

Table 4.
Pharmacologic Approaches for Impulsivity

| Indication | Mechanism of action | Typical dose | Immunologic evidence | Common side effects | Serious reactions | Other information |
|--|--|---|---|--|--|---|
| Antidepressants | | | | | | |
| Fluoxetine MDD, OCD, bipolar depression | SSRI | 20 mg/d; typically 20–80 mg/d, max 120 mg/d in OCD | Off-label: primary impulsive aggression, PTSD, impulsive aggression First line but mixed results with ICDs | Insomnia, headache, nausea, sexual side effects, weight gain | Bleeding (especially GI bleeding), hyponatremia/SIADH, serotonin syndrome, fractures | 2D6 inhibitor; black box for suicidality aged <24 y; long half life |
| Atomoxetine ADHD | SNRI | Child: <70 kg: 0.5 mg/kg/d in 2 divided doses; max 100 mg/d >70 kg: follow adult dosing Adult: 40 mg/d, max 100 mg/d | Off-label: impulsivity due to ADHD, binge-eating disorder | Sedation, fatigue, nausea, increase in blood pressure, insomnia, dizziness, anxiety, agitation, anticholinergic side effects, sexual dysfunction, dysmenorrhea | Hyper/hypotension, increased heart rate and risk of cardiac adverse events, orthostasis, suicidality, chemical hepatitis | Minimum trial 6–8 wk though improvement can continue for 8–12 wk; can be combined with stimulants |
| Desipramine MDD | TCA | Child: 25 mg at bedtime; max 100 mg/d Adult: 25–50 mg/d; max 300 mg/d | Off-label: impulsivity due to ADHD | Dry mouth, blurred vision, weight gain, sexual dysfunction, constipation, urinary retention, headache, dizziness, somnolence | Arrhythmia, cardiac conduction abnormalities (AV block), seizures | Check ECG before initiation and at each dose increase; black box for suicidality in those aged <24 y; increased lethality in overdose compared to other medication classes |
| Bupropion MDD, seasonal affective disorder, smoking cessation | NDRI | Child: IR >8 y: 37.5 mg twice/d; max 400 mg/d SR >11 y: 2 mg/kg/d; max 3 mg/kg/d or 150 mg XL >12 y: 150 mg/d; max 400 mg/d Adult and geriatric: IR: 100 mg twice/d; max 450 mg/d in 3–4 divided doses SR: 150 mg/d; max 200 mg twice/d XL: 150 mg/d; max 450 mg/d | Off-label: ADHD, bipolar depression | Agitation, dry mouth, insomnia, nausea, headache, weight loss | Lowers seizure threshold | Black box for suicidality in those aged <24 y; avoid in eating disorders, alcohol use disorders, or epilepsy |
| Antipsychotics | | | | | | |
| Aripiprazole BPAD, MDD, schizophrenia, irritability in autism | Partial D ₂ agonist, partial 5-HT _{1A} agonist, 5-HT _{2A} antagonist | Child: 1–2.5 mg/d; up to 15 mg/d Adult: 10–15 mg/d; max 30 mg/d Geriatric: 2–5 mg once/d, up to 15 mg/d | Off-label: dementia, OCD, Tourette syndrome, conduct disorder, aggression in autism | Akathisia, anxiety, insomnia, tremors, somnolence, weight gain, headache | Can cause more impulsive behaviors such as pathologic gambling and impulse control disorders; NMS with caution in impulse control disorders; NMS | Minimal risk of hyperprolactinemia, favorable side effect profile, can be combined with clozapine for rational polypharmacy; black box warning with dementia; requires metabolic monitoring |
| Risperidone Schizophrenia, BPAD, irritability in autism | D ₂ , 5-HT _{2A} , a ₁ , a ₂ , H ₁ antagonist | Child: 0.25–0.5 mg daily depending on weight; max 2–3 mg/d Adult: 2 mg daily in 1–2 divided doses; max 6 mg/d Geriatric: 0.5 mg twice/d; max 6 mg daily | Off-label: Tourette syndrome, ODD, conduct disorder, behavioral symptoms of dementia, aggression in autism | Somnolence, orthostatic hypotension, weight gain | Hyperprolactinemia, EPS (typically at >4 mg daily) | Requires metabolic monitoring; black box warning for increased mortality in older adults |
| Olanzapine Schizophrenia, agitation, bipolar mania, bipolar depression, treatment-resistant depression | 5-HT _{2A} , D ₂ , H ₁ , M ₁ , a ₁ , 5-HT _{2C} antagonist | Child: 1.25–5 mg; max 20 mg/d Adult: 2.5–10 mg daily; max 20 mg/d Geriatric: 2.5 mg/d; max 10 mg | Off-label: Tourette syndrome, OCD, trichotillomania, gambling | Significant weight gain, hyperglycemia, dyslipidemia, somnolence, dry mouth, constipation | Drug reaction with eosinophilia and systemic symptoms (DRESS) | Cigarette smoking may increase clearance by 40%; black box warning for increased mortality in older adults |
| Quetiapine Schizophrenia, bipolar mania, bipolar depression | 5-HT _{2A} , D ₂ , H ₁ , a ₁ antagonist, 5-HT _{1A} agonist | Child: IR: 25 mg twice/d; max 800 mg/d XR: 50 mg/d; max 800 mg/d Adult: IR: 100–200 mg/d; max 800–1,200 mg daily XR: 300 mg/d; max 800–1,200 mg daily Geriatric: 25 mg at bedtime; max 300 mg/d | Off-label: Parkinson psychosis, behavioral symptoms of dementia | Dizziness, sedation, weight gain, constipation, hypotension | Orthostatic hypotension, possibly cataract formation | Requires metabolic monitoring; black box warning for increased mortality in older adults |
| Clozapine Treatment-resistant schizophrenia, suicidal behavior in schizophrenia or schizoaffective disorder | D _{1,4} , 5-HT _{2A} , 5-HT _{2C} antagonist | Adult: 12.5–25 mg/d; 300 mg by the end of 2 wk; max 900 mg/d Geriatric: 6.25 mg/d, max 50 mg/d | Off-label: dementia, Parkinson psychosis, treatment-resistant bipolar disorder, autism, developmental disability | Orthostasis, weight gain, sedation, sialorrhea, tachycardia | Agranulocytosis, myocarditis, GI hypomotility, NMS, QTc prolongation | Dose requirements higher in smokers; if a patient stops taking, reduce the dose by 60%–70%; must be tapered; requires frequent blood draws; can lower seizure threshold |
| Ziprasidone Agitation/aggression in psychotic disorders, substance use, or medical causes | Possibly D ₂ , 5-HT _{2A} , a ₁ , 5-HT _{1D} , 5-HT _{2C} antagonist, 5-HT _{1A} agonist | Child >35 kg: 20 mg/d; max 160 mg Adult: 40 mg twice/d with meal; max 80 mg twice/d | Off-label: delirium in the ICU, delusional infestation, treatment-resistant depression | Sedation, akathisia, dizziness, rash | QTc prolongation, bradycardia, DRESS | Need to be taken with 500-calorie food bolus; requires metabolic monitoring; black box warning for increased mortality in older adults |
| Pimozide Tourette syndrome | Blocks D ₂ receptors in the nigrostriatal pathway | Child: 0.5 mg–1 mg/d; dose range 2–8 mg/d Adult: 1–2 mg/d; max 10 mg/d | Off-label: skin picking | Constipation, akathisia, akinesia, drowsiness | ECG abnormalities | If therapy requires >4 mg/d, CYP2D6 genotyping should be performed; baseline ECG should be performed |
| Antiepileptics and anticonvulsants | | | | | | |
| Carbamazepine Bipolar disorder, focal seizures, and generalized onset seizures | Blocks voltage-gated sodium channels, inhibits glutamate release | Adult: 100–400 mg/d, max 1,600 mg/d For primary impulsive aggression, 450 mg/d is initial target dose with low-subtherapeutic drug levels | Off-label: primary impulsive aggression, intermittent explosive disorder | Dizziness, sedation, nausea, headache, rash | Myelosuppression, hepatitis, jaundice, SJS/TEN, angioedema, SIADH | Monitor drug level (mean 4.3 µg/mL), CBC with differential, sodium, LFTs, HLA-B1502 in people of Asian descent; teratogenic; self-inducer; enzyme inducer and inhibitor of many common medications (OCPs, antibiotics, psychotropics) |
| Oxcarbazepine Focal seizures | Unknown; thought to be blocking voltage-gated sodium channels, stabilizing neuronal membranes, decreasing propagation of synaptic impulses; modulates activity of calcium channels | 300 mg twice/d; max 2,400 mg/d | Off-label: BPAD, primary impulsive aggression, intermittent explosive disorder | Headache, ataxia, dizziness, nausea, vomiting, drowsiness | SJS/TEN, anaphylaxis, angioedema, hyponatremia | Better tolerated than CBZ and is not teratogenic; reduce efficacy of OCPs by up to 50%; moderate enzyme inducer; check HLA-B1502 in people of Asian descent before starting |
| Valproic acid Bipolar disorder, focal seizures, and generalized onset seizures | Inhibits voltage-gated sodium channels, increases GABA activity, inhibits GABA transaminase, modulates calcium channels | Adult: 250 mg 3 times/d; increase by 250–500 mg to target serum level 20–30 mg/kg in 1–4 divided doses for rapid symptom control Geriatric: 125–250 mg 3 times/d; increase by 125–250 mg to target serum level | Off-label: primary impulsive aggression, bipolar depression, intermittent explosive disorder, aggression in brain injury and dementia | Teratogenic in pregnancy, thrombocytopenia, PCOS, weight gain, somnolence, tremor, hair loss, nausea, fatigue, dizziness | Hepatotoxicity, pancreatitis | Effective for aggression at mean level of 39.2 µg/mL; teratogenic, so need baseline pregnancy test; monitor: CBC, weight, PT/PTT, LFTs, glucose, lipids, and check drug level 3 days after dose change; check level, CBC, LFTs every 6 mo |
| Levetiracetam Bipolar disorder, focal seizures, generalized onset seizures | Inhibits glutamate release, inhibits voltage-gated sodium channels | Child and geriatric: 25 mg/d × 2 wk, 50 mg/d × 2 wk, 100 mg/d; max 200 mg/d Adult: 25 mg/d × 2 wk, 50 mg/d × 2 wk, 100 mg/d × 1 wk, then 200 mg/d; max 400 mg/d | Off-label: aggression, treatment-resistant depression, intermittent explosive disorder, PTSD, impulsivity in borderline eating disorders | Dizziness, headache, rash | SJS/TEN, angioedema | High risk of SJS in pediatrics |
| Topiramate Migraine, seizures | Blocks voltage-gated sodium channels, enhances GABA activity, glutamate antagonist, carbonic anhydrase inhibitor | Child: 0.25–0.5 mg/d; max 2 mg/d 2–3 times/d; max 2 mg/d >12 y: 25 mg/d; max 100 mg/d Adult: 25 mg/d; max 200 mg twice/d | Off-label: alcohol use disorder, antipsychotic-induced weight gain, binge eating disorder, cocaine use | Somnolence, fatigue, dizziness, memory difficulties, confusion, ataxia, paresthesias, nausea, anorexia, weight loss, change in taste perception | Metabolic acidosis, renal stones, osteomalacia, rare activation of suicidality, secondary angle-closure glaucoma, hyperammonemia, hyperthermia, oligohidrosis (children) | No benefit over placebo for gambling |
| Alpha-2 agonists | | | | | | |
| Clonidine ADHD | Stimulates a ₂ adrenoreceptors and supports neuronal inhibition by hyperpolarizing nerves, resulting in reduced sympathetic outflow from the CNS | Child: 0.05–0.1 mg nightly, max 0.2–0.4 mg/d depending on weight Adult and geriatric: 0.1 mg/d, increase by 0.1 mg and divided doses; max 0.4 mg/d | Off-label: ICU sedation, opioid withdrawal, agitation in autism, ADHD, Tourette syndrome | Sedation, dizziness, dry mouth, depression, anxiety, nausea, hypotension | Sinus bradycardia, AV block, hypertensive encephalopathy during withdrawal | Requires taper; comes in transdermal formulation |
| Guanfacine ADHD | Selective a ₂ adrenoreceptor agonist, which reduces sympathetic outflow on the heart and circulatory system | Child: 1 mg nightly; max 3–7 mg/d depending on formulation Adult: 1 mg nightly; max 4 mg/d | Off-label: OCD, ADHD | Sedation, weakness, dizziness, dry mouth, constipation | Hypotension, syncope, sinus bradycardia | Less likely to cause hypotension than clonidine |
| Anxiolytics | | | | | | |
| Buspirone GAD | Serotonin 5-HT _{1A} receptor partial agonist | Child: 25 mg/d; range 7–50 mg/d Adult: 30–30 mg/d; max 10 mg/d in 2–3 divided doses; max 60 mg/d | Off-label: depression, augmentation | Dizziness, lightheadedness, nausea, headache, jitteriness | None | Absorption increases 2x with food; consistent so taking with or without food can improve impulsivity |
| Alprazolam GAD, short-term anxiety, panic disorder | Short-acting benzodiazepine | Child: 0.05–0.07 mg/kg/d; max 4 mg/kg/d Adult: 0.25 mg 3–4/d; max 8 mg/d; 0.25 mg 3–4/d; Geriatric: 0.25 mg 3–4/d; 0.25 mg/d slowly | Off-label: GABAergic withdrawal | Somnolence | Anterograde amnesia, paradoxical reaction | Risk of dependence; risk when used with opioids; avoid in psychiatric withdrawal syndrome |
| Loxapam Anxiety, procedural anxiety/sedation | Short-acting intermediate-acting benzodiazepine | Child: 0.25–2 mg 2–3 times/d; max 2 mg/d; dose | Often given parenterally with an antipsychotic in | Somnolence, ataxia | Anterograde amnesia, paradoxical reactions, increased fall risk, respiratory depression | Risk of dependence; risk when used with opioids; avoid in psychiatric withdrawal syndrome |
| Beta blockers | | | | | | |
| Propranolol | Nonselective β_1 -adrenergic blocker; blocks β_1 and β_2 -adrenergic stimulation | Adult and geriatric: IR: 10 mg twice/d, max 120 mg/d; max 80 mg/d Performance anxiety: 10–20 mg 30–60 min prior to activity; max 40 mg 3 times/d | Off-label: anxiety due to primary psychototic disorder, autism, delays, performance anxiety | Dizziness, fatigue, bradycardia, hypotension | May mask clinical signs of hypoglycemia and hypothyroidism | May exacerbate asthma, COPD, CHF; requires taper |
| Glutamatergic antagonists | | | | | | |
| Memantine Alzheimer disease (moderate-severe) | NMDA receptor antagonist leading to reduced glutamate excitotoxicity, neuroprotection | Adult: 10 mg/d; max 20 mg/d For dementia: start at 5 mg/d | Off-label: skin picking, alcohol use disorder, gambling, kleptomania, ADHD | Confusion, dizziness, headache, hallucinations | Falling, seizures, delusions, hallucinations | No benefit for nicotine |
| N-acetylcysteine APAP toxicity | Antioxidant; increases glutathione synthesis | Adult: 600 mg/d; max 2,400 mg/d | Off-label: trichotillomania, OCD, cannabis dependence, skin picking disorder | GI upset, body odor | Avoid with nitroglycerin; may slow clotting so avoid with blood thinners | Available over the counter |
| Antimanic agents | | | | | | |
| Lithium Bipolar disorder | Unknown; alters cation transport across cell membranes; influences the reuptake of serotonin and norepinephrine; inhibits second messenger systems; neuroprotective effects | Child: 600–900 mg in 2–3 divided doses; max 1,200 mg/d Adult: 600–900 mg/d in 2–3 divided doses; max 1,800 mg/d Geriatric: on level but start low and go slow | Efficacy in bipolar disorder is partly due to reduction in impulsivity; MDD, postpartum psychosis, primary aggression, gambling | Gastrointestinal upset, tremor, thirst/polydipsia, polyuria, leukocytosis, acne, hypothyroidism | Nephrogenic diabetes insipidus, dysrhythmia, bradycardia | Monitor: lithium level, thyroid-stimulating hormone, basic + metabolic panel, then 1–2 mo; check level after adding a medication that alters metabolism such as NSAIDs, ACEI, HCTZ; that levels altered by dietary sodium intake |
| Opioid antagonists | | | | | | |
| Naltrexone Alcohol use disorder, opioid use disorder | Inhibit dopamine release in the nucleus accumbens through GABAergic inhibition of GABA _A receptors in the ventral tegmental area | Child: 25 mg/d; max 100 mg/d; max 120 mg/d; max 120 mg/d Adult: 25 mg/d; max 72 mg/d; max 120 mg/d; max 120 mg/d | Off-label: gambling, compulsive sexual behavior, kleptomania, trichotillomania, inconsistent with binge eating, trichotillomania, and substance use | Headache, nausea, vomiting, drowsiness, anorexia | Hepatotoxicity, eosinophilia | Check LFT prior to administration; contraindicated with elevation >1.5 times limit of normal |
| Stimulants | | | | | | |
| Methylphenidate ADHD | NDRI; increases dopaminergic and norepinephrine activity in the prefrontal cortices | Dosing varies based on formulation and brand: Child: IR: 2.5 mg/d twice/d; max 18 mg/d; XR: 18 mg/d; max 72 mg/d Adult and geriatric: 2 doses; max 60 mg/d | May reduce aggression in ADHD as impulsivity and acting out are symptoms | Hypertension, anxiety, irritability | Acute MI, sudden cardiac death, growth suppression, psychosis, exacerbation of psychotic or manic symptoms | May increase impulsive behaviors such as skin picking, gambling, and picking in patients without ADHD |

Intermediate acting:
10 mg twice/d; max
60 mg/d
XR: 18–36 mg/d; max
72 mg/d