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Review article

Postpartum onset obsessive-compulsive disorder: diagnosis and management

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Summary

The postpartum period is associated with an increased risk of developing obsessive-compulsive disorder (OCD) in women. Postpartum onset OCD is often undiagnosed and untreated resulting in serious consequences for the patient, her family and the newborn. The symptoms of postpartum onset OCD may consist of obsessional intrusive thoughts about harming the newborn without compulsions or with both obsessions and compulsions. In this review, the phenomenology of postpartum onset OCD is described as well as strategies for screening and diagnosis. The review also characterizes the differences between postpartum onset OCD and postpartum depression and postpartum psychosis and explores strategies for managing postpartum onset OCD patients. Issues regarding pharmacologic treatment of OCD in breastfeeding mothers are also reviewed.

Keywords: Postpartum; obsessive-compulsive disorder; diagnosis; management; breastfeeding.

Introduction

In women, the puerperium has been associated with an increased risk of developing psychiatric disorders (Kendell et al., 1981; Kumar and Robson, 1984; Paffenbarger, 1982; Pitt, 1982). Postpartum depression and puerperal psychosis (Brockington et al., 1981; Kendell et al., 1987) have received much attention in the literature. Postpartum onset obsessive-compulsive disorder (OCD), a frequently seen clinical entity, on the other hand, has been largely understudied. When undiagnosed and untreated, postpartum onset OCD can cause marked suffering and dysfunction in the patient and her family, interruption of the mother-infant bonding and adverse cognitive-behavioral developmental effects in the newborn.

This review will describe the phenomenology of postpartum onset OCD, its differential diagnoses as compared with other postpartum psychiatric disorders and its management with particular consideration for treatment during breastfeeding.

Method

Keywords 'postpartum', 'obsessive-compulsive', 'breastfeeding', 'clomipramine', 'fluoxetine', 'sertraline', 'paroxetine', 'fluvoxamine', 'citalopram', 'venlafaxine', 'depression', 'psychosis' and 'pregnancy' were used in combinations to search for literature published from 1966 to the present in Medline. References cited in the searched articles were also reviewed.

Phenomenology

Women are at an increased risk of developing OCD during the postpartum period. In several earlier studies (Ingram, 1961; Lo, 1967; Pollitt, 1957; Rasmussen and Tsuang, 1986), patients with OCD reported pregnancy and childbirth as significant life events which may have triggered the onset of their illness. These studies have several limitations. They are retrospective studies in which patients were asked to recollect and identify possible precipitating events. Recall bias may have been introduced thus making it difficult to derive a definitive causal link between childbirth and OCD onset. Diagnostic criteria such as 'obsessional states' and 'obsessional patients' used in some of the studies (Ingram, 1961; Lo, 1967; Pollitt, 1957) may also differ from the Diagnostic

and Statistical Manual (DSM) criteria of OCD used today. In addition, the exact incidence of postpartum onset OCD in women cannot be derived from these studies, as those patients who reported pregnancy or childbirth as precipitating events were not differentiated according to gender.

In Buttolph and Holland's retrospective study of 180 patients meeting DSM-III-R criteria for OCD (Buttolph and Holland, 1990), 60 patients (39 women and 21 men) participated by returning their questionnaires. Among the female subjects, 21% reported onset and 15% reported worsening of their OCD after childbirth. All 8 women with postpartum onset OCD reported having both obsessions and compulsions. The results of this study are limited by the retrospective design and low response rate.

Sichel and colleagues (Sichel et al., 1993a) described 15 postpartum women who developed disturbing, intrusive, ego-dystonic thoughts of harming their newborns without compulsions. These obsessional thoughts escalated rapidly within 4 weeks of delivery. All 15 met DSM-III-R criteria for OCD and none of the patients were psychotic. Patients described intrusive thoughts or images of stabbing the baby with a knife, sexually abusing the newborn or drowning the baby in the bathtub while bathing it. Patients experienced heightened fear that they may act on the thoughts and hence developed avoidance behaviors such as not bathing the baby or avoiding working with knives. When followed up a year later, none of the patients had developed compulsions, in contrast to OCD in nongravid population in whom evolution of obsession to later include compulsions is common (Sichel et al., 1993a).

Epperson and colleagues (Epperson et al., 1995) recently reported on 56 women with OCD who have been pregnant at least once, of whom 18.6% had onset of their illness during pregnancy or the early postpartum period. Women with onset of OCD during pregnancy or early postpartum were more likely to report contamination obsession as their predominant symptom compared with women with nongravid onset OCD.

In a case-controlled retrospective study, Maina and colleagues (Maina et al., 1999) investigated 68 patients (35 males and 33 females) who met DSM-IV criteria for OCD without concurrent major depression. Among the various types of life events occurring during the 6 or 12 months prior to the onset of OCD, 'birth of a live child' reported by 8 mothers (24% of female subjects) was the only life event significantly more reported by OCD patients compared with control subjects. All 8 women had their OCD onset within 4 weeks postpartum. Women with postpartum onset OCD also reported significantly more aggressive obsessions about harming the newborn than women who did not report postpartum onset of OCD. Interestingly, 7 out of the 8 women were reported to have had some obsessive and/or compulsive symptoms before pregnancy.

In summary, existing data suggest that onset of OCD is common during the postpartum period. In addition, there are differential characteristics in the phenomenology of postpartum onset OCD, with respect to the presence or absence of compulsions and the contents of obsessions and/or compulsions.

Women with pre-existing OCD often experience worsening of their symptoms during the puerperium. In the study by Epperson et al. (Epperson et al., 1995) 25 of the 34 women (73%) with pre-existing OCD reported worsening of their symptoms during pregnancy or early postpartum. In a retrospective study of 57 women with DSM-III-R diagnosis of OCD (Williams and Koran, 1997), 7 out of 24 patients (29%) who completed full-term pregnancies reported worsening of their pre-existing OCD during the postpartum period. Interestingly, none reported onset of their symptoms during the postpartum period. Among the 4 patients who reported improvement of their symptoms during pregnancy, 2 experienced exacerbation after delivery. Exacerbation of pre-existing OCD is common in women after delivery, even when medication discontinuation is successful during pregnancy (Altshuler et al., 1998).

In women with pre-existing OCD, miscarriage may also bring about an exacerbation of their symptoms. In a cohort study of 229 women with history of miscarriage in the preceding 6 months, miscarriage was a significant risk factor for the recurrence of OCD (Geller et al., 2001).

Epidemiology

The exact incidence or prevalence rates of postpartum onset OCD is unknown. Lifetime prevalence rate of OCD in the general population is 2 to 3% (Karno et al., 1988; Robins et al., 1984) and is consistent across different countries (Weissman et al., 1994). The prevalence rate of OCD in the puerperium may be similar to the 3-month point prevalence rate of OCD in the general population (Robins et al., 1984).

Lifetime prevalence of OCD maybe higher in women than in men (3.1% and 2.0%, respectively) (Bebbington, 1998; Pigott, 2002). The mean age of onset for women (22.9 years, SD: 12.6 years) is later than that for men (15.5 years, SD: 5.4 years) (Rasmussen and Tsuang,

1986). The age of onset of OCD in women has a bimodal distribution with the first peak incidence occurring between 13 to 16 years of age and the second between 22 to 32 years of age (Neziroglu et al., 1992), suggesting that the incidence of OCD in women is highest during childbearing years (Robins et al., 1984).

Etiology

The cause of OCD is unknown. Serotonin dysfunction has been suggested in the pathogenesis of OCD (Barr et al., 1993; Pigott, 2002) as well as familiar inheritance (Nestadt et al., 2000; Pauls et al., 1995), memory dysfunction (Kim et al., 2002; Savage et al., 2000), and anatomical and functional abnormalities in the brain (Rauch, 2000; Saxena et al., 1998).

The etiology of postpartum onset OCD is also unknown. Estrogen and progesterone have been shown to influence serotonergic neurotransmission (Biegon et al., 1983; Cone et al., 1981; Ehrenkranz, 1976; Renner et al., 1987; Stockert and De Robertis, 1985). The acute onset of OCD in the postpartum period may be accounted for by the dramatic fall in these female gonadal steroid hormone levels resulting in serotonergic dysfunction which in turn interacts with predisposition to psychiatric disorder (Sichel et al., 1993a; Williams and Koran, 1997). McDougle and colleagues have suggested that a rapid increase in oxytocin to a high level near the end of pregnancy and during the puerperium may trigger exacerbation or onset of OCD, noting that oxytocin may play a role in the pathogenesis of recurrent and unwanted sexual thoughts or images which are common types of obsessions in nongravid OCD patients (McDougle et al., 1999). Changes in other reproductive hormones such as gonadotropin-releasing hormone and prolactin have also been implicated (Shear and Mammen, 1995).

Referring to their case series of 4 new fathers who developed OCD, Abramowitz et al. suggested the cognitive-behavioral model in the pathogenesis of OCD in the postpartum period, stating that the neurobiological mechanism of OCD cannot account for the onset of the disorder in men during their partners' pregnancy or puerperium (Abramowitz et al., 2001). The cognitive-behavioral model of OCD suggests that patients with OCD attach exaggerated significance to the unwanted, intrusive thoughts which are in fact experienced universally and misinterpret them catastrophically. For instance, the thought 'what if I drop the baby' is misinterpreted as 'I will drop the baby'. Efforts are then made to resist or remove the resultant anxiety in the form of avoidance behaviors, neutralization or compulsions. These actions are partly successful at relieving the anxiety and hence self-perpetuating (Rachman, 1997).

In new mothers with pre-existing OCD, the responsibility of looking after a helpless newborn along with other family and environmental changes that result after delivery may be a source of psychological stress causing exacerbation of the disorder (Williams and Koran, 1997).

Screening and diagnosis

Primary care physicians, obstetricians, pediatricians and psychiatrists should actively screen for symptoms of OCD early – within 2 to 4 weeks – in the postpartum period as the peak time of onset for postpartum OCD may be early in the puerperium. In two case series, the mean time of onset of OCD symptoms were 2.2 weeks (SD: 1.2 weeks) (Sichel et al., 1993a) and 3.7 weeks (SD: 4.9 weeks) (Arnold, 1999) following delivery, respectively, with onset as early as the second postpartum day reported in the latter study. A simple screening question may be asked during a postpartum follow-up or a well baby visit; ''it's not uncommon for new mothers to experience intrusive, unwanted thoughts that they might harm their baby. Have any such thoughts occurred to you?''. Patients should also be asked about compulsions such as excessive washing and checking behaviors. When the patient confirms the presence of such symptoms, the Yale-Brown Obsessive Compulsive Scale (YBOCS) (Goodman et al., 1989b; Goodman et al., 1989c), an easy-to-administer self-report scale, may be used to evaluate the severity of the symptoms and to monitor response to treatment.

If the mother admits to having thoughts of harming the infant, the frequency and the intensity of the thoughts should be sought. The patient should be asked whether she has any actual intentions or desires to harm the baby, others (e.g. other children) or herself. The clinician should assess the patient's likelihood of committing harm so that urgent psychiatric referral and intervention may be undertaken as necessary. A thorough psychiatric examination including assessment of the patient's perceptive function, cognitive function, reality testing, insight and judgement should be performed to rule out a psychotic disorder. Questions regarding depressed mood, anhedonia and other neurovegetative symptoms such as appetite, sleep, and/or energy changes should be asked to rule out the presence of postpartum depression or concurrent major depression. A comprehensive medical history taking and physical examination are also warranted. Routine laboratory indices including thyroid function test must be checked

to rule out any organic causes for the obsessive and/or compulsive symptoms.

New mothers may worry about their newborns becoming ill or being hurt. Worry should be differentiated from obsessions about harming the infant, which take the form of intrusive thoughts, images or impulses. When the new mother's worry or anxiety is excessive or interfering with functioning, further questioning may be necessary to assess for the presence of generalized anxiety disorder. Obsessions should also be differentiated from ruminations in major depression.

Postpartum OCD and depression

In nongravid population, major depressive disorder is the most common comorbid diagnosis in patients with OCD with 60 to 80% lifetime prevalence rate of comorbidity (Rasmussen and Eisen, 1994). Comorbid major depression may be more common in female patients with OCD than in male OCD patients (Overbeek et al., 2002).

A similar relationship appears to exist between OCD and depression during the postpartum period. Earlier reports have suggested that obsessional symptoms commonly co-occur with postpartum affective disorders (Davidson and Robertson, 1985; Ingram, 1961; Pollitt, 1957). Nine out of 15 women (60%) described by Sichel and colleagues (Sichel et al., 1993a) developed secondary major depression 2 to 3 weeks following the onset of OCD. One patient developed severe depression that required electroconvulsive therapy. Women with pre-existing OCD may also be at increased risk of developing postpartum depression. Williams and Koran (Williams and Koran, 1997) found that 9 out of 24 (37%) women with pre-existing OCD reported experiencing postpartum depression and that in 5 patients this was their first episode of depression.

The presence of obsessional thoughts of harming the newborn is common in women with postpartum depression. In a cohort study of 100 depressed mothers and 46 non-depressed mothers (Jennings et al., 1999), 41% of mothers with depression were reported to have had some thoughts of harming their infants while only 6.5% of mothers without depression reported ever having these thoughts.

In a prospective study of 37 women with postpartum onset major depression and 28 women with nongravid major depression (Wisner et al., 1999), 57% of women with postpartum onset major depression and 39% with nongravid major depression reported having obsessions or compulsions although the difference was not statistically significant. However, women with postpartum onset major depression were found to have more aggressive obsessional thoughts, the most frequent being thoughts about harming their newborns, than women with nongravid major depression. The study also found that women with postpartum onset major depression with aggressive obsessions had significantly more checking obsessions.

Lastly, when OCD is complicated by major depression, the obsessive-compulsive symptoms appear to be more resistant to treatment (Overbeek et al., 2002). Therefore, comorbid major depression in patients with postpartum onset OCD may also have significant implications for treatment and prognosis.

Postpartum OCD cf. postpartum psychosis

Postpartum psychosis is the most severe of all postpartum psychiatric disorders. Fortunately, it is a rare disorder occurring in only 1 to 2 in 1000 postpartum women (Kendell et al., 1987). Postpartum psychosis is frequently considered to be a manifestation of bipolar disorder (Gold, 2002) or a manifestation of major depression with psychotic features (Arnold et al., 2002). Women with bipolar disorder who relapse after giving birth often present with symptoms of postpartum psychosis. On the other hand, an episode of postpartum psychosis is often associated with later development of bipolar or schizoaffective disorders (Altshuler et al., 1998).

The symptoms of postpartum psychosis occur early after birth, as early as 2 to 3 days postpartum (Nonacs and Cohen, 1998). Almost all cases present by the first 2 to 3 weeks postpartum (Brockington et al., 1981). Early symptoms of postpartum psychosis consist of irritability, mood lability and agitation which rapidly evolve to confusion, mood changes similar to a mixed manic episode (Gold, 2002) and frank psychotic symptoms such as hallucinations, disorganized thoughts, bizarre behavior, delusions and loss of reality. The theme of the delusion is often the newborn and may involve the need to harm or kill the baby or denying the birth (Knops, 1993). Postpartum psychosis is a psychiatric emergency. If untreated the disorder is associated with 5% suicide rate (Knops, 1993) and up to 4% infanticide rate (Cohen and Altshuler, 1997).

The delusion regarding the infant in postpartum psychosis must be differentiated from intrusive thoughts of harming the infant in postpartum OCD. To patients with postpartum OCD, the thoughts are ego-dystonic; patients are frightened, disturbed and even tormented by the

thoughts. In patients with postpartum psychosis the delusions are ego-syntonic and no such distress is seen in regard to their thoughts. Patients with postpartum psychosis experience impulses to act on their delusions and therefore have an increased risk of actually harming the infant (Button and Reivich, 1972). Mothers with postpartum OCD avoid objects or being with their newborn in order to lessen the chance that they may act on their thoughts and often feel guilty about neglecting the baby. Such avoidance behaviors are rarely observed in patients with postpartum psychosis.

Patients with postpartum OCD are often reluctant to tell others about their symptoms – even their families – because they fear that their babies may be taken away by child welfare authorities or because of the real sense of shame they experience. Even if the patient receives treatment, some mothers may not acknowledge having these thoughts until late in the course of treatment or when they are no longer actively having the thoughts (Jennings et al., 1999). It is imperative to reassure and educate postpartum women that occurrence of these intrusive thoughts are common so that patients may receive appropriate care and treatment without having to suffer in silence. Postpartum advocacy groups may have an important role in providing support to new mothers with postpartum onset OCD and raising the awareness of the disorder in the general public.

Management

When formulating a management plan for a patient with postpartum onset OCD, the clinical decision must be an informed and individualized one, incorporating risks and benefits of various treatment modalities and patient wishes.

Non-pharmacologic treatment

Cognitive-behavioral therapy (CBT) may be an effective treatment option in postpartum onset OCD, especially in women who present with both obsessions and compulsions. CBT is aimed at modifying cognitive errors in OCD patients (cognitive therapy) and reducing rituals through exposure and response prevention (behavioral therapy). To date, no CBT trials on postpartum population exist. Some authors have recommended CBT as the first-line treatment in patients with OCD in the general population (March et al., 1997) and it may offer more long-term gains than pharmacotherapy alone (O'Sullivan et al., 1991). CBT is a valuable treatment option if the woman wishes to breastfeed her infant, as this form of treatment will obviously alleviate the possibility of exposing the newborn to psychotropic agents through breast milk.

When the patient's symptoms consist mainly of intrusive, obsessional thoughts without compulsions, pharmacologic treatment may be an effective option. Trials of exposure and response prevention in patients with obsessional thoughts without compulsions – as frequently seen in postpartum onset OCD – have produced inconsistent results. In addition, empirical data on the usefulness of other CBT techniques such as thought-stopping in reducing obsessions are lacking (Jenike, 2001). Certain behaviors (e.g. avoidance behaviors, mental rituals, assurance seeking from others) may not be readily reported by patients as compulsions. These behaviors have an anxiety-alleviating effect and may be considered functionally similar to overt compulsions. These behaviors may be amendable to treatment with CBT, and therefore their presence should be carefully sought and incorporated in the management plan.

Supportive psychotherapy for the patient and her family may also be a useful adjunct to CBT and/or pharmacotherapy. An understanding therapist may be able to enhance the patient's compliance with CBT critical for its effectiveness. OCD patients often involve family members in their rituals. There have been reports of husbands who have lost their jobs because the new mothers were so frightened of their thoughts of harming their babies that they were unable to be alone with the newborns (Jennings et al., 1999). Support and education are important for the family in understanding the patient's illness, in reversing family dysfunction that may have resulted and in the care of the newborn.

Pharmacologic treatment

Large, randomized, double-blind, placebo-controlled studies have demonstrated the efficacy and tolerability of the selective serotonin-reuptake inhibitors (SSRIs) fluoxetine (Tollefson et al., 1994), sertraline (Greist et al., 1995), paroxetine (Zohar and Judge, 1996), fluvoxamine (Goodman et al., 1989a), and citalopram (Koponen et al., 1997; Marazziti et al., 2001; Montgomery et al., 2001) and clomipramine (DeVeaugh-Geiss et al., 1991; Montgomery et al., 1990; Thoren et al., 1980) in the treatment of OCD in the general population. Recent data on the efficacy of venlafaxine is also encouraging (Albert et al., 2002a; Ananth et al., 1995; Grossman and Hollander, 1996; Rauch et al., 1996; Sevincok and Uygur, 2002; Yaryura-Tobias and Neziroglu, 1996).

Although postpartum OCD patients appear to respond well to antidepressant treatment (Buttolph and Holland, 1990; Chelmow and Halfin, 1997; Hertzberg et al., 1997; Sichel et al., 1993b), specific data on the efficacy of the above agents in the treatment of postpartum onset OCD is sparse. Nevertheless, their efficacy in OCD in nongravid population warrants their use in treating postpartum OCD. Patients with anxiety disorders in the postpartum are likely to respond to standard treatment (Shear and Mammen, 1995). Furthermore, there are no theories or evidence to suggest that postpartum OCD patients will respond differently to these agents. Therefore women with postpartum OCD may be managed according to standard treatment approaches for OCD in nongravid population (Shear and Mammen, 1995).

In the case series by Sichel and colleagues (Sichel et al., 1993a), all 15 patients treated with either fluoxetine, clomipramine, desipramine or a combination of these drugs responded rapidly and their symptoms improved significantly as indicated by changes in the clinical global impression (CGI) scale. At 1-year follow-up, 12 patients had elected to remain on pharmacotherapy because of the presence of residual obsessions. In another case series of 7 patients with postpartum onset OCD (Arnold, 1999), 3 patients participated in a 12-week, open-label trial of fluvoxamine, with 2 of the patients showing a positive response, defined as a 30% or greater decrease in the total score of the YBOCS.

When starting SSRI or clomipramine therapy, the dosage should be titrated gradually in order to minimize side effects. Patients with OCD usually require higher doses for remission of their symptoms compared with patients with major depression or other anxiety disorders (Goodman, 1999). An adequate trial (10 to 12 weeks) of an SSRI or clomipramine at a therapeutic dosage is recommended for response in OCD. When adequate trial of an agent produces unsatisfactory clinical improvement, CBT may be combined with the pharmacologic treatment (Albert et al., 2002b; Hollander et al., 2002). Alternatively, another serotonergic agent may be tried (Greist and Jefferson, 1998) or augmentation (e.g. pindolol (Dannon et al., 2000), risperidone (McDougle et al., 2000), olanzapine (Bystritsky et al., 2001)) maybe added, noting that safety data on the aforementioned augmenting agents during breastfeeding are limited at present. Similar to OCD in nongravid patients, pharmacotherapy should be maintained for at least a year in postpartum OCD patients following therapeutic response. If medication is discontinued prematurely, the relapse episode is associated with poorer response to treatment (Maina et al., 2001). When attempting to discontinue medication, the dosage should be tapered slowly and therapy should be restarted immediately if symptoms worsen or return.

Recent research suggests that estradiol deficiency may play a role in the pathogenesis of postpartum depression and postpartum psychosis. Women with postpartum depression (Ahokas et al., 2001) or postpartum psychosis (Ahokas et al., 2000) who had documented deficiency of serum estradiol were successfully treated with sublingual 17-beta-estradiol with rapid response. Estrogen replacement may also be effective in treating patients with postpartum OCD with measured estrogen deficiency.

Prophylactic treatment may be indicated if a patient has a history of postpartum onset or worsening of OCD following her prior pregnancies, as recurrences may arise with later pregnancies (Hertzberg et al., 1997). Prevention via effective early treatment may be important since some women may alter reproductive plans because of their postpartum psychiatric illness (Peindl et al., 1995). There are no studies to date that evaluate the efficacy of antidepressants or CBT in the management of OCD during pregnancy. Cognitive-behavioral therapy has been recommend as the first-line treatment of OCD in pregnant women in order to avoid fetal exposure to psychotropic agents (McDonough and Kennedy, 2002). When pharmacotherapy is clinically indicated, fluoxetine appears to have the most data on safety during pregnancy (Chambers et al., 1996; Cohen et al., 2000; Goldstein, 1995; Goldstein et al., 1997; Nulman et al., 1997; Nulman et al., 2002; Pastuszak et al., 1993). Obsessions during pregnancy may often involve the safety of the fetus. Therefore, when pharmacotherapy is being considered, the physician should be prepared to address the patient's concerns about medication use during pregnancy. Future studies are needed to establish an effective approach to managing patients with OCD or obsessive and/or compulsive symptoms during pregnancy, which in turn will have important implications for prophylaxis of postpartum onset OCD.

Early detection and aggressive treatment of OCD during the postpartum period is crucial in order to minimize dysfunction in the patient and her family. All too often, patients do not seek help and suffer for many years (Sichel et al., 1993b). OCD patients frequently suffer marriage, relationship or financial problems secondary to the disorder. When the stress of looking after the newborn is compounded by the mother's illness, the burden on the family becomes paramount.

Breastfeeding and pharmacologic treatment

When managing postpartum women with medical or psychiatric disorders, the patient's choice to breastfeed or not poses a challenge to the clinical decision-making process. The clinician's aim is to formulate a therapeutic regimen that is effective in treating the mother with OCD and safest for the nursing infant. If antidepressant therapy is clinically indicated in a mother who wishes to breastfeed, the risk-benefit profile of her options should be thoroughly discussed with the patient.

There are clear benefits to breastfeeding. The American Academy of Pediatrics recommends breastfeeding as an exclusive source of nutrition for infants during the first 6 months of life and up to 12 months. There are strong evidence to support that breast milk decreases the incidence of various acute and chronic diseases such as diarrhea, otitis media, lower respiratory infection and inflammatory bowel diseases (American Academy of Pediatrics, 1997). Breastfeeding has also been reported to reduce the risk of breast cancer in premenopausal women (Newcomb et al., 1994) and reduce postpartum blood loss (Chua et al., 1994).

There are also clear detriments to untreated psychiatric illness in the mother. Infants of mothers with psychiatric disorders such as OCD or major depression show poor cognitive, emotional and motor development and delayed growth (Cogill et al., 1986; Cummings and Davies, 1994; Field, 1998; Weinberg and Tronick, 1998). Mothers with psychiatric illness also form insecure attachments with their infants (Murray and Cooper, 1997), are withdrawn in their interactions with them (Field, 1998) and show a reduced quality of interaction (Stein et al., 1991), which may all negatively affect infant emotional and social development.

Disruption in mother-infant bonding and interaction due to the severity of the mother's psychiatric illness and possible hospitalization may have negative effects on the development of the infant (Nonacs and Cohen, 2002). Ten of the 15 mothers with postpartum onset OCD in Sichel et al.'s study were hospitalized (Sichel et al., 1993a). Misri et al. (Misri and Sivertz, 1991) suggested that instead of risking the disruption of mother-infant bonding as well as breastfeeding due to the mother's hospitalization, it would be wiser to effectively treat the mother with appropriate medication whether the mother is breastfeeding or not.

All antidepressants are transferred through breast milk. The American Academy of Pediatrics has classified psychotropic drugs (anti-anxiety drugs, antidepressants and neuroleptics) under 'Drugs for Which the Effect on Nursing Infants is Unknown but May Be of Concern' (American Academy of Pediatrics Committee on Drugs, 2001). The best indication of the degree of drug of exposure in the infant is the concentration of the drug in infant's plasma (Anderson, 1991) although its implication in clinical practice is unclear. Clinical examination looking for any adverse effects is also important in monitoring the infant.

Clomipramine

No adverse effects have been reported in eight infants exposed to clomipramine during gestation and/or lactation (Birnbaum et al., 1999; Schimmell et al., 1991; Wisner et al., 1995; Yoshida et al., 1997a). Infant serum levels of clomipramine and its metabolite desmethylclomipramine in 5 of the infants were either undetectable or too low to be quantified. Although the cases of infants exposed to clomipramine through breast milk are limited, based on the safety data available, it has been suggested that it is not necessary for nursing mothers to cease clomipramine treatment or to avoid breastfeeding (Wisner et al., 1995).

Fluoxetine

In the majority of case reports and case series of infants nursed by mothers taking fluoxetine, no adverse effects were observed in the infants and undetectable or trace amounts of the parent compound and its metabolite norfluoxetine were found in infant sera (Birnbaum et al., 1999; Burch and Wells, 1992; Hendrick et al., 2001c; Isenberg, 1990; Taddio et al., 1996; Yoshida et al., 1998). Burt et al. in their review of the literature found that of the 190 reported infants exposed to fluoxetine through breast milk, no adverse effects were reported in 180 infants (Burt et al., 2001).

Few anecdotal case reports of adverse effects have been reported in infants breastfed by mothers taking fluoxetine. Lester et al. described a 6-week-old infant who was referred for colic, whose mother was taking 20 mg per day of fluoxetine (Lester et al., 1993). No explanation was given for the extremely high serum levels of fluoxetine and norfluoxetine in the infant (340 ng/ml and 208 ng/ml, respectively) only after a day of nursing. Nevertheless, based on this single case report fluoxetine packaging information was revised to state that it was not recommended for use in breastfeeding women (Gelenberg, 1995). An infant breastfed by a mother taking fluoxetine, carbamazepine and buspirone

has been observed to have had seizure-like episodes (Brent and Wisner, 1998). The mother had taken fluoxetine throughout pregnancy and it is difficult to ascertain which of the three drugs the mother was taking may have contributed, if at all, to the seizure-like episodes.

Chambers and colleagues (Chambers et al., 1999) in their study of 26 infants exposed to fluoxetine through breast milk found that compared with 38 infants who were breastfed by mothers who discontinued the drug, infants exposed to fluoxetine had lower weight gain (average deficit of 392 g when weights were measured between 2 weeks and 6 months). The authors stated that although the severity of the mother's depression as measured by the Center for Epidemiologic Studies – Depression (CES-D) scale completed by 70% of mothers mid-pregnancy were similar between the two groups, these scores may not have accurately reflected the severity of depression during the postpartum period. Mothers who took fluoxetine during the postpartum period may have been more severely depressed which may have negatively influenced infant development and weight gain. Most infants exposed to fluoxetine through breast milk had also been exposed to the drug during pregnancy the longest. No other adverse effects were noted in infants by their mothers.

Kristensen and colleagues (Kristensen et al., 1999) studied 14 infants whose mothers breastfed while taking fluoxetine. Two infants were reported to have had 'withdrawal symptoms' defined as 'uncontrollable crying, irritability and poor feeding' and two other infants were reported to have had colic. All four of the mothers had taken fluoxetine during pregnancy and the authors stated that the adverse reactions may be attributable to *in utero* exposure to fluoxetine and its metabolite. No adverse effects were noted in the remaining 10 infants.

Sertraline

The SSRI sertraline has been recommended as the first-line treatment for postpartum depression in breastfeeding mothers based on multiple case series demonstrating its relative safety in breastfed infants (Wisner et al., 2002). No adverse effects have been reported in case series studying infants exposed to sertraline through breast milk. Undetectable or trace amounts ($<= 24$ ng/ml) of sertraline and N-desmethylsertraline have been found in infant sera (Altshuler et al., 1995; Birnbaum et al., 1999; Hendrick et al., 2001b; Kristensen et al., 1998; Mammen et al., 1997; Stowe et al., 1997; Wisner et al., 1998). In a recent study of 22 breastfeeding mother-infant pairs (Stowe et al., 2003), no adverse effects were observed in any of the 22 infants exposed to sertraline. The highest concentrations of sertraline and desmethylsertraline were observed in the hindmilk 8 to 9 hours after maternal sertraline ingestion. Consequently, discarding breast milk 8 to 9 hours after maternal dose may significantly reduce infant daily dose of sertraline (by a mean of 17.1% in the study).

In order to assess the extent of central 5-hydroxytryptamine (5-HT) blockade produced by sertraline in breastfed infants, Epperson and colleagues (Epperson et al., 1997; Epperson et al., 2001) measured platelet serotonin (5-HT) transporter blockade in 14 infants exposed to sertraline through breast milk. After 6 to 14 weeks of exposure to sertraline through breast milk, the 5-HT concentrations in infants did not change significantly from baseline. In 11 infants whose serum sertraline and desmethylsertraline levels were measured, the concentrations were less than 2.5 ng/ml and 5.0 ng/ml, respectively. No adverse effects were reported in any of the infants.

Paroxetine

In 5 case series studying a total of 59 infants exposed to paroxetine through breast milk (Begg et al., 1999; Hendrick et al., 2001b; Hendrick et al., 2000; Misri et al., 2000; Stowe et al., 2000), in all infants the serum concentrations of paroxetine were either undetectable or detected at levels too low to be quantified. No adverse effects were observed in any of the infants. No adverse effects were observed in further 8 infants whose serum levels of paroxetine were not measured (Ohman et al., 1999; Spigset et al., 1996).

A recent study by Costei and colleagues (Costei et al., 2002) showed that infants of mothers who took paroxetine during the third trimester were more likely to have neonatal complications such as respiratory distress than the comparison group comprising of infants whose mothers took paroxetine only during the first and second trimesters or took nonteratogenic agents during the first trimester. The study also showed that infants who were exposed to paroxetine during the third trimester and through breast milk showed more adverse effects such as alertness and constipation than breastfed infants in the comparison group. As the authors stated, adverse effects observed during breastfeeding among infants exposed to paroxetine during the third trimester may be attributable to the greater severity of psychiatric morbidity in their mothers compared with mothers of infants in the comparison group. The results of this study may have impor-

tant clinical implications for postpartum OCD prophylaxis during pregnancy.

Fluvoxamine, citalopram, venlafaxine

The data on the safety of fluvoxamine (Hendrick et al., 2001b; Piontek et al., 2001; Wright et al., 1991; Yoshida et al., 1997b), citalopram (Jensen et al., 1997; Rampono et al., 2000; Schmidt et al., 2000; Spigset et al., 1997) and venlafaxine (Hendrick et al., 2001a; Ilett et al., 2002) during breastfeeding are sparse. No adverse effects have been observed in the limited number of infants exposed to these agents through breast milk. Infant serum levels of the parent compounds and their metabolites have been undetectable or present in trace amounts.

There are no data on the long-term effects of breast milk SSRI exposure on infant development, particularly the developing neurotransmitter system (Wisner et al., 2002). All patients should be maintained on the lowest effective dose to minimize medication exposure to the infant. Prior to commencing pharmacotherapy, the newborn should be examined thoroughly noting physical parameters and behavioral patterns such as feeding and sleeping patterns so that the infant can be objectively monitored if and when adverse effects arise from medication exposure (Wisner et al., 1996).

Conclusion and recommendations for future research

OCD onset is common during the postpartum period. Expectant mothers and health professionals should be educated about the symptoms of postpartum onset OCD. The disorder should be screened for early in the postpartum period and aggressively treated in order to minimize patient suffering, family dysfunction and negative effects on infant development. Further studies are needed to evaluate the epidemiology of postpartum OCD and to describe its phenomenology and clinical course and how these differ in comparison with OCD in nongravid women. Identifying risk factors that predispose to the development of postpartum OCD may have important implications for prophylaxis during subsequent pregnancies. Research aimed at understanding the cause of postpartum onset OCD may contribute to the understanding of the etiology of OCD in general. Current management strategies for postpartum onset OCD are based on studies on nongravid population. Double-blind, placebo-controlled treatment trials in patients with postpartum onset OCD are necessary in order to formulate an effective and well-tolerated management approach specific to postpartum onset OCD.

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