

Table III.Oral Medications for the Treatment of Pediatric Hypertension

Medication Class	Advantages	Disadvantages	Comments	Oral Medications and doses*
Angiotensin Converting Enzyme inhibitor	Once daily dosing, usually well tolerated Many agents can be compounded into a suspension	Lab monitoring at initiation and dose increases to monitor for hyperkalemia and increased serum creatinine Cough and angioedema are known side effects	Contraindicated in aortic stenosis, pregnancy Can lead to renal failure in individuals with renal artery stenosis Requires dose adjustment in renal insufficiency	<p><u>Lisinopril</u></p> <p>Start: 0.07 mg/kg/dose once daily; Maximum start dose: 5 mg/dose;</p> <p>Maximum dose: 0.61 mg/kg/dose up to 40 mg/dose.</p> <p><u>ADULT dose range:</u> Start dose: 10 mg/dose once daily; Usual dose range: 20-40 mg/day; Maximum dose: 80 mg/day</p> <p><u>Enalapril</u></p> <p>Start: 0.08-0.1 mg/kg/day; Maximum start dose: 5 mg/day</p> <p>Maximum dose: 0.6 mg/kg per day up to 40 mg/day</p> <p><i>(Can be given QD or divided BID)</i></p> <p><u>ADULT dose range:</u> Start dose: 2.5-5 mg/dose once daily; Maximum dose: 40 mg/day</p> <p><i>(QD or divided BID)</i></p>
Angiotensin-receptor	Once daily dosing,	Lab monitoring at initiation and	Contraindicated	<u>Losartan</u>

<p>blocker</p>	<p>usually well tolerated</p> <p>Losartan can be compounded into a suspension</p>	<p>dose increases to monitor for hyperkalemia and increased serum creatinine</p> <p>Can cause angioedema</p>	<p>in pregnancy</p> <p>Can lead to renal failure in individuals with renal artery stenosis</p>	<p>Start: 0.7 mg/kg/dose once daily</p> <p>Maximum start dose: 50 mg once daily</p> <p>Maximum dose: 1.4 mg/kg/day up to 100 mg once daily</p> <p>ADULT Start dose: 50 mg once daily; Usual dose range: 25-100 mg/day <i>divided QD or BID</i></p>
<p>α- and β-Blocker</p>		<p>May negatively impact athletic performance</p> <p>Heart rate can be dose-limiting</p> <p>Can cause: hyperkalemia, hepatotoxicity, bronchospasm, heart failure, hypo- or hyperglycemia, dyslipidemia</p> <p>Abrupt discontinuation can lead to rebound hypertension</p>	<p>Contraindicated in asthma, heart failure, heart block, pulmonary edema</p> <p>Should avoid use in diabetics</p>	<p>Labetalol</p> <p>Start dose: 1–3 mg/kg/day divided BID;</p> <p>Maximum dose: 10–12 mg/kg/day up to 1200 mg/day divided BID</p> <p>ADULT Start dose: 100 mg BID; increase by 100 mg/dose every 2–3 days to a Maximum dose of 2.4 g/24 hr Usual dose range: 200–800 mg/24/day divided BID</p>
<p>β-Blocker</p>	<p>Propranolol can be administered in a</p>	<p>May negatively impact athletic performance</p>	<p>Contraindicated in asthma and heart failure (Non-</p>	<p>Propranolol</p> <p>(non-cardio selective)</p>

	<p>sustained-release formulation, given once daily</p> <p>Can be used to treat migraine headaches</p> <p>Usually well tolerated</p>	<p>Heart rate can be dose-limiting</p> <p>Can cause: hyperkalemia, hepatotoxicity, bronchospasm, heart failure, hypo- or hyperglycemia, dyslipidemia</p> <p>Abrupt discontinuation can lead to rebound hypertension</p>	<p>cardioselective agents) and in heart block, pulmonary edema</p> <p>Should avoid use in diabetics</p>	<p>Start dose: 1–2 mg/kg/day divided BID or TID; Maximum dose: 4 mg/kg/day up to 640 mg/day divided BID or TID</p> <p>ADULT Start dose: 40 mg/dose given BID or 60–80 mg of sustained-release capsule once daily.</p> <p>Usual dose range: 160–320 mg once daily; Maximum dose: 640 mg/24 hr.</p> <p><u>Atenolol</u></p> <p><u>(Cardioselective (β-1 > β-2) Blocker)</u></p> <p>Start dose: 0.5–1 mg/kg/day divided QD or BID;</p> <p>Maximum dose: 2 mg/kg/day up to 100 mg/day divided QD or BID;</p> <p>ADULT start dose: 50 mg once daily;</p> <p>Maximum dose: 100 mg once daily</p>
<p>Calcium channel blocker</p>	<p>Once daily dosing, usually well tolerated</p> <p>Several agents can be compounded into a</p>	<p>May cause tachycardia, peripheral edema</p>		<p><u>Amlodipine</u></p> <p>Start dose: 0.1 mg/kg once daily; Maximum start dose: 5 mg daily; Maximum dose of 0.6 mg/kg/day up to 10 mg/day.</p> <p><i>Can also be divided</i></p>

	<p>suspension</p> <p>Several agents have extended-release formulations</p>			<p><i>BID.</i></p> <p>ADULT start dose: 5- 10 mg once daily;</p> <p>Maximum dose: 10 mg once daily</p>
Central α -agonist	<p>Transdermal formulation available; patch can be changed once weekly.</p> <p>Oral suspension available.</p>	<p>Can cause: dry mouth, sedation, constipation</p> <p>Abrupt discontinuation can lead to rebound hypertension</p>	<p>Concurrent β-Blocker use may exacerbate rebound hypertension during medication withdrawal.</p>	<p><u>Clonidine</u></p> <p>Start dose: 5–10 mcg/kg/day PO divided Q8–12 hr; increase at 5–7 day intervals to 5–25 mcg/kg/day PO divided Q6 hr;</p> <p>Maximum dose: 25 mcg/kg/day up to 0.9 mg/day;</p> <p>ADULT start dose: 0.1 mg BID; increase in weekly intervals by 0.1 mg/day;</p> <p>Usual dose range: 0.1–0.8 mg/day divided BID;</p> <p>Maximum dose: 2.4 mg/day</p>
Diuretic	<p>Useful as add-on therapy and in children with edema</p>	<p>Lab monitoring after initiation and dose increases to monitor for electrolyte disturbances</p> <p>May lead to hyperuricemia</p> <p>May negatively impact athletic</p>	<p>Potassium sparing diuretics can lead to hyperkalemia when used with ACE inhibitors and/or angiotensin receptor blockers</p> <p>Furosemide is contraindicated in anuria and</p>	<p><u>Hydrochlorothiazide</u></p> <p>Start dose: 1 mg/kg/day once daily</p> <p>Maximum dose: 3 mg/kg/day up to 50 mg/day given once daily</p> <p>ADULT start dose: 12.5-25 mg once daily; Maximum dose: 100 mg/day divided once daily or</p>

		performance	hepatic coma	<p>BID</p> <p><u>Furosemide</u></p> <p>Start dose: 0.5–2.0 mg/kg/dose, can be given once daily to BID; Maximum dose: 6 mg/kg/dose given once daily or BID;</p> <p><u>ADULT start dose:</u> 20-80 mg/dose given Q6-12 hours; Maximum dose: 600 mg/day</p>
Vasodilator	Oral suspension available (hydralazine)	Can cause: tachycardia, fluid retention; hypertrichosis (minoxidil); lupus-like syndrome (hydralazine)	<p>Requires dose adjustment in renal insufficiency</p> <p>Generally reserved as add-on therapy for resistant hypertension.</p> <p>Concurrent use with β-Blocker and diuretic recommended to prevent tachycardia and edema</p>	<p><u>Hydralazine</u></p> <p>Start dose: 0.75 mg/kg/day divided Q6-12 hours; Maximum start dose: 25 mg/dose;</p> <p>Maximum dose: 7.5 mg/kg/day up to 200 mg/day;</p> <p><u>ADULT start dose:</u> 10-50 mg/dose given Q6 hours; Maximum dose: 300 mg/day</p> <p><u>Minoxidil</u></p> <p>Children < 12 years:</p> <p>Start dose: 0.2 mg/kg/day divided QD-TID; Maximum start dose: 5 mg/day;</p> <p>Maximum dose: 50 mg/day divided QD-TID</p> <p>Children \geq 12</p>

				years/ADULT: Start dose: 5 mg/day divided QD-TID; Usual dose range: 10-40 mg/day divided QD-TID; Maximum dose: 100 mg/day divided QD-TID
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* For an inclusive listing of available medications in each class, please refer to PMID 15286277