V

TREATMENT

23 Principles of Treatment Planning

Essential Concepts

- An appropriate treatment plan emanates from a thorough psychiatric evaluation.
- Sensitive feedback about the results of the evaluation sets the stage for providing treatment recommendations.
- A therapeutic alliance must be forged with both the patient and his or her parents or guardians.
- Setting a stage of mutual respect and open communication at the outset of treatment begins an alliance that may be the most powerful therapeutic tool you have.

CLINICAL DESCRIPTION

When parents or guardians bring their child for evaluation by a mental health professional (especially a physician) they may be riddled with guilt, fearful of the diagnosis, and anxious about the potential of being blamed for the child's difficulties. They may see their child's failings as evidence of their inadequacy as parents.

The reason and source of referral for a child or adolescent receiving a psychiatric evaluation is essential to determine. Ask why the family is coming now. Begin the evaluation with as much clarity as possible about the process—first the evaluation, and then the feedback and recommendations for treatment. Treatment of psychiatric disorders tends to be shrouded in mystery and ambiguity for many people. Parents may fear the use of medication. They may be concerned about stigma. Clarify these issues early and often.

The feedback about evaluation findings should begin a dialogue about the child's strengths, weaknesses, diagnosis, and target symptoms.

KEY POINT

Clarify the nature of confidentiality of treatment with the child and the family. In general, the younger the child the more that is shared about the general progress of treatment. It is important that the parents have a clear understanding of the treatment goals and methods, such that they understand the process of psychotherapy and pharmacotherapy. There can be confidentiality as to the content of the therapy unless there is a potential that the child is self-destructive or destructive to others. Suicidality, antisocial behaviors, sexual promiscuity, and substance use are issues that do not have confidentiality if the child is at serious risk of harm. Usually it is reassuring to the child and promotes a sense of safety when the limits of confidentiality are elaborated.

TIP

In general, the postevaluation feedback is with parents and guardians first. However, with adolescents, it is advised that they have the option of being present at meetings with the parents when the findings of the evaluation and recommendations are being made. It is also helpful to discuss with an adolescent what they would like their parents to be told about the content of your meetings with him or her, and to give some feedback about the issues you think he or she is dealing with. The general approach is to join with the adolescent in working together for common goals.

KEY POINT

The intensity of the treatment (inpatient, partial hospital, in-home services, or outpatient therapy) is the first determination. Secondly, determine whether treatment will be sequential (for example, starting with psychotherapy and only adding medication if the therapy does not work), or multimodal (starting several interventions at once). Much depends on the acuity and functional impairment of the symptoms. Many children require multimodal treatment in a variety of systems (family, individual, school, etc.). The physician should help coordinate the treatment and be an active member of the treatment team.

TABLE 23.1. Setting the Stage for Treatment

- Set aside sufficient time to discuss the results of your evaluation of the child. A therapeutic alliance with the parents may be initiated via open communication and a nonblaming, but clear diagnostic formulation of the components of their child's strengths as well as challenges.
- Formulate a treatment plan with goals and objectives. Use a biopsychosocial formulation to focus your treatment plan.
  - Biological—what is the psychiatric diagnosis? Identify if there is a biological treatment (medication) that may be helpful. Is there need for further testing (psychological, laboratory, etc.) to assess physical health and biological strengths and vulnerabilities?
  - Psychological—what are the psychological symptoms? Are there psychotherapeutic techniques that will be helpful?
  - Family and social issues may be a primary target of treatment. Family conflict is often an issue. Friends, social network, and school may be other areas of need.
- Set priorities—choose to target the most impairing symptoms first.
  - Safety of the child, including risk of harm to self or others.
  - Symptoms that are likely to worsen without rapid treatment (such as school avoidance).
  - Problems that are most urgent to the child and family.
  - Symptoms that are most amenable to treatment.
- Parents, and usually the child, should help determine which treatment strategy to follow. Parental motivation or ability to carry out a treatment plan is a primary factor.
- The treatment plan should be consistent with the family's resources (time, money, and emotional).
- Discuss the evidence base for treatment. If there are treatments that have been demonstrated to be effective, discuss them with the parents. Risks of the intervention as well as benefits (and risks of no intervention) should be discussed. If there isn't much evidence for a treatment, say so. Also say why you are recommending the treatment(s) you are.
- Treatment planning (and communication about treatment progress) is an ongoing process. Continue to reassess the child and his or her response to interventions and make appropriate modifications.

24 Psychopharmacology

Essential Concepts

- Medication may be an important component of a multimodal treatment plan for a child suffering from behavioral and emotional problems.
- For all psychotropics used, there should be a careful consideration of risks and benefits of the treatment with the family/guardian and education and assent of the child.
- Rating forms of symptoms prior to and following the initiation of medication may be helpful in quantifying effectiveness as well as side effects.
- Take a careful medical and medication/substance history prior to the initiation of any medication, with laboratory, ECG, or other tests as appropriate.

It is part of the cure to wish to be cured.

—Lucius Annaeus Seneca

GENERAL PRINCIPLES AND CLINICAL CONSIDERATIONS

The essential consideration in using medications for the treatment of psychiatric disorders in children and adolescents is being clear what the diagnosis and target symptoms are, knowing the risks and benefits, and being thoughtful and careful about medication use. While this is important for all of medicine, it is even truer in the treatment of children, whose bodies and nervous systems are not yet fully developed.

Pharmacotherapy should be part of a broader treatment plan in which consideration is given to all aspects of the child's life. It should not replace psychosocial and educational

interventions. Likewise, medication should not be thought of as the treatment of last resort, when everything else has failed. Realistic expectations of pharmacotherapy based on a clear definition of which target symptoms may be effectively ameliorated as well as what cannot be reasonably expected (e.g., changing the child's attitude) are the ingredients for successful intervention.

Even as there needs to be care taken in using medication, we also know that untreated disorders (such as depression, mania, and psychosis) have worse prognoses. There is evidence that early detection and medication intervention with prodromal schizophrenia may improve lifetime prognosis and functioning. We also know that children who are unable to pay attention will miss out academically and socially on early developmental tasks. Thus, risks of using medication must be weighed against not only the benefits but also the risk of not treating, which may be chronicity and social incapacitation.

KEY POINT

Many of the medications used for the treatment of psychiatric disorders in children and adolescents are considered "off-label," or not approved by the U.S. Food and Drug Administration (FDA) for the pediatric population. For many medications, the intensive testing required for FDA approval has not been sought by the medication manufacturers. For this reason, medications determined to be effective with adults are used with children. Because children are not just "miniature adults," the medications should be used more judiciously, carefully, and only with clear indications and target symptoms.

Evaluation and Treatment

The sine qua non of all psychiatric care is a thorough evaluation, using multiple informants. This includes ensuring good physical health, and getting baseline laboratory and physical assessment data, as indicated. Table 24.1 highlights the essentials of evaluation prior to the use of pharmacotherapy.

Once the decision has been made that pharmacotherapy is appropriate for the symptoms and functional disability with which the child or adolescent presents, follow the plan for pharmacotherapy outlined in Table 24.2.

TABLE 24.1. Evaluation Essentials for the Use of Pharmacotherapy

1. Conduct a comprehensive psychiatric evaluation of the child or adolescent, including information from multiple sources, assessment of the family, and family history of psychiatric and medical disorders.
2. Provide careful diagnostic and psychiatric symptom review with the patient and caregivers.
3. Ensure a physical examination.
4. Collect baseline laboratory and physical assessment data where warranted. Consider baseline rating scales of target symptoms.
5. Determine indicated nonpharmacologic interventions for the diagnosed disorder.
6. Consider the risks and benefits of pharmacotherapy.
7. Consider the risks and benefits of specific medications relevant to the disorder.
8. Conduct a formal consent procedure with the parent and youth. Give handouts on medications, where appropriate.

TABLE 24.2. Essentials of Pharmacotherapy

1. Review the patient's (and pertinent family) medical history, drug allergies, and past drug reactions.
2. Identify treatable symptoms and establish treatment goals.
3. Initiate medications at low doses and assess dosing schedule (for ease, effectiveness, and to minimize side effects).
4. Monitor therapy regularly.
   - Ask patient and parents about presence of adverse reactions and side effects.
   - Perform routine physical assessments (blood pressure, height, weight, etc.).
   - Use rating scales to assess side effects, as available.
5. Limit and manage side effects.
   - Start medications at low doses and titrate slowly.
   - Avoid adding medications that may cause drug interactions.
   - Identify need for medications that treat side effects (e.g., benztropine, diphenhydramine).
6. Determine treatment duration.
   - Evaluate effectiveness of medication and dosage after 2–6 weeks.
   - Duration of therapy—reevaluate need for medication every 6 months.

(Continued)

TABLE 24.2. Essentials of Pharmacotherapy (*continued*)

7. Minimize duplicate therapy and polypharmacy.
   - Monotherapy is preferred when possible.
   - Consider potential drug–drug interactions when combining medications.
8. Coordinate care with the patient, caretakers, all health care and mental health care providers, and the family pharmacist.

MAJOR CLASSES OF MEDICATIONS USED IN CHILD AND ADOLESCENT PSYCHIATRY

Stimulant Medications

The stimulant medications act to enhance dopamine and noradrenergic transmission. They improve both cognitive and behavioral functioning. They are considered the first-line medications in the treatment of attention deficit hyperactivity disorder (ADHD). Stimulants are the most prescribed psychotropic agents for children in the United States.

The stimulant medications come in short and longer acting preparations. The most commonly reported side effects of stimulant medications are appetite suppression and sleep disturbance. Less frequently, mood disturbance, headaches, abdominal discomfort, increased lethargy, and fatigue or "spaciness" have been reported. There may be increases in heart rate and blood pressure, and monitoring is suggested. Additionally, all stimulants may exacerbate tics. Although the etiology remains unclear, some ADHD children taking stimulants may demonstrate growth delay. "Drug holidays" (summers or other periods of time not taking the stimulant) typically remediate that delay. Table 24.3 gives information relevant to the use of stimulant medication in clinical practice.

TIP

There has been concern raised in Canada and later in the United States that Adderal XR and possibly other stimulants may increase the risk of sudden death. Although epidemiologically this has not been substantiated, a careful individual and family history of heart arrhythmias and monitoring of heart rate, blood pressure, and EKG, as indicated, are advised for Adderal XR and the other stimulant medications.

TABLE 24.3. Stimulant Medications

Drug	*Chemical Effect*	*Average Daily Dose Range*	*Pharmacokinetic Parameters (duration)*	*Monitoring*
		Amphetamine Mixtures		
Adderall	Blocks reuptake of DA and NE, inhibits MAO	2.5–40 mg 1–3 divided doses	4–6 h	Blood pressure, height, weight
Adderall XR		10–30 mg QAM	12 h	
		Dextroamphetamine		
Dexedrine	Blocks reuptake of DA and NE, inhibits MAO	5–40 mg 1–3 divided doses	4–6 h	Blood pressure, height, weight
Dexedrine spansules		5–40 mg QD	6–8 h	
		Methylphenidate		
Concerta	Blocks reuptake of DA	18–54 mg QAM	12 h	Blood pressure, height, weight
Metadate CD		20–60 mg QAM	9 h	

(Continued)

TABLE 24.3. Stimulant Medications (*continued*)

Drug	*Chemical Effect*	*Average Daily Dose Range*	*Pharmacokinetic Parameters (duration)*	*Monitoring*
Amphetamine Mixtures				
Focalin		5–20 mg 2 divided doses	3–5 h	Blood pressure, height, weight
Ritalin IR		5–60 mg 2–3 divided doses	3–5 h	
Ritalin SR		20 mg QD	8 h	
Other				
Cylert (pemoline)	Blocks reuptake of DA	37.5–112.5 mg QD	6–8 h	Liver enzymes, height, weight

DA, dopamine; NE, norepinephrine; MAO, monoamine oxidase.

Antidepressant Medications

Antidepressant therapy is composed of four main drug classes: tricyclic antidepressants (TCAs), selective serotonin reuptake inhibitors (SSRIs), newer atypical antidepressants, and monoamine oxidase inhibitors (MAOIs). The MAOIs are associated with a number of dietary and therapeutic restrictions that make the use of this medication in children and adolescents unpopular. This section will focus on the other three categories of antidepressants.

In clinical practice, antidepressants are essential options for patients with unipolar depression or anxiety. Care must be taken to assess for a previous history of mania-like symptoms and to monitor for activation and fluctuations in suicidality with treatment. The SSRIs have been demonstrated effective in the treatment of depression. The other classes of medication may be beneficial for an individual patient, but have less evidence of effectiveness for depression. However, the TCAs and atypical antidepressant medications may be useful for treatment of other psychiatric disorders, such as anxiety, enuresis, insomnia, and ADHD. Each antidepressant class has a unique mechanism of action and side-effect profile. Information regarding the use of antidepressants with young people is summarized in Table 24.4.

TIP

Remember that antidepressant effectiveness is not immediately apparent. Initial improvement can be expected after 4 to 6 weeks of pharmacotherapy, but substantial improvement may not be apparent until up to 12 weeks. Once the patient has achieved a remission of symptoms, the antidepressant should be continued for a duration of at least 9 months in order to prevent relapse. Patients with three or more episodes of depression and those whose first episode was unusually severe are at high risk of recurrence and should be considered for maintenance therapy. Watch carefully for "switching" or induction of mania.

KEY POINT

Among the antidepressants, only fluoxetine is approved by the FDA for use in treating major depressive disorder in pediatric patients. Fluoxetine, sertraline, fluvoxamine, and clomipramine are approved for OCD in pediatric patients. Antidepressant

TABLE 24.4. Antidepressant Medications

Drug	*Chemical Effect*	*Average Daily Dose Range*	*Side Effects*	*Monitoring*
		Tricyclic Antidepressants (TCAs)		
Amitriptyline (Elavil) (tertiary TCA)	5HT, ±NE	Children: 1–3 mg/kg/day in three divided doses Adolescents: 25–100 mg/day	Anticholinergic side effects, orthostatic hypotension, sedation,	EKG, CBC, blood pressure, heart rate, weight, plasma concentrations
Imipramine (Tofranil) (tertiary TCA)		Children: 1.5–5 mg/kg/day in 1 to 4 divided doses Adolescents: 25 to 100 mg/day	GI intolerance, weight gain, sexual dysfunction	
Nortriptyline (Pamelor) (secondary TCA)	NE, ±5HT	Children: 1–3 mg/kg/day in 3–4 divided doses Adolescents: 30–150 mg/day in 3–4 divided doses	Same as above; less anticholinergic and sedative effects	
		Selective Serotonin Reuptake Inhibitors (SSRIs)		
Citalopram (Celexa)	5HT	No dosing information available for children	GI intolerance, sexual dysfunction, activation, mania, sleep disturbance	Weight, liver function, drug interactions, manic symptoms, suicidality
Escitalopram (Lexapro)	5HT	(5–40 mg/day is usual)		
Fluoxetine (Prozac)	5HT	5–40 mg/day (can be given three times a week)		
Fluvoxamine (Luvox)	5HT	50–200 mg/day (may need multiple daily dosing)		
Paroxetine (Paxil)	5HT	5–20 mg/day (limited data)		
Sertraline (Zoloft)	5HT	Children: 25–100 mg/day Adolescents: 50–100 mg/day		
		Atypical Antidepressants		
Bupropion (Wellbutrin, Wellbutrin SR, Wellbutrin XL)	NE, DA	Limited data with IR product in pediatric patients; typical adult dose is 100 mg TID	Agitation, insomnia, GI intolerance	Weight, blood pressure, seizure threshold (Contraindicated with bulimia)
Venlafaxine (Effexor, Effexor XR)	5HT, NE	No dosing information available for children	GI intolerance, sexual dysfunction, activation, mania, sleep disturbance, hypertension	Weight, blood pressure, drug interactions
Mirtazapine (Remeron)	5HT, NE	No dosing information available for children	Somnolence, weight gain	Lipids, weight, agranulocytosis
Nefazodone (Serzone)	5HT	No dosing information available for children	GI intolerance, insomnia, agitation	Liver function, drug interactions

5HT, serotonin; NE, norepinephrine; DA, dopamine; EKG, electrocardiogram; CBC, complete blood count; IR, immediate release.

medication may effectively ameliorate depression in youth. In the Treatment for Adolescents with Depression (TADS) study, 71% improved with both fluoxetine and CBT, 60% improved with fluoxetine alone, 43% improved with CBT alone, and 34% improved with placebo.

KEY POINT

In October 2004, the U.S. Food and Drug Administration (FDA) issued a black box warning for all antidepressants used in the pediatric "age range." This was prompted by concerns that antidepressant use may exacerbate suicidal thinking and behaviors in vulnerable children and adolescents who are treated with these medications. The FDA warning emphasizes the need for careful clinical monitoring of young patients receiving antidepressants. FDA recommended guidelines include weekly monitoring for the first 4 weeks after initiating antidepressant medication, then every other week for the second 4 weeks, then assessed every 3 months while on the medication. Assess for worsening of depression or suicidality and symptoms of activation (anxiety, agitation, disinhibition, panic, irritability, insomnia, akathisia, or mania/hypomania). Of note, there were no completed suicides by antidepressant users in the studies cited by the FDA.

Mood Stabilizers

There are three commonly used and well-studied mood stabilizers: lithium, valproate, and carbamazepine. Of the three, only lithium is FDA approved for the treatment of bipolar disorder in adolescents (over the age of 12). Valproate is becoming increasingly popular for the treatment of mania in children and adolescents. It appears to be as effective and may be better tolerated in some patients. Information regarding the clinical use of these three major mood stabilizers is summarized in Table 24.5.

Anti-Anxiety Medications

Drugs with anxiolytic activity include benzodiazepines, buspirone, TCAs, SSRIs, alpha-2a agonists, such as clonidine or guanfacine, and beta-blockers. Of these, only benzodiazepines and buspirone are specifically considered anxiolytics.

TABLE 24.5. Mood Stabilizer Medications

Drug	*Chemical Effect*	*Average Daily Dose Range*	*Side Effects*	*Monitoring*
Lithium carbonate (Lithobid, Eskalith)	5HT, ±NE	Children: 15–60 mg/kg/day in 3–4 divided doses Adolescents: 600–1800 mg/day in 3–4 divided doses or 2 divided doses for sustained-release products	Sedation, thirst, polyuria, polydipsia, weight gain, GI intolerance, tremor, hypothyroidism, seizures, acne	EKG, CBC, electrolytes, renal function tests, thyroid function tests, weight, plasma concentrations **Serum levels:** Acute mania: 0.8–1.5 mEq/L Maintenance: 0.6–1 mEq/L
Valproate, valproic acid (Depakote, Depakene)	GABA	30–60 mg/kg/day in 2–3 divided doses.	Sedation, thrombocytopenia, alopecia, nausea, weight gain, tremor, GI upset, hepatotoxicity, agranulocytosis, neutropenia	CBC with platelets, liver function tests, weight, menses, plasma concentrations **Serum level:** 50–125 µg/mL
Carbamazepine (Tegretol, Carbatrol)	Multiple CNS effects	Children: 10–20 mg/kg/day in 3–4 divided doses Adolescents: 400–800 mg/day in 2–3 divided doses	Dizziness, rash, impaired coordination, slurred speech, ataxia, drowsiness, nausea, vomiting, agranulocytosis, hepatotoxicity	CBC with platelets, EKG, weight, plasma concentrations **Serum level:** 8–12 µg/mL

5HT, serotonin; NE, norepinephrine; GABA, γ aminobutyric acid; EKG, electrocardiogram; CBC, complete blood count.

Benzodiazepines are used in the treatment of acute anxiety, panic, and sleep disorders, and may be useful for acute treatment of neuroleptic-induced akathisia. Benzodiazepines potentiate the inhibitory effects of GABA. The disadvantages of benzodiazepines are their sedation, disinhibition, and psychological and physical dependence. For these reasons, benzodiazepines are rarely used in child and adolescent psychiatry as maintenance medications, but may have utility in the acute management of severe anxiety (such as debilitating school-related anxiety) for a brief period of time.

Buspirone is an azapirone anxiolytic. Unlike benzodiazepines, the anxiolytic effect of buspirone is not immediate and can take up to 2 to 3 weeks. Advantages are that it is not associated with dependence or withdrawal reactions and has no demonstrated potential for abuse. However, clinically buspirone may not be as effective as an anxiolytic, and data regarding its use in children are sparse. Information about the use of anxiolytics in clinical practice is summarized in Table 24.6.

Antipsychotic Medications

Antipsychotic medications are used to treat children with serious psychopathology including psychotic disorders, depression with psychotic features, mania, autism spectrum disorders, Tourette disorder, self-injurious behaviors, and severe aggressive behaviors.

There are two general classes of antipsychotics used in clinical practice: the traditional antipsychotics and the atypical antipsychotics. Both categories of antipsychotics effectively treat the hallmarks of psychosis, that is, the positive or active symptoms including hallucinations, delusions, bizarre behavior, disordered thinking, and severe agitation. The newer atypical antipsychotics are more successful at ameliorating the negative symptoms of schizophrenia such as apathy and avolition. It is this latter action plus their less severe side effect profile that has led to the atypical antipsychotics replacing the traditional antipsychotics as first-line antipsychotic medications.

Potential long-term complications of most atypical antipsychotics include hyperprolactinemia, extrapyramidal symptoms (EPS), and tardive dyskinesia (TD), although TD is less common with atypical antipsychotics than with the typicals. Additionally, the FDA has issued a warning that all of the atypical antipsychotics carry a risk of precipitating type-2 diabetes. Olanzapine and clozapine are associated with the greatest weight gain and glucose intolerance. Ziprasidone has

TABLE 24.6. Antianxiety Medications

Drug	*Chemical Effect*	*Average Daily Dose Range*	*Side Effects*	*Monitoring*
Benzodiazepines				
Alprazolam (Xanax)	GABA	0.375–3 mg/day in 3 divided doses	Sedation, disinhibition, drowsiness, incoordination, confusion, memory impairment	HR, RR, BP, CBC, liver function
Clonazepam (Klonopin)	GABA	0.1–0.2 mg/kg/day in 2 divided doses		
Diazepam (Valium)	GABA	0.12–0.8 mg/kg/day in 3 divided doses		
Lorazepam (Ativan)	GABA	0.02–0.1 mg/kg every 4–8 h		
Nonbenzodiazepines				
Buspirone (BuSpar)	5HT	0.3–0.6 mg/kg/day in 2 divided doses	Dizziness, headache, lightheadedness, nausea	Liver function, renal function

GABA, γaminobutyric acid; 5HT, serotonin; HR, heart rate; RR, respiratory rate; BP, blood pressure; CBC, complete blood count.

the fewest metabolic side effects, but must be monitored for prolonged conduction (QTc) on electrocardiogram. Aripiprazol reportedly causes the least hyperphagia and therefore should have a decreased risk of metabolic syndrome.

For the use of all antipsychotics, monitoring with the Abnormal Involuntary Movement Scale (AIMS) for the development of tardive dyskinesia and the Simpson-Angus Scale (SAS) for extrapyramidal symptoms is recommended. These are found in Appendix 1.

Information regarding the use of antipsychotics in clinical practice is summarized in Table 24.7.

Other Agents

A variety of other agents have been used in the treatment of child and adolescent psychiatric disorders. A few of these agents will be briefly discussed and are summarized in Table 24.8.

Atomoxetine (Strattera) is the first nonstimulant medication approved for the treatment of ADHD. Although its true mechanism of action is unknown, it is thought to be related to the selective inhibition of the presynaptic norepinephrine transporter. Although it has not demonstrated superior effectiveness to stimulant medications, it may be useful for youth who do not tolerate stimulant medication well, or who suffer from both ADHD and tics.

The alpha-adrenergic agonists, clonidine and guanfacine, were originally used as blood pressure medications, but have been used widely in child and adolescent psychiatry. They are the first-line treatment for tics. These medications may also have utility for treating the hyperactivity and impulsivity of ADHD. Additionally, the adrenergic agonist medications have been used successfully in treating some anxiety disorders, such as posttraumatic stress disorder, in which there is physiological arousal with increased sympathetic outflow. Clonidine is especially helpful in settling youth at night so they can sleep. Other uses have included the control of aggression toward self and others in youth with developmental disorders.

Diphenhydramine (Benadryl) and hydroxyzine (Atarax, Vistaril) are antihistamines used for a variety of psychiatric disorders and side effects of psychiatric medications. Diphenhydramine has been used effectively to treat sleep disturbances, anxiety, and EPS. Hydroxyzine is commonly used for the treatment of anxiety. Both medications may be activating or may cause visual perceptual disturbance in a small group of children who are sensitive to the central anticholinergic effect.

TABLE 24.7. Antipsychotic Medications

Drug	*Chemical Effect*	*Average Daily Dose Range*	*Side Effects*	*Monitoring*
Traditional Antipsychotics—Lower Potency Agent				
Chlorpromazine (Thorazine)	DA	0.5–1 mg/kg every 4–6 hours	Anticholinergic effects, orthostasis, sedation, EPS, NMS	CBC, BP, AIMS, SAS, EKG
Traditional Antipsychotics—Higher Potency Agent				
Haloperidol (Haldol)	DA	0.01–0.15 mg/kg/day in 2–3 divided doses	EPS, NMS hyperprolactinemia	EKG, BP, CBC, electrolytes, AIMS, SAS
Atypical Antipsychotics				
Aripiprazole (Abilify)	DA	No data in children; adult dose: 10–15 mg/day	Headache, akathisia, sleep disturbance, orthostasis	Weight, BMI, glucose, fasting lipids, BP, AIMS, SAS, EKG
Risperidone (Risperdal)	5HT, DA	Adult dose: 2–6 mg/day	Orthostasis, hyperprolactinemia, weight gain, EPS, hyperlipidemia	
Olanzapine (Zyprexa)	5HT, DA	Adult dose: 10–20 mg/day	Sedation, weight gain, hyperglycemia, hyperlipidemia	

(Continued)

TABLE 24.7. Antipsychotic Medications (*continued*)

Drug	*Chemical Effect*	*Average Daily Dose Range*	*Side Effects*	*Monitoring*
Quetiapine (Seroquel)	5HT, DA	Adult dose: 150–800 mg/day	Sedation, orthostasis, weight gain	Weight, BMI, glucose, fasting lipids, BP, AIMS, SAS
Ziprasidone (Geodon)	5HT, DA	Adult dose: 80–160 mg/day	Sedation, akathisia	
Clozapine (Clozaril)	5HT, DA	Adult dose: 200–900 mg/day	Orthostasis, weight gain, hyperglycemia, hyperlipidemia	

DA, dopamine; 5HT, serotonin; EPS, extrapyramidal symptoms; NMS, neuroleptic malignant syndrome; CBC, complete blood count; BP, blood pressure; EKG, electrocardiogram; BMI, Body Mass Index; AIMS, Abnormal Involuntary Movement Scale; SAS, Simpson Angus Scale.

TABLE 24.8. Other Medications

Drug	*Chemical Effect*	*Average Daily Dose Range*	*Side Effects*	*Monitoring*
Clonidine (Catapres)	Presynaptic alpha adrenergic agonist	3–10 µg/kg in 2–4 div doses	Sedation, hypotension, headache, dizziness, dry mouth Irritability, nausea, depression, bradycardia, skin irritation with patch, rebound HTN	BP, pulse, weight, EKG if history of CV disease in child or family
Guanfacine (Tenex)	Presynaptic alpha adrenergic agonist	15–90 µg/kg 1–2 div doses	Same as Clonidine, but less hypotension and sedation	BP, pulse, weight, EKG if history of CV disease in child or family
Atomoxetine (Strattera)	NorE reuptake inhibitor	0.5–1.8 mg/kg 1–2 div doses	GI discomfort, decreased appetite, rhinitis, headache, lethargy, mild insomnia	BP, pulse, weight
Diphenhydramine (Benadryl)	H1 antagonist	25–300 mg/day 1–4 div doses	Sedation, dizziness, dry mouth, constipation, blurred vision, lowered seizure threshold with very high doses	No specific tests
Hydroxyzine (Atarax, Vistaril)	H1 antagonist	10–100 mg/day 1–4 div doses	Same as diphenhydramine	No specific tests