A Review of Pharmacologic Treatments for Obsessive-Compulsive Disorder

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Objective: Obsessive-compulsive disorder is a chronic and often disabling disorder that affects 2 to 3 percent of the U.S. population. Optimal treatment involves a combination of pharmacologic and cognitivebehavioral therapies. Advances in psychopharmacology have led to safe and effective treatments for obsessive-compulsive disorder that provide clinically significant improvement in symptoms. In this article the authors review studies of pharmacologic treatments. Methods: A MED-LINE search was conducted to identify relevant articles from 1991 to 2002. Double-blind, placebo-controlled studies as well as open-label studies and case reports were included. Results and discussion: The serotonin reuptake inhibitors (SRIs), including clomipramine, fluvoxamine, fluoxetine, sertraline, and paroxetine, have been approved by the U.S. Food and Drug Administration for the treatment of adults with obsessive-compulsive disorder; three of these (clomipramine, fluvoxamine, and sertraline) have been approved for treatment of children and adolescents. Clomipramine and the selective serotonin reuptake inhibitors (SSRIs) are first-line agents. However, 40 to 60 percent of patients with obsessive-compulsive disorder do not respond to adequate treatment trials with SRIs, and agents that alter serotonin receptors and other neurotransmitter systems, such as dopamine, norepinephrine, and second-messenger systems, may play a role in treatment. Treatment options for patients who do not respond to SRIs include switching, augmentation, or novel-agent strategies. Up to two-thirds of patients with obsessive-compulsive disorder have comorbid psychiatric disorders, which may present a challenge in pharmacologic treatment. Major depressive disorder is the most common comorbid condition. Nonpharmacologic invasive techniques may play a role in refractory cases of obsessive-compulsive disorder, but further research is warranted. (Psychiatric Services 54:1111-1118, 2003)

bsessive-compulsive disorder is a chronic and often disabling disorder that affects 2 to 3 percent of the U.S. population (1). One aspect of diagnosing obsessive-compulsive disorder centers on the marked distress caused by obsessions or compulsions as well as significant interference in social or occupational functioning (2).

Obsessive-compulsive disorder has a major impact on quality of life in several domains, including social functioning, employment, marriage and family relationships, and socioeconomic status (3–6). The more severe the symptoms, the poorer the quality of life in the domain of social functioning (4). More than half the patients in one study reported that obsessive-compulsive disorder interfered with work and social functioning, and 70 percent reported that the disorder caused problems in family relationships (5). Family members of persons with obsessive-compulsive disorder are often affected by the patient's symptoms (6). Many family members are forced to become enmeshed with the patient's obsessions or compulsions, such as by having to provide repeated reassurance or to take part in avoidance or checking rituals, which can be cumbersome and debilitating. Persons with obsessivecompulsive disorder have also demonstrated elevated levels of unemployment and receipt of disability payments (7).

Thus it is evident that impairment due to obsessive-compulsive disorder is widespread and affects all aspects of the individual's daily life. One study showed that the social impairment of persons with severe obsessive-compulsive disorder was equal to that of patients with schizophrenia (8).

Methods

A MEDLINE search was conducted to identify relevant articles from 1991 to 2002. Double-blind, placebo-controlled studies as well as open-label studies and case reports were included.

Results and discussion

Optimal treatment for obsessivecompulsive disorder involves a combination of both pharmacologic and cognitive-behavioral therapies. Although the cognitive-behavioral techniques of exposure and response prevention are effective in the treatment of obsessive-compulsive disorder, in this article we focus only on pharmacologic treatments.

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Obsessive-compulsive disorder is frequently associated with embarrassment and shame. As a result, often patients do not seek necessary treatment, which is unfortunate, because advances in psychopharmacology have led to safe and effective treatments that provide clinically significant improvement in symptoms. Manipulation of the serotonergic system is associated with improvement in obsessive-compulsive symptoms. At the neurochemical level, serotonin is transported back into the neuron through transporter proteins. Serotonin reuptake inhibitors (SRIs) work by blocking these transporter proteins, which results in a greater availability of serotonin neurotransmitter in the synaptic cleft. SRIs are firstline agents in the treatment of obsessive-compulsive disorder.

However, 40 to 60 percent of patients with obsessive-compulsive disorder do not respond to adequate treatment trials with SRIs (9), and agents that alter serotonin receptors and other neurotransmitter systems, such as dopamine and norepinephrine, as well as second-messenger systems may play a role in the treatment of obsessive-compulsive disorder. Treatment options for patients who do not respond to SRIs include switching, augmentation, and novelagent strategies. Although patients who respond may experience clinically significant improvement in their obsessions and compulsions, they are not cured of the illness and may still have residual symptoms. Because obsessive-compulsive disorder is highly comorbid with other psychiatric disorders, pharmacotherapy is aimed at targeting associated conditions as well.

The treatment of obsessive-compulsive disorder with SRIs differs from that of depression, because higher dosages and longer treatment trials (ten to 12 weeks) are often required for a full effect. The SSRIs have a better-tolerated side-effect profile for most patients than clomipramine, a tricyclic antidepressant, because they do not produce antihistaminergic, anticholinergic, or antiadrenergic effects and are associated with a lower risk of cardiac toxicity. A review of SRI treatment studEditor's Note: This paper is part of a series of psychopharmacology updates edited by Ewald Horwath, M.D. Contributions are invited to address the psychopharmacological treatment of psychiatric disorders. Papers should focus on integrating new treatments and on issues faced in the public sector, such as psychiatric and medical comorbidity, severe and persistent illness, and weighing of risks versus benefits of medications. For more information, please contact Dr. Horwath at the New York State Psychiatric Institute, 1051 Riverside Drive, Unit 88, New York, New York 10032 (e-mail, eh10@colum bia.edu).

ies suggested that 65 to 70 percent of patients with obsessive-compulsive disorder respond at least moderately to first-time SRI treatment (10).

Currently, five SRIs, including clomipramine, fluvoxamine, fluoxetine, sertraline, and paroxetine, have been approved by the U.S. Food and Drug Administration for the treatment of adults with obsessive-compulsive disorder; three of theseclomipramine, fluvoxamine, and sertraline-have been approved for treatment of children and adolescents with the disorder. Evidence is accumulating on the efficacy of citalopram (11,12) and venlafaxine (13-15) in the treatment of obsessive-compulsive disorder, although these agents do not have an FDA indication for this disorder.

Clomipramine

Clomipramine not only works as an SRI but also blocks the reuptake of norepinephrine and dopamine. Multiple controlled studies have demonstrated clomipramine's efficacy in the treatment of obsessive-compulsive disorder (16–19). The first multicenter, randomized, placebo-controlled trial of clomipramine for obsessive-compulsive disorder was published in 1991. In two trials among patients

with obsessive-compulsive disorder, scores on the Yale-Brown Obsessive-Compulsive Scale (YBOCS) decreased by an average of 38 percent and 44 percent with clomipramine, compared with 3 percent and 5 percent with placebo (18).

Selective serotonin reuptake inhibitors (SSRIs)

SSRIs may have a better side-effect profile than tricyclic agents. However, SSRIs are not well tolerated by all patients and vary in their side-effect profiles and half-lives. Fluoxetine has the longest half-life-two to four days-and its active metabolite, norfluoxetine, has a half-life of seven to nine days. Clinically, fluoxetine may have an activating profile. Therefore, gradual dosage titration is needed to avoid insomnia and restlessness or potential exacerbation of anxiety early in treatment. Early open trials showed efficacy in the treatment of obsessive-compulsive disorder (20). In addition, one multicenter, doubleblind, placebo-controlled study found clinically significant improvement at fluoxetine dosages of 20, 40, and 60 mg daily (21). In another doubleblind placebo-controlled study with fluoxetine, dosages of 40 and 60 mg (but not 20 mg) were superior in efficacy to a placebo (22).

Fluvoxamine was shown to have efficacy in several double-blind, placebo-controlled studies (23–25). In one multisite study, fluvoxamine at a daily dosage of 100 to 300 mg was found to be superior to placebo, and 43 percent of patients who were treated with fluvoxamine responded after six weeks, compared with 12 percent of those who received placebo (26). Fluvoxamine was also shown in an eightweek trial to be significantly more effective than desipramine, mainly a noradrenergic reuptake inhibitor, demonstrating the selective efficacy of SSRIs in the treatment of obsessive-compulsive disorder (24). A controlled-release formulation of fluvoxamine has shown promising efficacy in the treatment of obsessive-compulsive disorder, with significantly superior efficacy to that of placebo as early as week 2 (27).

Sertraline has shown efficacy in the treatment of obsessive-compulsive dis-

order despite negative results in an early study (28). In an eight-week doubleblind, controlled trial at daily dosages of up to 200 mg, sertraline was found to be more effective than placebo (29). A multicenter, 12-week, placebo-controlled, double-blind trial of sertraline at three fixed daily dosages—50, 100, and 200 mg—showed that the 50 and 200 mg dosages were more effective than placebo, but not the 100 mg dosage (30).

Furthermore, the ability of sertraline to maintain improvement was demonstrated in a double-blind, placebo-controlled study in which the patients described above who responded to treatment were assigned to a double-blind, fixed-dose trial for an additional 40 weeks. At the 52week end point, mean scores on four primary outcome measures-the YBOCS, the Clinical Global Impression (CGI) severity-of-illness and improvement scales, and the National Institute of Mental Health Global Obsessive Compulsive Scaleshowed significantly greater improvement (p<.005) in the sertraline group than in the placebo group (31).

In a recent 28-week double-blind trial of sertraline compared with placebo among patients who had achieved a sustained response during 52 weeks of single-blind therapy, sertraline had significantly better efficacy than placebo on two of three primary outcomes, including dropout due to relapse or insufficient clinical response (9 percent compared with 24 percent) and acute exacerbation of symptoms (12 percent compared with 35 percent) (32).

Paroxetine has also demonstrated effectiveness in the treatment of obsessive-compulsive disorder (33). In a recent multicenter, double-blind, placebo-controlled study of paroxetine among patients with obsessivecompulsive disorder, acute and longterm treatment and prevention of relapse were examined (33). For acute treatment—phase I (12 weeks) paroxetine at daily dosages of 40 and 60 mg (but not 20 mg) was found to be clinically significant compared with placebo in the treatment of obsessivecompulsive disorder compared with placebo among 348 patients.

In phase II, 263 patients who had

completed phase I underwent six months of treatment with flexibly dosed paroxetine in an open-label trial. In phase III, 105 patients who had responded to the open-label trial of paroxetine were randomly assigned to a six-month double-blind, fixed-dose, parallel trial with either paroxetine or placebo. During phase III, a greater proportion of placebo recipients than paroxetine-treated patients experienced relapse (59 percent and 38 percent, respectively) (33). As is the case with all SSRIs that have a short halflife, abrupt discontinuation of paroxetine may result in a discontinuation syndrome. Therefore, paroxetine dosages should be tapered gradually.

Citalopram does not have FDA approval for the treatment of obsessivecompulsive disorder. It is the most selective of the SSRIs, with less potential for drug interactions. In a recent 12-week, placebo-controlled, doubleblind study of citalopram among 401 patients, all three daily dosages-20, 40, and 60 mg—were found to be statistically superior to placebo in the treatment of obsessive-compulsive disorder (11). In a ten-week singleblind study of 30 patients with obsessive-compulsive disorder who underwent randomized treatment with fluvoxamine, paroxetine, or citalopram, no significant differences were found between the three treatments (12).

Augmentation strategies

Because not all patients respond to SRIs, one further treatment option is augmentation of an SRI with another agent that alters other neurotransmitter systems or different serotonin receptors. It is known that dopamine and serotonin have complex structural interactions in the brain. Furthermore, combinations of a dopamine antagonist and an SRI have been reported to be effective in the treatment of obsessive-compulsive disorder. Haloperidol was shown to be effective as an augmentation strategy for the treatment of patients with obsessivecompulsive disorder and comorbid ticrelated disorders (34). In this doubleblind, placebo-controlled study of patients with obsessive-compulsive disorder whose illness was refractory to fluvoxamine, haloperidol augmentation was found to be significantly more

effective than that of placebo. All eight patients with a concurrent chronic ticrelated disorder responded to ongoing treatment with fluvoxamine combined with haloperidol (34).

This finding suggests that a subtype of patients with obsessive-compulsive disorder who have comorbid tics may benefit from augmentation with a dopamine antagonist. Also, open case series have demonstrated the effectiveness of combinations of pimozide and SRIs among patients with obsessive-compulsive disorder with and without comorbid tic-related disorders (35). Case reports and open studies with combinations of risperidone and SRIs have shown effectiveness in the treatment of obsessivecompulsive disorder (36,37).

In the first double-blind, placebocontrolled trial of risperidone augmentation among patients with SRIrefractory obsessive-compulsive disorder, nine (50 percent) of the 18 patients who completed the risperidone trial responded, compared with none of the 18 patients in the placebo group (38). Also, no differences in response were noted between patients with obsessive-compulsive disorder with and without comorbid diagnoses of a chronic tic-related disorder or schizotypal personality disorder. In addition, more recent case studies have shown some benefit of augmentation of SRIs with olanzapine among patients with treatment-refractory obsessive-compulsive disorder (39,40). A doubleblind, placebo-controlled olanzapine augmentation study documented efficacy as well (41).

The $5HT_{1A}$ agonist buspirone has been reported to effectively augment fluoxetine in open-label studies of obsessive-compulsive disorder (42,43) but not in a controlled study (44). In two double-blind augmentation trials of SRIs, the addition of buspirone was not found to be significantly better than placebo in reducing obsessivecompulsive symptoms (45,46). One open-label addition of D,l-fenfluramine, an indirect 5-HT agonist, to ongoing SRI treatment was associated with improvement in obsessive-compulsive symptoms among six of seven patients (47). Fenfluramine is no longer available on the U.S. market.

Lithium, which is thought to en-

hance presynaptic 5-HT release in the brain (48), was found to improve obsessive-compulsive symptoms when used to augment fluoxetine in an open-label trial (49) but not in a double-blind augmentation study among partial responders with obsessive-compulsive disorder who were receiving clomipramine (50). Two double-blind, placebo-controlled trials of lithium in addition to ongoing fluvoxamine treatment among nonresponders with obsessive-compulsive disorder have been conducted-a two-week study with 20 patients and a four-week study with ten patients (51). A small statistically significant reduction in obsessive-compulsive symptoms was reported in the twoweek trial but not in the four-week trial.

Clonazepam, a benzodiazepine with serotonergic properties, has been found to be effective in the treatment of obsessive-compulsive disorder when used to augment SRIs in case series (52) and in a doubleblind, placebo-controlled crossover trial with fluoxetine or clomipramine (53). Trazodone, a 5-HT₂-blocker with weak 5-HT reuptake properties, was reported to be effective when used to augment various SRIs in five case reports of refractory obsessivecompulsive disorder (54). Tryptophan, a 5-HT precursor, has shown varying degrees of effectiveness in case reports of SRI augmentation in the treatment of obsessive-compulsive disorder (55).

Switching antidepressants

An alternative to augmentation strategies involves switching to another SSRI, to clomipramine, or to the serotonin norepinephrine reuptake inhibitor (SNRI) venlafaxine. Although meta-analyses have suggested that clomipramine has a more potent effect than SSRIs in treating obsessive-compulsive disorder (56–58), the studies on which these analyses were based were not head-to-head comparisons, and the patient samples differed in their severity of illness.

In head-to-head trials, no individual SRI has been shown to be superior to another (59,60). Side effects of clomipramine may include dry mouth and urinary retention and constipation (anticholinergic blockade), sedation and weight gain (antihistaminergic blockade), and orthostatic hypotension (alpha adrenergic blockade), and there is also potential for prolongation of the QT interval and seizures. Only about 25 percent of patients who fail to respond to one SRI will respond to a second SRI trial (61). Venlafaxine is unique in that it acts mostly as an SSRI at dosages below 225 mg daily and begins to have substantial noradrenergic effects at 225 mg daily, as an SNRI. Venlafaxine

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has been shown to be effective in case reports of patients with obsessivecompulsive disorder (13,14). In a recent 12-week single-blind study of venlafaxine compared with clomipramine for acute treatment of obsessive-compulsive disorder, no statistically significant difference was found between the two drugs (15).

In a second 12-week single-blind study of venlafaxine versus clomipramine versus citalopram among patients who were unresponsive to at least two trials of SSRIs other than citalopram, 14 percent of patients responded to citalopram, 42 percent to venlafaxine, and 37.5 percent to clomipramine (15). These findings suggest that patients with obsessivecompulsive disorder who fail to respond to two SSRI trials might benefit from being switched to an agent that has a different mechanism of action, such as clomipramine or venlafaxine (62).

Novel treatment strategies

For some patients, obsessive-compulsive disorder remains refractory to treatment even after switching or augmentation trials. For these patients, alternative novel pharmacotherapy may provide relief from obsessions and compulsions. Intravenous clomipramine has been reported to be successful in the treatment of obsessive-compulsive disorder (63). In a randomized, doubleblind, placebo-controlled trial of intravenous versus oral pulse loading of clomipramine among 15 patients with obsessive-compulsive disorder, six out of seven patients who were treated with intravenous clomipramine responded after 4.5 days from the second pulse, but only one of eight paresponded tients to oral clomipramine, indicating greater immediate improvement (63).

Monoamine oxidase inhibitors have shown some efficacy in case reports of refractory obsessive-compulsive disorder (64). In a placebo-controlled trial of fluoxetine and phenelzine among 54 patients with obsessivecompulsive disorder, the patients who were treated with fluoxetine improved significantly more than the patients who received phenelzine or placebo, except for a subgroup of patients with symmetry obsessions who responded to phenelzine (65). Trazodone demonstrated efficacy in reducing obsessive-compulsive symptoms in case reports and open studies (66) but not in a double-blind, placebo-controlled trial (67). In addition, buspirone has shown varying effectiveness in treating patients with obsessive-compulsive disorder (68,69).

Clonidine, an α_2 agonist, has been shown to be effective in both oral (70) and intravenous (71) form in case reports but not in a double-blind, controlled crossover trial of clomipramine, clonazepam, and clonidine among 28 patients with obsessivecompulsive disorder (72). Clonazepam has also shown efficacy in case reports (73,74). Other benzodiazepines, such as alprazolam, have not been found to be effective in the treatment of obsessive-compulsive disorder (75).

Agents that affect autoimmune mechanisms, steroids, and peptide hormones may play a role in the treatment of obsessive-compulsive disorder. The sudden onset of obsessivecompulsive symptoms after infection by group A B-hemolytic streptococci has been reported among children. Plasmapheresis and intravenous immunoglobulin have been reported to be effective in case studies of such patients (76,77). Among 30 children with infection-triggered exacerbations of obsessive-compulsive disorder or tic-related disorders who received intravenous immunoglobulin, plasma exchange, or placebo, both the intravenous immunoglobulin group and the plasma-exchange group demonstrated significant improvement at one month (78). An open trial with flutamide, an androgen receptor antagonist, among eight patients with obsessive-compulsive disorder demonstrated a lack of response (79).

Medications that affect secondmessenger systems may also be effective in the treatment of patients with obsessive-compulsive disorder. In a six-week double-blind, controlled crossover trial of inositol compared with placebo among 13 patients with obsessive-compulsive disorder, YBOCS scores were significantly lower when the patients were receiving inositol than when they were receiving placebo (80).

Comorbid conditions

Up to two-thirds of patients with obsessive-compulsive disorder have comorbid psychiatric disorders (81,82), which may present a challenge in pharmacologic treatment. Major depressive disorder is cited as the most common comorbid condition among patients with obsessive-compulsive disorder—up to 55 percent of patients in one study (83). SSRIs may target both conditions, with clinical improvement seen earlier for depressive symptoms (four to six weeks) and later for obsessive-compulsive symptoms (up to 12 weeks).

The co-occurrence of obsessivecompulsive disorder and bipolar disorder may be as high as 30 percent (84,85). This rate of comorbidity presents the biggest clinical challenge, because SRIs, which are often optimal for treating obsessive-compulsive disorder, may convert predisposed patients into manic states. Thus it is important to first initiate a mood stabilizer, such as lithium, valproate, or carbamazepine, and then

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exercise caution when using SRIs.

The prevalence of obsessive-compulsive symptoms among patients with schizophrenia has been estimated to range from 7.8 percent to 46.6 percent (86-88). Of interest, in one study, patients with both schizophrenia and obsessive-compulsive disorder showed greater functional impairment with worsened clinical course and treatment response than matched patients with schizophrenia who did not have obsessive-compulsive disorder (89). The possibility that there exists a "schizo-obsessive" subtype of schizophrenia (90) or that there is an overlap in pathology of the comorbid

conditions has been discussed. There is evidence of emergence or worsening of obsessive-compulsive symptoms among some patients with schizophrenia after they begin the atypical neuroleptics clozapine (91,92), olanzapine (93), and risperidone (94). This result may be due to compensatory upregulation of postsynaptic serotonin receptors. The addition of an SRI to the atypical agent may improve obsessivecompulsive symptoms in this subgroup (95,96).

Comorbid anxiety disorders are prevalent among patients with obsessive-compulsive disorder. In a twoyear prospective study, the rate of disorders comorbid with obsessive-compulsive disorder was high-23 percent for social phobia, 21 percent for simple phobia, and 20 percent for generalized anxiety disorder (97). Among 100 study participants with primary obsessive-compulsive disorder, high lifetime rates of social phobia (18 percent), panic disorder (12 percent), and specific phobia (22 percent) were reported (98). SRIs are the pharmacologic treatment of choice for patients with comorbid panic disorder, social phobia, generalized anxiety disorder, and specific phobias.

However, some patients with panic disorder may be sensitive to the activation of SRIs and may initially experience worsening symptoms. Therefore, other treatment options include use of a benzodiazepine, such as clonazepam, in addition to the SRI or use of a monoamine oxidase inhibitor. Although these agents come with the need for dietary restrictions and have the potential for serious side effects, such as hypertensive crises, they are a treatment option for treatment-refractory obsessive-compulsive disorder with comorbid panic disorder.

Nonpharmacologic strategies

Other biological approaches for obsessive-compulsive disorder include neurosurgery, deep-brain stimulation, electroconvulsive therapy, and repetitive transcranial magnetic stimulation. The neurosurgical techniques of cingulotomy and capsulotomy may provide clinical improvement among some patients with treatment-refractory obsessive-compulsive disorder. In one prospective study of 18 patients with obsessive-compulsive disorder who were evaluated before and six months after bilateral cingulotomy, five patients (28 percent) met the criteria for treatment response (99).

Overall, stereotactic surgery should be viewed as a last option in treating refractory obsessive-compulsive disorder, and certain criteria, including several failed treatment trials with cognitive-behavioral therapy, must be met. Deep-brain stimulation, involving insertion of a pacemaker electrode into similar brain regions, may hold promise and does not cause lesions in brain tissue, but this approach requires further study. In one controlled study, repetitive transcranial magnetic stimulation, when applied to the right prefrontal cortex, was shown to produce a transient reduction in compulsive urges (100). Electroconvulsive therapy has not shown much benefit among patients with treatment-refractory obsessivecompulsive disorder. Further research in all these areas is required.

Conclusions

Obsessive-compulsive disorder is a common and disabling disorder but it often responds to appropriate treatment in the form of cognitive-behavioral therapy and pharmacotherapy. The SSRIs and the tricyclic antidepressant clomipramine are first-line pharmacotherapeutic treatments for patients with obsessive-compulsive disorder. SSRIs have a better-tolerated side-effect profile than clomipramine for many patients. Because 40 to 60 percent of patients with obsessivecompulsive disorder do not respond to an SRI, augmentation with agents that affect serotonin and other neurotransmitter systems may play a role in treatment among nonresponders with obsessive-compulsive disorder.

Of importance, a subtype of patients with obsessive-compulsive disorder who have comorbid tic-related disorders may preferentially benefit from augmentation with a dopamine antagonist. Switching from an SSRI to an SNRI, such as clomipramine or venlafaxine, may also be effective. Novel treatments with agents that target autoimmune mechanisms, second-messenger systems, and steroidpeptide hormones may be effective in some cases.

Comorbid psychiatric disorders are highly prevalent among persons with obsessive-compulsive disorder. One subtype of patients with schizophrenia may experience exacerbation of obsessive-compulsive symptoms after treatment with atypical neuroleptics. In these cases, the addition of an SRI may be helpful. Treatment should be ultimately aimed at targeting all core and associated symptoms among patients with obsessive-compulsive disorder. Finally, nonpharmacologic invasive techniques may play a role in refractory cases of obsessive-compulsive disorder, but further research is warranted. \blacklozenge

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References

- Karno M, Golding JM: Obsessive compulsive disorder, in Psychiatric Disorders in America: The Epidemiologic Catchment Area Study. Edited by Robins LN, Regier DA. New York, Free Press, 1991
- American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, 4th ed rev. Washington, DC, American Psychiatric Association, 2000
- Koran LM: Quality of life in obsessivecompulsive disorder. Psychiatric Clinics of North America 23:509–617, 2000
- Koran LM, Thienemann ML, Davenport R: Quality of life for patients with obsessive-compulsive disorder. American Journal of Psychiatry 153:783–788, 1996
- Hollander E, Stein D, Kwon JH, et al: Psychosocial function and economic costs of obsessive-compulsive disorder. CNS Spectrums 2:16, 1997
- Calvocoressi L, Lewis B, Harris M, et al: Family accommodation in obsessive-compulsive disorder. American Journal of Psychiatry 152:441, 1995
- Leon AC, Portera L, Weissman MM: The social costs of anxiety disorders. British Journal of Psychiatry 27:19–22, 1995
- Bystritsky A, Liberman RP, Hwang S, et al: Social functioning and quality of life comparisons between obsessive-compulsive and schizophrenic disorders. Depression and Anxiety 14:214–218, 2001
- Goodman WK, McDougle CJ, Barr LC, et al: Biological approaches to treatment-resistant OCD. Journal of Clinical Psychiatry 54:16–26, 1993
- Rasmussen SA, Eisen JL, Pato MT: Current issues in the pharmacologic management of obsessive compulsive disorder. Journal of Clinical Psychiatry 54:4–9, 1993

- Montgomery SA, Kasper S, Stein DJ, et al: Citalopram 20 mg, 40 mg, and 60 mg are all effective and well tolerated compared with placebo in obsessive-compulsive disorder. International Clinical Psychopharmacology 16:75–86, 2001
- Mundo E, Bianchi L, Bellodi L: Efficacy of fluvoxamine, paroxetine, and citalopram in the treatment of obsessive-compulsive disorder: a single-blind study. Journal of Clinical Psychopharmacology 17:257–271, 1997
- Grossman R, Hollander E: Treatment of obsessive-compulsive disorder with venlafaxine (letter). American Journal of Psychiatry 153:576–577, 1996
- 14. Rauch SL, O'Sullivan RL, Jenike MA: Open treatment of obsessive-compulsive disorder with venlafaxine: a series of ten cases (letter). Journal of Clinical Psychopharmacology 16:81–83, 1996
- Ravizza L, Albert U, Ceregato A: Venlafaxine in OCD. Presented at the International Obsessive-Compulsive Disorder Conference. Sardinia, Italy, Mar 29 to Apr 1, 2001
- Thoren P, Asberg M, Cronholm B, et al: Clomipramine treatment in obsessive compulsive disorder: I. a controlled clinical trial. Archives of General Psychiatry 37:1281–1285, 1980
- Flament MF, Rapoport JL, Berg CJ, et al: Clomipramine treatment of childhood obsessive-compulsive disorder: a doubleblind controlled study. Archives of General Psychiatry 42:977–983, 1985
- The Clomipramine Collaborative Study Group: Clomipramine in the treatment of patients with obsessive-compulsive disorder. Archives of General Psychiatry 48:730– 738, 1991
- DeVeaugh-Geiss J, Moroz G, Biederman J, et al: Clomipramine hydrochloride in childhood and adolescent obsessive-compulsive disorder: a multicenter trial. Journal of the American Academy of Child and Adolescent Psychiatry 31:45–49, 1992
- Liebowitz MR, Hollander E, Schneier F, et al: Fluoxetine treatment of obsessive-compulsive disorder: an open clinical trial. Journal of Clinical Psychopharmacology 9:423– 427, 1989
- 21. Tollefson GD, Rampey AH, Potvin JH, et al: A multicenter investigation of fixed-dose fluoxetine in the treatment of obsessivecompulsive disorder. Archives of General Psychiatry 51:559–567, 1994
- 22. Montgomery SA, McIntyre A, Osterheider M, et al: A double-blind, placebo-controlled study of fluoxetine in patients with DSM-III-R obsessive-compulsive disorder. European Neuropsychopharmacology 3:143–152, 1993
- Perse TL, Greist JH, Jefferson JW, et al: Fluvoxamine treatment of obsessive-compulsive disorder. American Journal of Psychiatry 144:1543–1548, 1987
- Goodman WK, Price LH, Rasmussen SA, et al: Efficacy of fluvoxamine in obsessive compulsive disorder. Archives of General Psychiatry 46:36–44, 1989
- 25. Jenike MA, Hymna S, Baer L, et al: A controlled trial of fluvoxamine in obsessive-

compulsive disorder: implications for a serotonergic theory. American Journal of Psychiatry 147:1209–1215, 1990

- 26. Greist JH: Fluvoxamine in OCD: A Multicenter Parallel Design Double-Blind Placebo-Controlled Trial. Presented at the 18th Collegium Internationale Neuro-Psychopharmacologicum Congress. Nice, France, June 28 to July 2, 1992
- 27. Hollander E, Koran LM, Goodman W, et al: A double-blind placebo-controlled study of the efficacy and safety of controlled-release fluvoxamine in patients with obsessive-compulsive disorder. Journal of Clinical Psychiatry 64:640–647, 2003
- Jenike MA, Baer L, Summergrad P, et al: Sertraline in obsessive compulsive disorder: a double-blind comparison with placebo. American Journal of Psychiatry 147: 923–928, 1990
- 29. Chouinard G, Goodman W, Greist JH, et al: Results of a double-blind placebo controlled trial of a new serotonin uptake inhibitor, sertraline, in the treatment of obsessive-compulsive disorder. Psychopharmacology Bulletin 26:279–284, 1990
- 30. Greist J, Chouinard G, Duboff E, et al: Double-blind parallel comparison of three dosages of sertraline and placebo in outpatients with obsessive-compulsive disorder. Archives of General Psychiatry 52:289–295, 1995
- 31. Greist JH, Jefferson JW, Kobak KA, et al: A one-year double-blind placebo-controlled fixed dose study of sertraline in the treatment of obsessive-compulsive disorder. International Clinics of Psychopharmacology 10:57–65, 1995
- 32. Koran LM, Hackett E, Rubin A, et al: Efficacy of sertraline in the long-term treatment of obsessive-compulsive disorder. American Journal of Psychiatry 159:88–95, 2002
- 33. Hollander E, Allen A, Steiner M, et al: Acute and long-term treatment and prevention of relapse of obsessive-compulsive disorder with paroxetine. Journal of Clinical Psychiatry, in press
- 34. McDougle CJ, Goodman WK, Leckman JF: Haloperidol addition in fluvoxamine-refractory obsessive-compulsive disorder: a double-blind, placebo-controlled study in patients with and without tics. Archives of General Psychiatry 51:302–308, 1994
- McDougle CJ, Goodman WK, Price LJ, et al: Neuroleptic addition in fluvoxamine-refractory obsessive-compulsive disorder. American Journal of Psychiatry 147:652– 654, 1990
- 36. Saxena S, Wang D, Bystritsky A, et al: Risperidone augmentation of SRI treatment for refractory obsessive-compulsive disorder. Journal of Clinical Psychiatry 57:303–306, 1996
- Ravizza L, Barzega G, Bellino S, et al: Therapeutic effect and safety of adjunctive risperidone in refractory obsessive-compulsive disorder (OCD). Psychopharmacology Bulletin 32:677–682, 1996
- 38. McDougle CJ, Epperson CN, Pelton GH, et al: A double-blind, placebo-controlled

study of risperidone addition in serotonin reuptake inhibitor-refractory obsessivecompulsive disorder. Archives of General Psychiatry 57:794–801, 2000

- 39. Weiss EL, Potenza MN, McDougle CJ, et al: Olanzapine addition in obsessive-compulsive disorder refractory to selective serotonin reuptake inhibitors: an open-label case series. Journal of Clinical Psychiatry 60:524–527, 1999
- Koran LM, Ringold AL, Elliot MA: Olanzapine augmentation for treatment-resistant obsessive-compulsive disorder. Journal of Clinical Psychiatry 61:514–517, 2000
- 41. Bystritsky A, Ackerman DL, Rosen RM, et al: Augmentation of SSRI response in refractory OCD using adjunctive olanzapine: a placebo controlled trial. Presented at the International Obsessive-Compulsive Disorder Conference. Sardinia, Italy, Mar 29 to Apr 1, 2001
- Markovitz PJ, Stagno SJ, Calabrese JR: Buspirone augmentation of fluoxetine in obsessive-compulsive disorder. American Journal of Psychiatry 47:798–800, 1990
- 43. Jenike MA, Baer L, Buttolph L: Buspirone augmentation of fluoxetine in patients with obsessive-compulsive disorder. Journal of Clinical Psychiatry 52:13–14, 1991
- 44. Grady TA, Pigott TA, L'Heureux F, et al: Double-blind study of adjuvant buspirone for fluoxetine treated patients with obsessive-compulsive disorder. American Journal of Psychiatry 150:819–821, 1993
- 45. Pigott TA, L'Heureux F, Hill JL, et al: A double-blind study of adjuvant buspirone hydrochloride in clomipramine-treated patients with obsessive-compulsive disorder. Journal of Clinical Psychopharmacology 12: 11–18, 1992
- 46. McDougle CJ, Goodman WK, Leckman JF, et al: Limited therapeutic effect of addition of buspirone in fluvoxamine-refractory obsessive-compulsive disorder. American Journal of Psychiatry 150:647–649, 1993
- 47. Hollander E, DeCaria CM, Schneier FR, et al: Fenfluramine augmentation of serotonin reuptake blockade antiobsessional treatment. Journal of Clinical Psychiatry 51:119–123, 1990
- De Montigny C: Enhancement of the 5-HT neurotransmission by antidepressant treatments. Journal of Physiology 77:455–461, 1981
- 49. Ruegg RG: Lithium plus fluoxetine treatment of obsessive compulsive disorder. Abstract presented at the annual meeting of the American Psychiatric Association, New York City, May 1990
- 50. Pigott TA, Pato MT, L'Heureux F, et al: A controlled comparison of adjuvant lithium carbonate or thyroid hormone in clomipramine-treated patients with obsessive compulsive disorder. Journal of Clinical Psychopharmacology 11:242–248, 1991
- McDougle CJ, Price LH, Goodman WK, et al: A controlled trial of lithium augmentation in fluvoxamine-refractory obsessivecompulsive disorder: lack of efficacy. Journal of Clinical Psychopharmacology 11: 175–184, 1991

- 52. Leonard HL, Topol D, Bukstein O, et al: Clonazepam as an augmenting agent in the treatment of childhood-onset obsessivecompulsive disorder. Journal of the American Academy of Child and Adolescent Psychiatry 33:792–794, 1994
- 53. Pigott TA, L'Heureux F, Rubenstein CF, et al: A controlled trial of clonazepam augmentation in OCD patients treated with clomipramine or fluoxetine. Abstract presented at the annual meeting of the American Psychiatric Association, Washington, DC, May 4, 1992
- Marazziti D, Gemignani A, Dell'Osso L: Trazodone augmentation in OCD: a case series report. CNS Spectrums 4:48–49, 1999
- Mattes JA: A pilot study of combined trazodone and tryptophan in obsessive-compulsive disorder. International Clinical Psychopharmacology 1:170–173, 1986
- Griest JH, Jefferson JW, Kobak KA, et al: Efficacy and tolerability of serotonin transport inhibitors in obsessive-compulsive disorder: a meta-analysis. Archives of General Psychiatry 52:53–60, 1995
- Piccinelli M, Pini S, Bellantouono C, et al: Efficacy of drug treatment in obsessivecompulsive disorder: a meta-analytic review. British Journal of Psychiatry 166:424– 443, 1995
- Stein DJ, Spadaccni E, Hollander E: Metaanalysis of pharmacotherapy trials for obsessive-compulsive disorder. International Clinical Psychopharmacology 10:11–18, 1995
- 59. Freeman CPL, Trimble MR, Deakin JFW, et al: Fluvoxamine versus clomipramine in the treatment of obsessive-compulsive disorder: a multicenter, randomized, doubleblind, parallel group comparison. Journal of Clinical Psychiatry 55:301–305, 1994
- Koran LM, Cain JW, Dominguez RA, et al: Fluvoxamine versus clomipramine for obsessive-compulsive disorder: a doubleblind comparison. Journal of Clinical Psychopharmacology 16:121–129, 1996
- Goodman WK, Ward H, Kablinger A, et al: Fluvoxamine in the treatment of obsessivecompulsive disorder and related conditions. Journal of Clinical Psychiatry 58(suppl 5):32–49, 1997
- Hollander E, Bienstock CA, Koran L, et al: Refractory obsessive-compulsive disorder: state-of-the-art treatment. Journal of Clinical Psychiatry 63(suppl 6):20–29, 2002
- 63. Koran LM, Sallee FR, Pallanti S: Rapid benefit of intravenous pulse loading of clomipramine in obsessive-compulsive disorder. American Journal of Psychiatry 54: 396–401, 1997
- Annesley PT: Nardil response in a chronic obsessive compulsive. British Journal of Psychiatry 115:748, 1969
- 65. Jenike MA, Baer L, Minichiello WE, et al: Placebo-controlled trial of fluoxetine and phenelzine for obsessive-compulsive disorder. American Journal of Psychiatry 154: 1261–1264, 1997
- 66. Baxter LR Jr: Two cases of obsessive-compulsive disorder with depression responsive

to trazodone. Journal of Nervous and Mental Disease 173:432–433, 1985

- 67. Piggott TA, L'Heureux F, Rubenstein CS, et al: A double-blind, placebo controlled study of trazodone in patients with obsessive-compulsive disorder. Journal of Clinical Psychopharmacology 12:156–162, 1992
- Jenike MA, Baer L: An open trial of buspirone in obsessive-compulsive disorder. American Journal of Psychiatry 145:1285– 1286, 1988
- 69. Hewlett WA: Novel pharmacological treatments of obsessive-compulsive disorder, in Obsessive-Compulsive Disorders. Edited by Hollander E, Stein DJ. New York, Marcel Dekker, 1997
- Knesevich JW: Successful treatment of obsessive-compulsive disorder with clonidine hydrochloride. American Journal of Psychiatry 139:364–365, 1982
- Hollander E, Fay M, Cohen B, et al: Serotonergic and noradrenergic sensitivity in obsessive compulsive disorder: behavioral findings. American Journal of Psychiatry 145:1015–1017, 1988
- Hewlett WA, Vinogradov S, Agras WS: Clomipramine, clonazepam, and clonidine treatment of obsessive-compulsive disorder. Journal of Clinical Psychopharmacology 12:420–430, 1992
- Hewlett WA, Vinogradov S, Agras WS: Clonazepam treatment of obsessions and compulsions. Journal of Clinical Psychiatry 51:158–161, 1990
- Bodkin JA, White K: Clonazepam in the treatment of obsessive compulsive disorder associated with panic disorder in one patient. Journal of Clinical Psychiatry 40:265– 266, 1989
- Stein DJ, Hollander E, Mullen LS, et al: Comparison of clomipramine, alprazolam, and placebo in the treatment of obsessivecompulsive disorder. Human Psychopharmacology 7:389–395, 1992
- 76. Allen AJ, Leonard H, Swedo SE: Case study: a new infection-triggered, autoimmune subtype of pediatric OCD and Tourette's syndrome. Journal of the American Academy of Child and Adolescent Psychiatry 34:307–311, 1995
- 77. Swedo SE, Rapoport JL, Cheslow DL, et al: High prevalence of obsessive-compulsive symptoms in patients with Sydenham's chorea. American Journal of Psychiatry 146:246–249, 1989
- Perlmutter SJ, Leitman SF, Garvey MH, et al: Therapeutic plasma exchange and intravenous immunoglobulin for obsessive-compulsive disorder and tic disorders in childhood. Lancet 354:1153–1158, 1999
- Altemus M, Greenberg BD, Keuler D, et al: Open trial of flutamide for treatment of obsessive-compulsive disorder. Journal of Clinical Psychiatry 60:442–445, 1999
- Fux M, Levine J, Aviv A, et al: Inositol treatment of obsessive-compulsive disorder. American Journal of Psychiatry 153: 1219–1221, 1996
- 81. Karno M, Golding JM, Sorenson SB, et al: The epidemiology of obsessive compulsive disorder in five US communities. Archives

of General Psychiatry 45:1094-1099, 1988

- Rasmussen SA, Eisen JL: The epidemiology and differential diagnosis of obsessive compulsive disorder. Journal of Clinical Psychiatry 55:5–14, 1994
- Eisen JL, Goodman WK, Keller MB, et al: Patterns of remission and relapse in obsessive-compulsive disorder: a two-year prospective study. Journal of Clinical Psychiatry 60:346–351, 1999
- Cosoff S, Hafner RJ: The prevalence of comorbid anxiety in schizophrenia, schizoaffective disorder, and bipolar disorder. Australian and New Zealand Journal of Psychiatry 32:67–72, 1998
- Kruger S, Cooke RG, Hasey GM, et al: Comorbidity of obsessive compulsive disorder in bipolar disorder. Journal of Affective Disorders 34:117–120, 1995
- Fenton WS, McGiashan TH: The prognostic significance of obsessive-compulsive symptoms in schizophrenia. American Journal of Psychiatry 143:437–441, 1986
- Eisen JL, Beer DA, Pato MT, et al: Obsessive-compulsive disorder in patients with schizophrenia or schizoaffective disorder. American Journal of Psychiatry 154:271– 273, 1997
- Berman I, Kalinowski A, Berman SM, et al: Obsessive and compulsive symptoms in chronic schizophrenia. Comprehensive Psychiatry 365:6–10, 1995
- Hwang MY, Morgan JE, Losconzcy MF: Clinical and neuropsychological profiles of obsessive-compulsive schizophrenia. Journal of Neuropsychiatry and Clinical Neuroscience 12:91–94, 2000
- Zohar J: Is there room for a new diagnostic subtype: the schizo-obsessive subtype? CNS Spectrums 2:49–50, 1997
- Baker RW, Chengappa KNR, Baird JW, et al: Emergence of obsessive-compulsive symptoms during treatment with clozapine. Journal of Clinical Psychiatry 53:439–442, 1992

- 92. Patil VJ: Development of transient obsessive compulsive symptoms during treatment with clozapine (letter). American Journal of Psychiatry 149:272, 1992
- 93. Lykouras L, Zeruas IM, Gournellis R, et al: Olanzapine and obsessive-compulsive symptoms. European Neuropsychiatry 10: 385–387, 2000
- 94. Kopala L, Honer WG: Risperidone, serotonergic mechanisms, and obsessive-compulsive symptoms in schizophrenia (letter). American Journal of Psychiatry 151: 1714–1715, 1994
- 95. Allen L, Tejera C: Treatment of clozapine induced OC symptoms with sertraline (letter). American Journal of Psychiatry 151: 1096–1097, 1994
- 96. Poyurovsky M, Hermesh H, Weizman A: Fluvoxamine treatment in clozapine-induced obsessive-compulsive symptoms in schizophrenic patients. Journal of Clinical Neuropharmacology 19:305– 313, 1996
- 97. Eisen JL, Beer D, Pato MT, et al: Patterns of remission and relapse in obsessive-compulsive disorder: a 2-year prospective study. Journal of Clinical Psychiatry 60: 356–351, 1999
- 98. Rasmussen SA, Eisen JL: The epidemiology and clinical features of obsessive compulsive disorder, in Obsessive-Compulsive Disorders: Practical Management, 3rd ed. Edited by Jenike MA, Baer L, Minichiello WE. St Louis, Mosby, 1998
- Baer L, Rauch SK, Ballantine T, et al: Cingulotomy for intractable obsessive-compulsive disorder. Archives of General Psychiatry 52:384–392, 1995
- 100. Greenberg BD, George MS, Martin DJ, et al: Effect of prefrontal repetitive transcranial magnetic stimulation in obsessivecompulsive disorder: a preliminary study. American Journal of Psychiatry 154:867– 869, 1997

First-Person Accounts Invited for Column

Patients, former patients, family members, and mental health professionals are invited to submit first-person accounts of experiences with mental illness and treatment for the Personal Accounts column of *Psychiatric Services*. Maximum length is 1,600 words. The column appears every two months.

Material to be considered for publication should be sent to the column editor, Jeffrey L. Geller, M.D., M.P.H., at the Department of Psychiatry, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, Massachusetts 01655. Authors may publish under a pseudonym if they wish.