Single Modality Versus Dual Modality Treatment for Trichotillomania: Sertraline, Behavioral Therapy, or Both?

Darin D. Dougherty, M.D.; Rebecca Loh, B.S.; Michael A. Jenike, M.D.; and Nancy J. Keuthen, Ph.D.

Background: Trichotillomania is a psychiatric condition characterized by chronic hair pulling. Both cognitive behavioral therapy (CBT) and the selective serotonin reuptake inhibitors (SSRIs) have shown promise in the treatment of trichotillomania, with comparison studies favoring CBT over pharmacotherapy. However, no randomized, controlled studies to date have compared the efficacy of individual SSRI or CBT treatment to the combination of both treatment modalities.

Method: In this study, which ran from February 2000 through April 2003, subjects who met DSM-IV criteria for trichotillomania were randomly assigned to treatment with sertraline or placebo in a double-blind study design. Following 12 weeks of active pharmacotherapy, subjects not demonstrating significant trichotillomania symptom improvement had habit reversal training (HRT) added to their treatment regimen. Primary outcome measures were the Hair Pulling Scale and the Clinical Global Impressions scale.

Results: Thirteen subjects completing the 22-week study received single modality treatment of either sertraline or HRT, and 11 received both modalities of treatment. Trichotillomania symptoms in both groups improved, although the dual modality treatment group demonstrated larger gains and were much more likely to reach responder status at final evaluation.

Conclusion: These results suggest that the combination of sertraline and HRT may be more efficacious in the treatment of trichotillomania than either approach alone.

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Corresponding author and reprints: Darin D. Dougherty, M.D., Massachusetts General Hospital, CNY2612, Building 149, 13th Street, Charlestown, MA 02129 (e-mail: ddougherty@partners.org).

Trichotillomania, a psychiatric condition characterized by chronic hair pulling, is often associated with considerable comorbidity.[1] Typically striking during critical developmental periods in childhood or early adolescence, the disorder tends to follow an unremitting course. Studies indicate that this disorder affects 0.6% to 2.5% of the U.S. population.[2] The impact of trichotillomania can be wide-ranging and severe, as many sufferers report negative impact on interpersonal relationships as well as avoidance of public or social activities.[3]

Knowledge of effective treatments for trichotillomania remains limited despite recognition of its prevalence and potential impact on quality of life. The treatment literature is compromised by the existence of few controlled treatment trials, use of different outcome measures, conflicting treatment outcome results, poor long-term data, and limited comparison of treatment modalities.

There is, however, evidence that selective serotonin reuptake inhibitors (SSRIs) may be beneficial in some patients.[4] Controlled pharmacotherapy trials in trichotillomania cohorts have demonstrated efficacy of fluoxetine,[5] clomipramine,[5,6] venlafaxine,[7] and naltrexone,[8] while other controlled trials have failed to demonstrate efficacy for fluoxetine[2,9] and desipramine.[6] No controlled trials of sertraline for the treatment of trichotillomania have been conducted. However, there are case reports of the efficacy of sertraline in the treatment of trichotillomania.[10,11]

Another method commonly used in treating trichotillomania is behavioral therapy. Habit reversal training (HRT) is the most universally accepted and empirically studied behavioral therapy approach for trichotillomania.[12] The efficacy of HRT for trichotillomania has been reported in numerous case studies.[13,14] In the only controlled study of behavioral therapy techniques involving random treatment assignment, Azrin and colleagues[15] demonstrated superior efficacy of HRT over negative practice training.

Some studies have compared pharmacotherapy to behavioral therapy for the treatment of trichotillomania. Most have found that cognitive behavioral therapy (CBT) is more effective and has a better patient acceptance than pharmacotherapy. In 1 study of 14 patients with trichotillomania, subjects treated with CBT showed significant

symptom improvement over those treated with clomipramine, who were not statistically different from a placebo control.[16] Another study comparing CBT or clomipramine to a waitlist control also demonstrated the superiority of CBT.[17] In this study, patients in the pharmacotherapy group improved slightly but did not differ significantly from controls. Van Minnen et al.[18] found similar results in a study comparing behavioral therapy or fluoxetine to a waitlist control. In the only study to compare single modality treatment (medication or behavioral therapy) with combined therapy (medication and behavioral therapy),[12] those patients receiving combined therapy showed a greater reduction in hair-pulling symptoms than those receiving single modality treatment; however, this was a retrospective, nonrandomized study.

The current study assessed treatment response in patients with trichotillomania following pharmacotherapy with sertraline in a placebo-controlled, double-blind manner. In addition, subjects who failed to respond to sertraline underwent a controlled trial of HRT. To our knowledge, this is the first controlled trial comparing the efficacy of individual sertraline or HRT treatment to the combination of both treatment modalities.

METHOD

Subjects

All subjects were recruited from the Massachusetts General Hospital (MGH) Trichotillomania Clinic and Research Unit or via advertisements in local newspapers or on the Internet. Subjects were men or women between the ages of 18 and 65 who met DSM-IV[1] criteria for trichotillomania. This study, which ran from February 2000 through April 2003, was approved by the MGH Human Research Committee. Written informed consent was obtained from all patients before protocol-specified procedures were carried out.

In order to qualify for the study, subjects must have had trichotillomania symptoms for at least 4 months, with the scalp as the primary site of hair pulling and with an MGH Hair Pulling Scale (HPS)[19] score ≥ 15 or a Trichotillomania Impact Scale (TTMIS) score > 30 (the TTMIS scale is available from the authors upon request). Additionally, subjects must have been off treatment with any SSRI medications for at least 2 weeks (4 weeks for those taking fluoxetine) prior to baseline evaluation, and females of childbearing potential must have had a negative serum β-human chorionic gonadotropin pregnancy test.

Pregnant or nursing women, or women of childbearing potential who were not using a medically accepted means of contraception, were excluded from participation, as were patients who posed a serious suicidal or homicidal risk; patients with serious or unstable medical illness, including cardiovascular, hepatic, renal, respiratory, endocrine, neurologic, or hematologic disease; and patients on anticoagulant therapy. Other exclusion criteria included a history of seizure disorder, comorbid bipolar disorder, psychosis, organic mental disorder, or developmental disorder; a history of substance abuse without remission for at least 6 months; past trials of sertraline; current treatment with behavioral therapy for trichotillomania; and current use of any other medications that may interact with sertraline.

Assessment

Before entering into the study, potential subjects were provided with details on study procedures and were allowed as much time as needed to consider participation. Those who indicated an interest underwent a brief telephone screening to ensure that major eligibility requirements were met. If potential subjects appeared eligible following the screening, an initial appointment was scheduled.

At the baseline evaluation visit, a full psychiatric assessment was performed, including the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID),[20] and a complete medical history was obtained. A SCID-like diagnostic module compatible with DSM-IV criteria for trichotillomania[21] was used for assessment of trichotillomania. Subjects were then seen for assessment at the point of randomization (2 weeks following baseline evaluation) and every 4 weeks thereafter until study conclusion at the end of week 22. Initial randomization was to either sertraline or placebo. HRT was given to all subjects who did not demonstrate substantial symptom improvement after 12 weeks in the double-blind medication phase.

Several assessment measures were used throughout this study to monitor subjects' progress. Both clinician-administered and self-rated questionnaires were utilized to rate hair-pulling severity. Because trichotillomania is often associated with considerable comorbidity and poorer emotional and psychosocial functioning, a number of scales were used to quantify the impact of hair pulling on these factors.

Hair-pulling symptoms. The primary hair-pulling outcome measure was the HPS,[19,22] a 7-item self-report questionnaire that measures trichotillomania severity in terms of urges, behaviors, and associated distress. Items are rated on a 0 to 4 scale, with higher scores indicating greater symptom severity. The scale has been shown to have good internal consistency[19] and has documented test-retest reliability, convergent and divergent validity, and sensitivity to changes in symptoms following treatment.[22]

The Psychiatric Institute Trichotillomania Scale (PITS)[23] was the only clinician-administered trichotillomania scale used in this study. Following a guided interview format, hair-pulling severity is measured for 6 items (sites, severity, duration, resistance, interference, and distress) on a 0- to 7-point scale. In 1 study of a small sample

of hair pullers,[24] the PITS was found to have good interrater agreement and concurrent validity.

The patient-rated TTMIS, which assesses the impact of trichotillomania over the preceding week, consists of 29 statements rated on a 0 to 5 scale. Items evaluate the cost of hair pulling in terms of ability to function socially (e.g., "If it weren't for my hair pulling, I would have more friends"), time lost ("It takes me longer than others to get ready in the morning because of my hair pulling"), monetary impact ("I have to spend extra money to disguise my hair pulling"), and psychological distress ("I feel embarrassed because of my hair pulling"). This questionnaire was used as a measure of trichotillomania severity; unfortunately, there are no psychometric data available for the TTMIS.

Clinicians used the Clinical Global Impressions scale (CGI) to measure global change in subjects' hair-pulling symptoms. The CGI is an adaptation of the Patient Global Impressions scale.[25] Subjects are asked by the study clinician to rate symptom changes from pretreatment on a 7-point Likert scale ranging from very much improved (CGI = 1) to very much worse (CGI = 7).

Mood and anxiety symptoms. Depressive symptoms were monitored through use of the clinician-administered 17-item Hamilton Rating Scale for Depression ($HAM\text{-}D_{17}$)[26] and the Beck Depression Inventory (BDI),[27] a 21-item self-report measure. The Beck Anxiety Inventory (BAI)[28] was used to measure level of anxiety.

Quality of life. The Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q)[29] measured the subject's quality of life in 8 domains including physical functioning, subjective feelings of well-being, work, household duties, school, leisure activities, social relationships, and general activities. Raw scores and percentage scores were calculated for individual subscales and for the entire questionnaire, with higher numbers indicating higher quality of life.

Treatment

Drug administration. Following entry into the study, patients began a 2-week single-blind placebo phase. If they continued to satisfy study inclusion criteria after the placebo lead-in, subjects were randomly assigned to sertraline and placebo groups in a double-blind design. The placebo tablets were identical in appearance to the 25-mg and 50-mg sertraline tablets used in this study, and subjects in both groups were given the same instructions for increasing the number of tablets taken daily. Those randomly assigned to sertraline took 25 mg of sertraline daily for 1 week and then increased the daily dose to 50 mg in the second week. Subjects needed to be able to take a minimum of 50 mg of sertraline daily in order to continue participation in the study. Assuming tolerance of the 50-mg dose, subjects were instructed to increase the dose by 50 mg per week, provided that no adverse side effects arose at the higher dose, to a maximal daily dose of 200 mg. All subjects were instructed to contact the study's physician investigator (D.D.D.) should any complications arise, and the dose could be decreased at any time in response to adverse side effects.

Habit reversal training. Two 1-hour sessions of HRT, modeled after the multicomponent packages of Azrin et al.[15] and Mansueto et al.,[30] were given to all subjects who did not demonstrate substantial symptom improvement after 12 weeks in the double-blind medication phase. The behavioral intervention included self-monitoring of symptoms and related triggers (started 1 week before the first session), habit reversal training, stimulus control, cognitive restructuring, and relapse prevention. Subjects met individually with a psychologist (N.J.K.) who has extensive experience in the application of HRT in the treatment of trichotillomania. Sessions were scheduled 1 month apart and took place between study evaluations.

Study Procedures

All assessment measures, with the exception of the Q-LES-Q and CGI, were administered at each visit. The CGI was administered starting with the second visit, and the Q-LES-Q was utilized only at time of enrollment, time of randomization, and at the end of weeks 14, 18, and 22. At the fifth evaluation (14 weeks following entry into the study), patients with less than a 40% decrease in baseline HPS score had HRT added to their treatment regimen.

If subjects failed to complete the study, all assessment scales that were administered at the last visit were analyzed as intent to treat. Upon completion of the study, all subjects either continued medication under the supervision of a physician or were tapered off medication, depending on clinical indication and patient preference.

Data Analysis

Subject attrition. Because several subjects withdrew participation before completing the HRT phase, the data from those subjects were not included in the final analyses. However, the baseline characteristics of subjects who withdrew participation were compared with the baseline characteristics of the study completers to determine if there was a significant difference between the 2 groups. Independent-sample t tests were used to compare differences in age and questionnaire scores. Additionally, a χ^2 test was used to determine if there was a significant difference in dropout rate by gender.

Baseline evaluation. The ages and baseline assessment scores of all study completers who received single or dual modality treatment were compared by independent samples t tests to determine whether significant differences existed between the groups prior to any treatment. As the CGI was not administered at baseline assessment, scores from point of randomization (which followed the 2-week placebo lead-in phase) were used as

a CGI baseline measure. Gender differences were assessed using the χ^2 test.

Treatment efficacy. The HPS and CGI comprised this study's primary outcome measures. Independent samples t tests were performed on HPS final scores to determine if a significant difference existed between subjects receiving single versus dual modality treatment. Paired samples t tests were used to determine if the HPS scores within each group changed significantly between baseline and final evaluations, and independent samples t tests were used to assess whether the amount of change differed significantly between groups. Nonparametric tests were used to perform similar assessments on the CGI. Baseline and final CGI scores were compared for the 2 groups using the Mann-Whitney U test. Changes in CGI scores from point of randomization to final evaluation were compared within groups using the Wilcoxon test and between groups using the Mann-Whitney U test. These tests were performed at the .05 level of significance.

The secondary outcome measures were analyzed in a similar fashion, with a statistical significance level set at .01 to adjust for multiple comparisons. Final scores on the TTMIS, PITS, HAM-D_{17}, BDI, BAI, and Q-LES-Q were analyzed using appropriate t tests. Within-group analyses of those scores from baseline to final evaluation assessed whether any significant change in scores occurred for either group, and between-group analyses were performed on score changes from baseline to determine if 1 group experienced significantly greater changes in scores over the other. Finally, analyses were conducted based on whether subjects responded to the treatment(s) given. A responder was defined by (1) a ≥ 40% decrease in baseline HPS score and (2) a CGI score of 1 or 2. Response rates were calculated for single and dual modality treatment, and the 2 were compared to determine an odds ratio of response based on number of treatment modalities received.

Session-by-session analysis. Mean scores on the study's primary outcome measures, the HPS and CGI, were compared in a session-by-session manner to illustrate mean changes over time for the single and dual modality treatment groups. In addition, a Kolmogorov-Smirnov test for normality was performed on HPS scores and CGI scores for all visits for both single and dual modality treatment groups. This was followed by a mixed effects analysis of variance (ANOVA) in which HPS and CGI scores were the within-subjects variables and treatment modality was the between-subjects variable. Post hoc t tests were performed for visits 1, 5, and 7.

RESULTS

Completers Versus Noncompleters

Forty-two subjects enrolled in this study, of which 26 completed the 22-week participation period. Most subjects who did not complete the study were lost to follow-up, although 5 subjects terminated due to adverse events (1 not related to the study). Subjects who completed the study did not differ from those who withdrew participation in mean age or in baseline assessment measures of hair-pulling severity, affective symptoms, or quality of life. Analysis of gender differences was not possible given the low enrollment of male participants, reflecting the known predominance of females with this disorder.

Table 1. Baseline Characteristics of Single Modality and Dual Modality Treatment Groups[a]

Characteristic	Single Modality (N = 13)	Dual Modality (N = 11)	p Value
Gender, female, N (%)	13 (100)	10 (90.9)	
Age, y	26.3 (5.7)	31.5 (11.1)	NS
HPS score	17.8 (3.4)	19.0 (2.8)	NS
CGI score	3.8 (0.9)	3.9 (0.8)	NS
TTMIS score	67.5 (28.0)	39.7 (22.3)	NS
PITS score	24.4 (4.3)	23.1 (3.6)	NS
HAM-D_{17} score	4.0 (3.5)	4.0 (3.3)	NS
BDI score	7.8 (6.4)	7.4 (7.6)	NS
BAI score	5.7 (6.4)	5.9 (5.1)	NS
Q-LES-Q percent	75.7 (12.0)	75.5 (11.8)	NS

[a]Values shown as mean (SD) except as noted otherwise.
Abbreviations: BAI = Beck Anxiety Inventory, BDI = Beck Depression Inventory, CGI = Clinical Global Impressions scale, HAM-D_{17} = 17-item Hamilton Rating Scale for Depression, HPS = Massachusetts General Hospital Hair Pulling Scale, NS = not significant, PITS = Psychiatric Institute Trichotillomania Scale, Q-LES-Q = Quality of Life Enjoyment and Satisfaction Questionnaire, TTMIS = Trichotillomania Impact Scale.

Table 2. Comparison of Mean Scores at Final Evaluation for Subjects Who Received Single Modality Treatment and Those Who Received Dual Modality Treatment

Rating Instrument	Single Modality (N = 13), Mean (SD)	Dual Modality (N = 11), Mean (SD)	p Value
HPS score	14.5 (6.3)	11.1 (4.3)	NS
CGI score	3.2 (1.0)	2.1 (0.9)	.011
TTMIS score	50.7 (27.1)	23.8 (13.7)	.007
PITS score	19.8 (6.9)	14.4 (3.7)	NS
HAM-D_{17} score	2.3 (4.2)	2.9 (2.7)	NS
BDI score	5.2 (6.0)	2.3 (2.4)	NS
BAI score	3.2 (4.1)	3.2 (3.2)	NS
Q-LES-Q percent	75.0 (15.5)	77.4 (15.2)	NS

Abbreviations: BAI = Beck Anxiety Inventory, BDI = Beck Depression Inventory, CGI = Clinical Global Impressions scale, HAM-D_{17} = 17-item Hamilton Rating Scale for Depression, HPS = Massachusetts General Hospital Hair Pulling Scale, NS = not significant, PITS = Psychiatric Institute Trichotillomania Scale, Q-LES-Q = Quality of Life Enjoyment and Satisfaction Questionnaire, TTMIS = Trichotillomania Impact Scale.

Single Versus Dual Modality Treatment Participants

Of the 26 completers, only 2 received placebo only and thus were excluded from further analyses. One placebo participant achieved significant decreases in hair pulling by the 14th week and did not need additional HRT; the other declined participation in the HRT phase due to a lack of time to dedicate to practice of treatment

Table 3. Change Scores for Single Modality and Dual Modality Treatment Groups

	Single Modality (N = 13)		Dual Modality (N = 11)		
Rating Instrument	Mean (SD)	Within-Group p Value	Mean (SD)	Within-Group p Value	Between-Group p Value
HPS score	–3.2 (5.1)	.040	–7.9 (3.6)	.000	.017
CGI score	–0.62 (1.04)	.54	–1.82 (1.40)	.007	.026
TTMIS score	–16.8 (29.0)	.058	–15.9 (24.1)	.054	NS
PITS score	–4.5 (5.8)	.016	–8.6 (3.8)	.000	NS
HAM-D_{17} score	–1.7 (3.8)	.132	–1.1 (3.4)	.311	NS
BDI score	–2.7 (4.6)	.054	–5.2 (6.2)	.020	NS
BAI score	–2.5 (7.2)	.228	–2.7 (4.0)	.047	NS
Q-LES-Q percent	–0.7 (10.4)	.812	+1.9 (9.32)	.524	NS

Abbreviations: BAI = Beck Anxiety Inventory, BDI = Beck Depression Inventory, CGI = Clinical Global Impressions scale, HAM-D_{17} = 17-item Hamilton Rating Scale for Depression, HPS = Massachusetts General Hospital Hair Pulling Scale, NS = not significant, PITS = Psychiatric Institute Trichotillomania Scale, Q-LES-Q = Quality of Life Enjoyment and Satisfaction Questionnaire, TTMIS = Trichotillomania Impact Scale.

techniques. Of the remaining 24 subjects, 13 received single modality treatment (4 received medication treatment and 9 received HRT). Eleven received dual modality treatment of sertraline and HRT.

Table 1 summarizes baseline characteristics of the 24 subjects receiving either single or dual modality treatment. Subjects did not differ significantly in age or mean scores on the questionnaires.

Posttreatment Group Comparisons

Comparison of final scores between those in the single modality treatment group and those in the dual modality treatment group revealed significant differences in CGI ($U = 29.0$, $p = .011$) and TTMIS scores ($t = 2.980$, $df = 22$, $p = .007$). Hair-pulling severity was reduced in the dual modality group as measured by the HPS and PITS, though these differences did not reach significance. No differences between groups were observed in final scores on the HAM-D_{17}, BDI, BAI, or Q-LES-Q. Final scores are summarized in Table 2.

Change Scores

Within-group change scores. When compared with baseline scores, the scores at final evaluation revealed decreases in hair-pulling severity within each group. Change scores on the HPS, CGI, and PITS were significant for the dual modality treatment group, while the HPS was the only measure to detect significant changes from baseline evaluation to final assessment in the single modality group. Decreases in depression and anxiety were modest and nonsignificant for both groups. Quality of life as measured on the Q-LES-Q also did not change significantly. Table 3 summarizes mean change scores for both groups.

Between-group change scores. When the amount of score change from baseline to final evaluation was compared between groups, the dual modality treatment group demonstrated significantly greater treatment gains on both primary outcome measures over the single modality group. No significant differences in change scores were found on any of the secondary outcome measures.

Responders Versus Nonresponders

Two subjects (15.4%) in the single modality treatment group and 6 (54.5%) in the dual modality treatment group met study criteria for responder status. The resulting odds ratio is 6.6, indicating that subjects in the dual modality treatment group were much more likely to respond to treatment than those in the single modality treatment group.

Session-by-Session Analysis

Hair Pulling Scale. Figure 1 depicts changes over time in HPS scores by treatment modality. Note that HRT administration began after week 14 for those subjects who qualified. For subjects in the single modality treatment group, this meant that those randomly assigned to placebo (N = 9) began receiving HRT, while those randomly assigned to sertraline (N = 4) continued taking the medication without additional treatment. For subjects in the dual modality treatment group, HRT was added to ongoing treatment with sertraline. The graph illustrates greater improvements in trichotillomania symptoms for the dual modality treatment group after week 14, suggesting that the benefits of sertraline used in conjunction with HRT outweigh the benefits of either treatment alone.

A Kolmogorov-Smirnov test for normality on HPS and CGI scores for all visits for both the single and dual modality treatment groups found nothing significant. Therefore, mixed effects ANOVA was performed. The mixed effects ANOVA for the HPS revealed a significant main effect of study visit on HPS scores ($p < .001$, $df = 6$, $F = 8.364$) and a significant interaction between study visit and treatment modality ($p = .033$, $df = 6$, $F = 2.371$). Post hoc t tests had insufficient power to detect a significant difference between groups at any 1 visit. However, the p values for visit 5 ($p = .145$, $t = –1.512$, $df = 22$) and visit 7 ($p = .141$, $t = 1.512$, $df = 22$) trended in the appro-

Figure 1. Session-by-Session Comparison of Single Modality and Dual Modality Treatment Group Scores on the Massachusetts General Hospital Hair Pulling Scale (HPS)

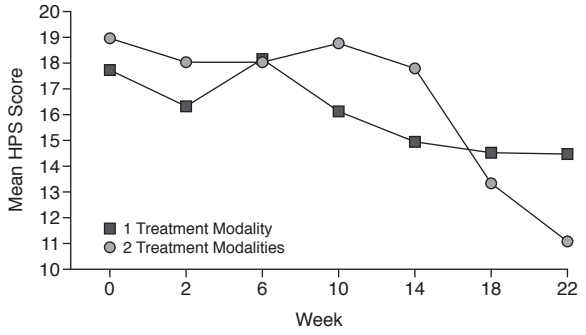
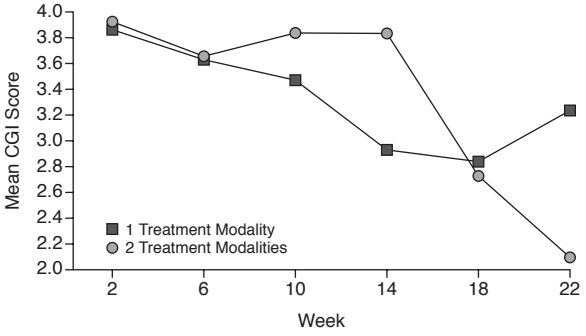


Figure 2. Session-by-Session Comparison of Single Modality and Dual Modality Treatment Group Scores on the Clinical Global Impressions Scale (CGI)



priate direction. The mixed effects ANOVA also revealed a significant effect of study visit on CGI score ($p < .001$, $df = 5$, $F = 7.096$) and a significant visit-by-group interaction ($p = .007$, $df = 5$, $F = 3.403$). Post hoc t tests revealed a significant difference between groups at visit 7 ($p = .010$, $t = 2.833$, $df = 22$) and an opposing trend toward significance at visit 5 ($p = .086$, $t = –1.796$, $df = 22$).

Clinical Global Impressions scale. Figure 2 depicts mean changes in CGI scores for the single modality and dual modality treatment groups. As with the trichotillomania severity measures, ratings of global status improved markedly for the dual modality group after week 14.

DISCUSSION

The current double-blind placebo trial assessed single modality (sertraline or HRT) versus dual modality (sertraline and HRT) treatment for trichotillomania. In the current study, symptom improvement was seen in both the single modality and dual modality groups. However, between-group analyses revealed that the dual modality group experienced significantly greater improvement than the single modality group as demonstrated by the primary outcome measures of the study (HPS, CGI). Of note, decreases in depression and anxiety symptoms were nonsignificant both within and across groups, suggesting that trichotillomania severity improvement was not accounted for by amelioration of comorbid depressive and anxiety symptoms. Note, however, that initial depression and anxiety symptoms were subclinical as measured by the HAM-D, BDI, and BAI. Surprisingly, no improvement in quality of life either within or across groups was reported.

The design of this study makes it difficult to ascertain the individual contributions of sertraline and HRT in the symptom improvements observed in the dual modality treatment group. Subjects in this group did not show substantial symptom improvement following 12 weeks of pharmacotherapy; therefore, they may be considered treatment resistant to sertraline. However, we cannot rule out that these subjects would have demonstrated improvement if allowed to continue treatment without the addition of HRT. Comparison of this group with the sertraline-only treatment group is difficult, as the sertraline-only subjects all showed substantial symptom improvement after 12 weeks on medication, raising the possibility that this group may have qualitative differences in the underlying etiology of their trichotillomania. Additionally, this single modality medication treatment group contained only 4 subjects, reducing the power of any statistical comparisons. A priori randomization of subjects to pharmacotherapy only, CBT only, and dual modality treatment in future studies would eliminate this possible sampling bias.

Another consideration relates to the stability of treatment effects produced by this study. While substantial symptom improvement was observed following 20 weeks of active treatment, we cannot tell if subjects will maintain symptom relief over the long term. Keuthen et al.[31] reported high relapse rates in trichotillomania patients who had shown symptom improvement following treatment. Long-term follow-up of patients is necessary to determine whether treatment with sertraline and HRT, singly or in combination, will yield lasting results.

While our study is the first to demonstrate the benefits of combined behavioral and pharmacologic treatment of trichotillomania over single modality treatment, the advantages of a dual modality approach have been established previously. For example, the superior efficacy of behavioral plus pharmacologic treatment has been shown in the treatment of posttraumatic stress disorder[32] and obesity.[33] These studies suggest that the 2 approaches have additive effects. That is, medication treatment may tackle biological bases of the disorder, while behavioral therapy addresses the habitual aspects that perpetuate the

disorder. Though future studies are warranted to discern the specific mechanism of action in the treatment of trichotillomania, it is possible that the combination of sertraline and HRT acts in a similar manner.

The possibility of enhanced results via a multimodal approach in the treatment of trichotillomania encourages exploration of other methods that may be used in combination with the pharmacologic, cognitive, and behavioral approaches already established. Future treatment of trichotillomania may benefit most from the use of concurrent treatments targeting both the biological and behavioral aspects of the disorder.

CONCLUSION

In summary, the current study found that treatment of trichotillomania with a combination of behavioral therapy and pharmacotherapy is more effective than either treatment alone. This finding could have important implications for guiding clinical practice in treating this population. Replication of this finding in larger cohorts is necessary to improve the generalizability of our results.

Drug names: clomipramine (Anafranil and others), desipramine (Norpramin and others), fluoxetine (Prozac and others), naltrexone (Revia and others), sertraline (Zoloft), venlafaxine (Effexor).

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