Treatment of **child abuse**

COMMON GROUND FOR MENTAL HEALTH, MEDICAL, AND LEGAL PRACTITIONERS

2ND edition

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Psychopharmacology

GENERAL CONSIDERATIONS

Childhood abuse and neglect are associated with a range of emotional and behavioral disturbances. In some cases, pharmacotherapy to treat posttraumatic psychiatric symptoms is a significant element of the treatment plan. This chapter describes the link between child maltreatment and mental illness, the underlying neurobiological and neuroendocrine changes that may occur following abuse (and which may increasingly serve as targets for medicines as our knowledge base expands), and indications for medications. The scientific data on various classes of medications used to treat childhood posttraumatic stress disorder (PTSD) are summarized, followed by a brief discussion of the treatment of acute stress disorder and medications used for prevention of PTSD. Special considerations related to the use of medications for foster children are also presented. The chapter concludes with a summary of outstanding questions in the understudied area of pharmacotherapy of childhood PTSD.

Child abuse and neglect are associated with a variety of psychiatric and behavioral disturbances. PTSD can be a direct outcome of abuse. Studies have also shown a link between childhood abuse and anxiety and mood disorders (such as major depressive disorder and bipolar disorder) and psychosis—including schizophrenia (Alvarez et al., 2011; Bebbington et al., 2011; Schafer & Fisher, 2011; Sugava et al., 2012). Abused children have a greater risk of developing an eating disorder or abusing drugs and alcohol, with earlier and more severe drug use, compared with nonmaltreated youths (Cisler et al., 2011; Douglas et al., 2010; Nomura, Hurd, & Pilowsky, 2012; Rayworth, Wise, & Harlow, 2004).

Children who develop PTSD are at risk of developing other comorbid conditions. A study of female juvenile offenders showed that girls with PTSD had more psychiatric diagnoses than those without. The comorbid conditions often arose concurrently with or after the PTSD, suggesting a link between the trauma and various psychopathologies. Common comorbid disorders in this population included substance abuse, conduct disorder, depression, psychosis, and generalized anxiety disorder. Suicide attempts were more likely in girls with PTSD (Dixon, Howie, & Starling, 2005). Though this study was of a specialized population, it highlights the variety and extent of comorbid psychopathology that can accompany PTSD.

NEUROBIOLOGY OF CHILD ABUSE

Child abuse causes changes in the brain. Technological advances have led to an improved but still evolving understanding of these changes on a structural and neurochemical level. Children who are traumatized have higher levels of peripheral sympathetic nervous system activity, such as circulating norepinephrine (Pervanidou, 2008). Cortisol, a hormone that is released in response to stress, has a variety of physiological effects, such as mobilizing glucose stores and suppressing immune function. In children, the cortisol response to trauma is perhaps even more complicated than in adults, and study findings have not been completely consistent. Child maltreatment is known to have long-term effects on the developing hypothalamic-pituitary-adrenal axis that are mediated by a variety of individual biological and environmental risk and protective factors (Tarullo & Gunnar, 2006).

A functional MRI study of adults who experienced childhood trauma showed increased amygdala responsiveness when exposed to threatening facial expressions. Reduced gray matter in the hippocampus and other brain regions was also seen (Dannlowski et al., 2012). Notably, these adults were studied decades after the traumatic events, suggesting long-lasting structural and functional brain changes.

THE ROLE OF GENES

Certain genetic polymorphisms may predispose individuals to or protect them from psychiatric sequelae when also exposed to environmental stressors. An example is the serotonin transporter gene, *5-HTTLPR* (serotonin-transporter-linked polymorphic region). Several studies have shown that the short allele confers a greater risk for depression in the presence of stressful life conditions (Aguilera et al., 2009; Brown et al., 2013). The long allele may be associated with a heightened response to selective serotonin reuptake inhibitor (SSRI) medications (Mushtag et al., 2012; Rundell et al., 2011). Testing for this allele is not used clinically at this time.

There are other examples of this gene-environment interaction. A corticotropin-releasing hormone receptor gene (*CRHR1*) haplotype is associated with adult depression if there is exposure to childhood adverse events such as abuse (Bradley et al., 2008; Grabe et al., 2010). A lower level of monoamine oxidase-A (MAOA) expression in the setting of mild to moderate trauma has been linked with higher levels of aggressive behavior and conduct disorder (Ferguson et al., 2011; Foley et al., 2004). There may also be a gene-environment link between certain catechol-*O*-methyltransferase gene (*COMT*) polymorphisms and childhood trauma. Studies have shown a predisposition for impulsive aggression in women with borderline personality disorder, dissociation, and/or schizotypal personality traits in those with certain polymorphisms of this gene (Savitz, van der Merwe, Newman, Solms, et al., 2008; Savitz, van der Merwe, Newman, Stein, & Ramesar, 2010; Wagner et al, 2010). As our knowledge base increases, these genes may represent specific targets for therapy.

DIAGNOSTIC ISSUES

Lenore Terr introduced the idea of type I and type II trauma in 1991. Type I trauma is a "single blow," an isolated event, more likely to result in classic PTSD symptoms. Type II traumas are recurrent and longstanding; they result in chronic mood dysregulation, dissociation, character identity problems, and rage (often self-directed). Some studies have suggested that physical abuse is more strongly associated with disruptive behavior and aggression in its victims, whereas neglected children may be more likely to display internalizing disorders (Petrenko et al., 2012). Clinicians should perform a thorough diagnostic assessment on each child, as these patterns are certainly not universal.

An increasing body of literature in developmental psychology has explored the effects of chronic, early-life relational trauma on a child's emotional regulation abilities. These effects include difficulty managing negative emotional states such as anger and a greater risk for problematic impulsivity and self-destructive behavior (Ehring & Quack, 2010).

Traumatized children may present with "extreme dysregulation of physical, affective, behavioral, cognition, and/or interpersonal functioning that is not adequately captured in current descriptions of PTSD diagnostic criteria" (American Academy of Child and Adolescent Psychiatry, 2010, p. 416). Children with these symptoms might be misdiagnosed as having bipolar disorder or other psychiatric illnesses if the examiner does not consider the role of trauma. Conversely, all emotional or behavior problems in a child with trauma may erroneously be attributed to PTSD when, in fact, the youngster has another mental illness (Griffin et al., 2011). The timing of the symptoms—in particular, if their onset coincides with a traumatic event—may aid with diagnosis; however, in cases of chronic trauma, a discrete timeline might not be possible.

A child's developmental stage may affect PTSD symptom presentation. The *Diagnostic and Statistical Manual of Mental Disorders* (4th edition, text revision; *DSM-IV-TR*) provides some modifications of criteria for children. For example, instead of intrusive traumatic recollections (which may be difficult for a child to describe), repetitive trauma-themed play is acceptable evidence of re-experiencing the traumatic event (American Psychiatric Association, 2000). Other PTSD criteria, however, do not provide specific guidance or allowances for young children. For example, studies have shown that traumatized youths may demonstrate a wide range of emotional states in response to trauma, not just "fear, helplessness, or horror . . . disorganized or agitated behavior" (*DSM-IV-TR*). Children, particularly preschool-age, may not be able to express feelings of detachment from others. It is not realistic to expect a young child to experience a sense of a foreshortened future or to be able to report avoiding trauma-related stimuli (Scheeringa, Zeanah, & Cohen, 2011).

A white paper by the National Child Traumatic Stress Network (2003) explores complex trauma in depth, asserting that our current diagnostic system does not account for its range of impacts on a developing child. Complex trauma is defined in this paper as multiple simultaneous or sequential traumas within the caretaking environment, beginning in childhood, as well as the multi-domain impairment and symptomatology that often result. The domains of impairment include attachment, biology, affect regulation, dissociation, behavioral control, cognition, and self-concept. The white paper includes recommendations for clinicians, researchers, and policymakers regarding complex trauma.

INDICATIONS FOR PSYCHOPHARMACOLOGY IN TRAUMA

Medications can be helpful in certain cases of trauma-related symptomatology but are not indicated in every case. First, the patient must have a psychiatric disorder or symptoms that are amenable to pharmacotherapy. Years of data show that medications can treat PTSD, major depressive disorder, bipolar disorder, psychosis, and generalized and other anxiety disorders. In cases of mild symptoms, starting with psychotherapy is typically prudent (American Academy of Child and Adolescent Psychiatry, 2010). Though medications

should be reserved for more severe cases, unfortunately there is often an inverse relationship between symptom severity and response to treatment. A suboptimal response to psychotherapy is one indication to consider the addition of medication. The presence of comorbidities that are also responsive to medications might more strongly suggest a role for pharmacotherapy; a discussion of the treatment of potential comorbid conditions is beyond the scope of this chapter. When medications are used, the ideal approach is to combine pharmacotherapy with psychotherapy.

GENERAL APPROACH TO TREATMENT

When initiating treatment of a child who has been the victim of abuse, the first step should be a thorough diagnostic assessment. As discussed above, childhood trauma is associated with many psychiatric conditions and can present with a range of emotional and behavioral disturbances not fully described by our current diagnostic criteria. Thus, the child should be assessed for symptoms of PTSD, mood disorders, psychosis, anxiety disorders, and substance abuse. The evaluator should explore how the symptoms affect the child's functioning. A thorough medical history is essential. The evaluator should closely assess for ongoing abuse, neglect, or trauma, as treatment will be less effective if the child continues to be victimized. Prenatal, birth, and developmental history should be obtained when possible. Family psychiatric history can be useful when formulating a differential diagnosis. The clinician should consider further workup with laboratory or other diagnostic tests if there are symptoms that could be explained by medical illness. The Practice Parameters for the Assessment and Treatment of Children and Adolescents with Post-Traumatic Stress Disorder, available through the American Academy of Child and Adolescent Psychiatry (2010), provides further discussion of assessment and treatment planning.

Once a preliminary diagnosis has been established, a treatment plan can be developed. The selection of a medication should be tailored to the diagnosis and symptoms. The high rate of psychiatric comorbidity in this population requires a thoughtful approach, to avoid unnecessary polypharmacy while still addressing the symptoms at hand.

MEDICATIONS

Data on the safety and effectiveness of psychotropic medications in treating PTSD in youths are limited. Clinical practice is outpacing current research in this area. Given the paucity of research, clinical decision making often relies on interpolating data from the adult literature. Developmental considerations must be taken into account, such as the neurobiological differences between children and adults and the poorly understood long-term effects of psychotropic medications on the developing brain. Thus, a cautious and judicious approach to pharmacotherapy should be undertaken. Table 32.1 summarizes the evidence.

Selective Serotonin Reuptake Inhibitors

Selective serotonin reuptake inhibitors are used for treating a variety of psychiatric illnesses, including major depressive disorder and various anxiety disorders. They are generally considered first-line agents for PTSD in adults, given their effectiveness against all three symptom clusters (re-experiencing, hyperarousal, and avoidance). However, data for children are less robust. One double-blind, placebo-controlled trial of sertraline showed a comparable response to placebo in 131 study participants (Robb et al., 2010). In another study, in which sertraline or placebo was added to Trauma-Focused Cognitive Behavioral Therapy (TF-CBT), both groups improved in a similar fashion, suggesting no additional benefit to adding an SSRI (Cohen et al., 2007). A study comparing response to citalopram of 24 children and 14 adults showed no difference between the response rates of the two age groups (Seedat et al., 2002). An open-label trial of citalopram for 8 patients showed significant improvements in PTSD symptoms (Seedat et al., 1999). In most of these studies, the children had suffered chronic, multiple traumas.

In a child with PTSD and a comorbid depressive or anxiety disorder, an SSRI might be a reasonable choice. However, some traumatized children experience severe mood dysregulation or have comorbid bipolar disorder, which might be worsened by an antidepressant. SSRIs are generally well tolerated, but patients should be monitored for side effects. Gastrointestinal upset and headaches may occur but are likely to resolve as treatment continues. Some children report sedation, which can often be addressed by moving the medication to bedtime. A transient increase in anxiety might occur at the start of therapy. In some cases, more concerning symptoms of behavioral activation can arise, including restlessness, insomnia, and agitation.

In 2003, the U.S. Food and Drug Administration issued a public health advisory about an increased risk of suicidal ideation or behaviors in children or adolescents prescribed antidepressants. Patients being treated with an SSRI, particularly in the early stages, should be monitored closely for the emergence of any suicidal thoughts or behaviors.

Though these studies do not demonstrate a robust response to SSRIs, it should be noted that, combined, they included fewer than 200 participants. Thus, it is difficult to derive strong conclusions about SSRIs' effectiveness or lack thereof for traumatized children. In many cases an SSRI may be a reasonable first choice, particularly if there is comorbid anxiety or depression.

Antiadrenergic Agents

As mentioned earlier, children with PTSD have higher circulating levels of sympathetic nervous system hormones such as norepinephrine. Medications that decrease sympathetic tone can be used to address the hyperarousal sometimes seen in PTSD. Centrally acting alpha-2 agonists such

Table 32.1. Summary of PTSD Medication Studies

Authors	Medication	Study Design	N	Trauma Type*	Target Symptoms	Results
Cohen et al., 2007	Sertraline added to TF-CBT	Randomized, placebo-controlled	24	II	Three core symptom clusters	Sertraline offered no benefit over psychotherapy alone
Robb et al., 2010	Sertraline	Double-blind, placebo-controlled	131	V	Three core symptom clusters	Sertraline offered no benefit vs. placebo
Seedat et al., 2002	Citalopram	Open-label, comparing children and adults	24	V	Three core symptom clusters	Teens and adults had symptom reduction
Seedat et al., 1999	Citalopram	Open-label	7	V	Three core symptom clusters	Reduction in all three symptom clusters
Harmon & Riggs, 1996	Clonidine	Open-label	7	II	Multiple (see text discussion)	Most or all had reductions in target symptoms
Horrigan, 1996	Guanfacine	Case report	1	II	Nightmares	Nightmares resolved
Fraleigh et al., 2009	Prazosin	Case report	1	II	Nightmares	Nightmares resolved
Strawn et al., 2009	Prazosin	Case report	1	I	Nightmares, hyperarousal, avoidance	Nightmares resolved; hyperarousal improved; avoidance persisted
Famularo et al., 1988	Propranolol	Case series, on-off-on design	11	V	Three core symptom clusters	Improvement in all symptom clusters; return of symptoms when drug stopped
Yeh et al., 2010	Aripiprazole to augment SSRI	Case report	1	I	Nightmares	Nightmares improved
Wheatley et al., 2004	Clozapine	Retrospective case series	6	V	Self-injury, aggression, hallucinations	4/6 had reduced aggression; 5/6 had fewer hallucinations
Keeshin & Strawn, 2009	Risperidone added to valproex (valproic acid) and clonidine	Case report	1	II	Three core symptom clusters	Decreased re-experiencing; improved sleep; fewer hospitalizations
Stathis et al., 2005	Quetiapine	Case series	6	II (3/6), U (3/6)	Three core symptom clusters	Less dissociation, anxiety, depression, anger in all 6
Looff et al., 1995	Carbamazepine	Case series	28	II	Three core symptom clusters	22/28 became asymptomatic; 6/28 had significant improvements
Steiner et al., 2007	Valproex (valproic acid)	Randomized controlled trial, high vs. low dose	12	U	Three core symptom clusters	High-dose led to greater reduction in PTSD symptoms

*I = single-episode trauma; II = chronic trauma; V = varied; U = unknown.

as clonidine and guanfacine work by decreasing the release of norepinephrine. The one identified open study of clonidine use for severely, chronically abused preschool children involved youngsters, ages 3–6 years, in a day treatment program who had had at least one month of family therapy without resolution of symptoms. A trial of clonidine reduced aggression in all children and reduced emotional outbursts, hyperarousal and hypervigilance, generalized anxiety, and oppositionality in the majority of children (Harmon & Riggs, 1996). Guanfacine reduced PTSD-related nightmares in a case report of a chronically abused 7-year-old (Horrigan, 1996).

Prazosin is an alpha-1 receptor antagonist that decreases adrenergic tone. Randomized, placebo-controlled studies of adults with PTSD have suggested the efficacy of this drug in reducing trauma-related nightmares. In children, a few case reports suggest that this medication may be beneficial. In one report, a 16-year-old girl with PTSD following a violent robbery at work was prescribed prazosin. She reported a robust decrease in nightmares and hyperarousal symptoms but no change in avoidance (Strawn, DelBello, & Geracioti, 2009). In another case report, a 16-year-old boy with PTSD resulting from several traumatic experiences also reported elimination of nightmares with prazosin (Fraleigh et al., 2009).

Propranolol is a beta-blocker with a variety of medical uses, such as treatment of hypertension and migraines; it is also used for some anxiety disorders, such as performance-related social phobias. It decreases the heart rate and blood pressure by reducing noradrenergic activity. An open-label pilot study investigated propranolol's effectiveness in treating PTSD symptoms in a group of 11 school-age children who had been physically and/or sexually abused. There was a statistically significant reduction in PTSD symptoms (Famularo, Kinscherff, & Fenton, 1988).

These medicines are sometimes used in combination with other agents (such as an SSRI) to address hyperarousal symptoms that are suboptimally treated by the other medication. Alpha-2 agonists are also used, often adjunctively with psychostimulants, in treating attention-

deficit/hyperactivity disorder (ADHD) to target motor hyperactivity and impulsivity. In a child with PTSD and ADHD, this class of medications could be strongly considered.

Given their cardiovascular effects, these medications should not be prescribed for children with cardiac problems without clearance by a cardiologist or pediatrician. Vital signs should be monitored, as low blood pressure and tachycardia (or bradycardia with propranolol) may develop; patients should be warned of possible orthostatic hypotension. These drugs can be mildly sedating but are otherwise fairly well tolerated.

Atypical Antipsychotics

A child or teen with PTSD may experience psychotic symptoms such as hallucinations, mood lability, or aggression. Also, as mentioned above, bipolar or psychotic disorders may be comorbid with PTSD. In these cases, SSRIs may only partially address the full array of symptoms. Some case series and case reports suggest that atypical antipsychotics, either alone or as augmentation, may be helpful.

A case report described the use of risperidone for a 13-year-old boy with a history of chronic sexual abuse and neglect and multiple hospitalizations for aggression and self-harm. He had prominent symptoms of hypervigilance, auditory hallucinations, and flashbacks and was diagnosed with PTSD. Risperidone was added to his regimen of divalproex (valproic acid) and clonidine, which resulted in resolution of his symptoms (Keeshin & Strawn, 2009).

In another case report, a 14-year-old girl developed PTSD following a physical assault. Symptoms of re-experiencing, avoidance, and hyperarousal were treated successfully with escitalopram, but she continued to suffer nightmares related to the trauma. The addition of aripiprazole at bedtime resulted in resolution of her nightmares (Yeh, Hsieh, & Chou, 2010).

Quetiapine was studied in a case series of six teens in a youth detention center, ages 15–17 years. These teens, who met the criteria for PTSD, were given low doses of quetiapine, which resulted in an overall reduction in PTSD symptoms, particularly dissociation, anxiety, depressed mood, and anger. Many of the youths reported sedation, though this was felt to be beneficial given the high rates of insomnia. Weight gain was significant during this six-week study (Stathis, Martin, & McKenna, 2005).

Clozapine, when used for schizophrenia or bipolar disorder, is reserved for treatment-resistant cases due to the low but serious risk of agranulocytosis. A case series suggested a possible benefit in teens with treatment-resistant symptoms of PTSD. In one series, six patients, ages 17–19 years, with PTSD from both acute and chronic traumas were treated with clozapine. They experienced symptoms of psychosis, had a history of aggression or self-injury, and had had at least two failed trials of other antipsychotic drugs. Patients reported improvements in psychosis and sleep (Wheatley et al., 2004). When clozapine is being considered, the ability of the patient to obtain weekly blood draws to monitor granulocyte counts should be a factor in determining the appropriateness of this medicine. Clozapine also carries the highest risk of weight gain and metabolic syndrome, but the lowest risk of tardive dyskinesia. In adults with schizophrenia, clozapine is indicated only after failed trials of at least two antipsychotics, including one atypical antipsychotic (American Psychiatric Association, 2004). In the understudied population of youths with PTSD, equally if not more stringent criteria should be applied.

This class of medication carries a significant side-effect profile, including metabolic syndrome, extrapyramidal symptoms, and other medication-specific effects. Monitoring of metabolic parameters and for abnormal involuntary movements should be performed at baseline and at regular intervals. No pediatric studies were found for olanzapine, ziprasidone, or some of the newer antipsychotics such as paliperidone, asenapine, lurasidone, and iloperidone.

Mood Stabilizers

Mood stabilizers are traditionally used for the manic or maintenance phase of bipolar disorder. They also have been used in the treatment of other conditions, including PTSD in adults. As with other classes of medications, data supporting their use in children or adolescents are limited. No studies were found on the use of lithium for this population.

A small study of 12 incarcerated adolescent males diagnosed with PTSD and conduct disorder randomized the subjects to either high- or low-dose divalproex sodium for seven weeks; the type of trauma was not specified. The 6 teens in the high-dose group showed greater reductions in overall symptom severity, as well as a greater decrease in the three PTSD core symptom areas (Steiner et al., 2007). Divalproex sodium can cause weight gain, sedation, hepatic injury, alopecia, tremor, elevated ammonia, teratogenicity if taken during pregnancy, and pancreatitis. Regular blood work is required for monitoring blood levels, complete blood counts, and liver function tests.

Carbamazepine has not been evaluated in randomized trials. In a case series of 28 children, ages 8–17 years, with PTSD resulting from repeated sexual abuse, 22 were asymptomatic by the end of the study and the other 6 were markedly improved. Concurrent treatment with an SSRI, a stimulant for ADHD, or clonidine was seen in a minority of cases (Looff et al., 1995). Regular blood work is required for monitoring drug levels, complete blood counts (due to the risk of thrombocytopenia or, rarely, pancytopenia), and liver function tests (due to the risk of hepatic injury). Drug interactions are an important consideration with carbamazepine, which is a strong inducer of multiple hepatic cytochrome P450 subsystems.

Benzodiazepines

Benzodiazepines are used to treat PTSD in adults, though the data suggest a cautious approach. The U.S. Department of Veterans Affairs and Department of Defense's (2010) Clinical Practice Guidelines for the Management of Post-Traumatic Stress recommends against the use of benzodiazepines due to their unclear efficacy and the risk of dependence. Some evidence has suggested an increased risk of developing PTSD when benzodiazepines are administered in the acute posttrauma period (Gelpin et al., 1996). Other concerns include the potential for worsening anxiety symptoms when these medications are discontinued and the risk of cognitive side effects. In children, benzodiazepines may have a paradoxically disinhibiting effect rather than an anxiolytic effect. No studies on the use of benzodiazepines in children or adolescents with PTSD were found; however, benzodiazepines may have some utility in some childhood anxiety disorders.

EARLY INTERVENTION

Treatment of Acute Stress Disorder

Some studies have investigated potential treatments for acute stress disorder (ASD); table 32.2 summarizes the evidence. Many studies in this area involve burn patients because they present quickly following the trauma and often require lengthy hospitalizations and close medical follow-up. However, these studies often do not specify the prevalence of abuse or suspected abuse.

Robert et al. (1999) found that treatment with low-dose imipramine, a tricyclic antidepressant, resulted in more symptom reduction than chloral hydrate. A comparative, non-placebo-controlled study of imipramine and fluoxetine found that 89% of patients responded to either medicine (Tcheung et al., 2005), while another comparison of imipramine, fluoxetine, and placebo showed no statistically significant difference between the three groups (Robert et al., 2008). A case series in which risperidone was used for three preschoolers who suffered burns due to child abuse showed improvements in all children (Meighen, Hines, & Lagges, 2007). A study of propranolol did not show a significant reduction in development of ASD symptoms compared with placebo (Sharp et al., 2010). Tricyclic antidepressants have a more significant side-effect burden than SSRIs and are more dangerous in overdose due to cardiac toxicity. It is difficult to know what clinical practices to derive from these limited data.

Table 32.2. Summary of Acute Stress Disorder and Prevention of PTSD Medication Studies

Authors	Medication	Study Design	N	Duration of Treatment	Results
Acute stress disorder					
Meighen et al., 2007	Risperidone	Case series	3	Followed for 8 weeks	Rapid reduction in all symptom clusters
Robert et al., 1999	Imipramine or chloral hydrate	Randomized, double-blind	25	7 days	83% responded to imipramine; 38% responded to chloral hydrate (statistically significant)
Robert et al., 2008	Imipramine, fluoxetine, or placebo	Randomized, placebo-controlled, double-blind	60	7 days	55% responded to placebo; 60% to imipramine; 72% to fluoxetine (not statistically significant)
Sharp et al., 2010	Propranolol	Retrospective chart review of prior placebo-controlled, randomized controlled trial	363	—	No difference in rates of ASD between treatment and placebo groups
Tcheung et al., 2005	Imipramine or fluoxetine	Retrospective chart review; switch medicines if no response after 7 days	128	7 days on each medication	Initially, 81% responded to imipramine and 75% to fluoxetine; 89% eventually responded to either medication
PTSD prevention					
Nugent et al., 2010	Propranolol	Double-blind placebo-controlled	29	10 days (monitored 6 weeks)	No difference between groups; boys had a nonsignificant decrease in symptoms with propranolol
Saxe et al., 2001	Morphine	Open-label	24	2–26 days (monitored 6 months)	Higher dose of morphine correlated with fewer PTSD symptoms at 6 months
Stoddard et al., 2011	Sertraline	Double-blind placebo-controlled	26	12 weeks (monitored 24 weeks)	Children reported no difference; parents reported decrease in observed PTSD symptoms with sertraline
Stoddard et al., 2009	Morphine	Open-label	70	Varied (monitored 6 months)	Correlation between total daily morphine dose and reduction in PTSD symptoms

— = Not applicable

Prevention of PTSD

An important emerging area of research is the prevention of PTSD following exposure to a trauma. As for ASD, many studies of PTSD prevention involve patients who have suffered burn injuries. Two studies of children and adolescents with severe burn injuries showed that the dosage of morphine administered in the immediate posttrauma period is inversely related to the risk of later developing PTSD. This may be due to morphine's inhibition of noradrenergically medicated overconsolidation of traumatic memories that is postulated to occur in PTSD (Saxe et al., 2001; Stoddard et al., 2009). Adult studies have yielded similar results. Whether these findings can be applied to abused children is unclear. More research may shed light on the utility of this intervention.

Sertraline has also been investigated for its possible efficacy in preventing PTSD. A placebo-controlled, double-blind, randomized controlled trial of 26 children and young adults, ages 6–20 years, showed mixed results. Participants reported no difference between the active medication and placebo after 24 weeks, whereas parents of those in the sertraline group reported a decrease in observed child PTSD symptoms compared with parents of those in the placebo group (Stoddard et al., 2011). A study of propranolol administered to traumatized children did not show a significant difference in ultimate development of PTSD symptomatology compared with placebo (Nugent et al., 2010). Again, in these studies, the traumas suffered were not abuse or neglect.

OVERSIGHT OF THE USE OF PSYCHOTROPIC MEDICATIONS FOR FOSTER CHILDREN

Children and adolescents in the child welfare system represent a special subset of youths who have experienced trauma. The use of psychotropic medications for this vulnerable population has recently received a great deal of attention in the press and in government oversight programs (U.S. Administration for Children and Families, 2012).

Foster children—who are, by definition, Medicaid-eligible—are at higher risk for developing emotional and behavioral disturbances and mental illness (Burns et al., 2004; dos Reis et al., 2001; Harman, Childs, & Kelleher, 2000; Landsverk et al., 2006; White et al., 2007), use mental health services at higher rates (Burns et al., 2004; dos Reis et al., 2001; Halfon, Berkowitz, & Klee, 1992; Harman, Childs, &Kelleher, 2000), and are more likely to receive psychotropic medications than other Medicaid-eligible youths (Breland-Noble et al., 2004; dos Reis et al., 2001; Raghavan, 2005).

The use of psychotropic medications for the treatment of youths in the general population who have severe emotional and behavioral disturbances has increased dramatically over recent years (Olfson et al., 2002; Zito et al., 2003). This increase is paralleled by an increase in the rate of polypharmacy, the concurrent administration of two or more psychotropic medications (Bhatara et al., 2004; Olfson et al., 2002; Safer, Zito, & dos Reis, 2003). Similar findings have been reported for foster children (Anderson et al., 2002).

In 2011, the U.S. Government Accountability Office published a report comparing the use of psychotropic medications for foster children and nonfoster children receiving Medicaid benefits in five states. It found that foster children were up to 4.5 times more likely than nonfoster children to be prescribed a psychotropic medication, up to 52.5 times more likely to be prescribed five or more psychotropic medications concurrently, and nearly 9 times more likely to be prescribed medications at doses exceeding published guidelines. States varied widely in the implementation of published guidelines on the oversight of psychotropic medications for children in state custody (American Academy of Child and Adolescent Psychiatry, 2005). The authors of the U.S. Government Accountability Office (2011) study recommended that the Department of Health and Human Services should consider endorsing guidelines for the states on best practices for monitoring psychotropic medication use in foster children.

In response to concerns raised about the high rate of use of psychotropic medications for foster children, Congress passed the Child and Family Services Improvement and Innovation Act of 2011. This piece of legislation required states to submit a description of their protocol (planned or in place) to oversee and monitor psychotropic medication use among children and youths in foster care. States were specifically asked to address the following:

- Strategies for screening and assessment to identify children with emotional, behavioral, or psychiatric disturbances that may require psychotropic medications
- Mechanisms for enhancing shared decision making on mental health treatment, including means of obtaining informed consent and assent and methods to facilitate effective communication between the prescriber, the child, and his or her caregivers
- Monitoring of the use of psychotropic medications at the individual and statewide level
- Availability of psychiatric consultation for clinical decision making (specifically as related to the consent process)
- Means for accessing and sharing accurate and up-to-date information and educational materials related to mental health and trauma-related interventions for clinicians, child welfare staff, youths, and caregivers

There are several models of psychotropic medication consent and oversight. Consent for children and adolescents who are wards of the state can be provided by a person or office within the child welfare agency, by someone appointed by the court to provide consent, by the court, by foster parents, or by child welfare caseworkers. Oversight can be prospective or retrospective. In prospective models,

medications are reviewed, typically in conjunction with a centralized consent process, prior to their prescription. In retrospective models, the responsibility for consent usually resides with foster parents or caseworkers. The use of psychotropic medication is monitored through review of Medicaid payment data. (For a review, see Leslie et al., 2010.)

OUTSTANDING QUESTIONS

Numerous outstanding questions emerge on the use of medications to treat posttraumatic symptoms in children and adolescents. Randomized controlled trials are needed to help clinicians better understand which medications are effective in this heterogeneous population. The impact of trauma type on symptomatology has been studied to some extent, but there has been no examination of how this might predict responses to specific treatments. How treatment affects long-term outcomes for patients is another understudied but important area. Whether monitoring of the use of psychotropic medications for foster children improves quality or cost-effectiveness of care is currently unknown. Additional research is also needed to clarify the distinctions between symptoms of trauma and psychiatric illness and how this affects clinical decision making.

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