained	Not obtained	
F	34	Bipolar depression									Full Term Delivery
			1	29	Methohexital 120mg	Esmolol 20mg Glycopyrrolate 0.4mg Ondansetron 4mg Succinylcholine 120mg Sodium citrate/citric acid oral solution 30mL	95	49	Not obtained	Not obtained	
			2	29 2/7	Methohexital 120mg	Esmolol 50mg Glycopyrrolate 0.4mg Ondansetron 4mg Propofol 50mg Succinylcholine 120mg Lidocaine 20mg	87	53	Not obtained	WNL	
			3	30 2/7	Methohexital 120mg	Esmolol 50mg Glycopyrrolate 0.4mg Ondansetron 4mg Propofol 50mg Succinylcholine 120mg Lidocaine 20mg	70	53	Not obtained	WNL	
			4	30 4/7	Methohexital 120mg	Esmolol 60mg Glycopyrrolate 0.4mg Ondansetron 4mg Propofol 100mg Succinylcholine 120mg	165	58	WNL(155)	WNL (140-155)	

Subject	Age (years)	Diagnosis	Treatment Number	Gestational Age	Anesthesia		Length of Seizure		FHT*		Birth Outcome
					Induction Agent	Other Medications	EEG	Peri-pheral	Pre	Post	
						Famotidine 20mg Sodium citrate/citric acid oral solution 30mL					
G	23	Mood disorder, unspecified									Preterm delivery; Neonate with right clubfoot and 5th toe displacement
			1	29	Methohexital	Glycopyrrolate 0.2 mg Ondansetron 4 mg Succinylcholine 70 mg Acetaminophen 1000 mg	141	58	Not obtained	Not obtained	
			2	29	Methohexital 25mg	Propofol 30mg Glycopyrrolate 0.2mg Ondansetron 4mg Succinylcholine 70mg Acetaminophen 1000mg Lidocaine 20mg	44	34	Not obtained	Not obtained	
			3	29	Methohexital 75mg	Propofol 30mg Glycopyrrolate 0.2mg Ondansetron 4mg Succinylcholine 70mg Acetaminophen 1000mg	51	37	Not obtained	Not obtained	
			4	30	Methohexital 75mg	Propofol 30mg Glycopyrrolate 0.2mg Ondansetron 4mg Succinylcholine 70mg Acetaminophen 1000mg Sodium citrate/citric acid oral solution 30mL	46	46	Not obtained	Not obtained	
			5	30	Methohexital 75mg	Propofol 70mg Glycopyrrolate 0.2mg Succinylcholine 70mg Sodium citrate/citric acid oral solution 30mL	63	46	Not obtained	Not obtained	
H	29	Unipolar depression									Not available
			1	31 4/7	Methohexital 50mg	Succinylcholine 80mg Propofol 40mg	139	44	WNL (150)	WNL (150)	

FHT Fetal Heart Tones ECT Electroconvulsive Therapy EEG Electroencephalogram

*WNL=120-160 beats per minute. If measured, actual beats per minute are in parenthesis.

**Bradycardia due to complete heart block