Dobutamine - Standard Concentration

Newborn use only

2025

Alert	In conditions with low systemic vascular resistance (SVR) (e.g., septic shock) dobutamine is not the appropriate first drug of choice
Indication	Inotrope to increase cardiac output in neonates with myocardial dysfunction and unchanged or increased systemic vascular resistance.
Action	Catecholamine with beta-1 and beta-2 receptor actions which increases myocardial contractility, heart rate and conduction velocity and decreases SVR [1]. Dose dependent effects: • Low dose, 2.5 microgram/kg/min – no significant hemodynamic effects in neonates with cardiovascular compromise • Moderate dose, 5–7.5 microgram/kg/min – increases cardiac output • Higher dose, 5–20 microgram/kg/min – increases cardiac output and blood pressure in hypotensive preterm infants An additional effect of dobutamine on increasing cardiac output has been demonstrated in hypotensive preterm infants receiving dopamine.
Drug type	Inotropic agent
Trade name	Abbott Dobutamine Hydrochloride, Dobutamine Sandoz, Dobutamine Hydrochloride DBL, Dobutrex
Presentation	250 mg/20 mL solution for injection; 250mg powder for reconstitution (Dobutrex)
Dose	5−20 microgram/kg/minute
Dose adjustment	
Maximum dose	Use of up to 20 microgram/kg/min reported in neonates
Total cumulative dose	
Route	Continuous IV infusion
Preparation	**Note: Refer to Appendix for tables to assist with concentration selection.** **20mL Syringe** **1 mg/mL infusion (suggested weight <1 kg)** Draw up 1.6 mL (20 mg) of dobutamine and add 18.4 mL glucose 5%, glucose 10% or sodium chloride 0.9% to make a final volume of 20 mL. **10 microgram/kg/minute = 0.6 mL/kg/hour.** **2 mg/mL infusion (suggested weight 1 to <2 kg)** Draw up 3.2 mL (40 mg) of dobutamine and add 16.8 mL glucose 5%, glucose 10% or sodium chloride 0.9% to make a final volume of 20 mL. **10 microgram/kg/minute = 0.3 mL/kg/hour.** **5 mg/mL infusion (suggested weight ≥2 kg)** Draw up 8 mL (100 mg) of dobutamine and add 12 mL glucose 5%, glucose 10% or sodium chloride 0.9% to make a final volume of 20 mL. **10 microgram/kg/minute = 0.12 mL/kg/hour.** **50mL Syringe** **1 mg/mL infusion (suggested weight <1 kg)** Draw up 4 mL (50mg) of dobutamine and add 46 mL glucose 5%, glucose 10% or sodium chloride 0.9% to make a final volume of 50 mL. **10 microgram/kg/minute = 0.6 mL/kg/hour.** **2 mg/mL infusion (suggested weight 1 to <2 kg)** Draw up 8 mL (100mg) of dobutamine and add 42 mL glucose 5%, glucose 10% or sodium chloride 0.9% to make a final volume of 50 mL. **10 microgram/kg/minute = 0.3 mL/kg/hour.** **5 mg/mL infusion (suggested weight ≥2 kg)** Draw up 20 mL (250mg) of dobutamine and add 30 mL glucose 5%, glucose 10% or sodium chloride 0.9% to make a final volume of 50 mL. **10 microgram/kg/minute = 0.12 mL/kg/hour.**

Administration	Continuous IV infusion via a central or peripheral line, preferably through a dedicated line to prevent accidental bolus. Do not flush line or suddenly stop infusion. If Dobutrex brand is used reconstitute each vial with 20 mL WFI to make a concentration of 250 mg/20 mL.
Monitoring	Continuous heart rate, ECG and blood pressure monitoring preferable. Assess urine output and peripheral perfusion frequently.
Contraindications	Contraindicated in patients with idiopathic hypertrophic sub aortic stenosis and previous hypersensitivity to dobutamine.
Precautions	May cause hypotension therefore ensure adequate circulating blood volume prior to commencement.
Drug interactions	No evidence of drug interactions demonstrated in clinical studies. Exert caution when co-administering with drugs which can cause hypertension or tachycardia.
Adverse reactions	The positive inotropic and chronotropic effects of dobutamine may cause hypertension, tachyarrhythmias, myocardial ischaemia and ventricular fibrillation. Hypotension may result from vasodilation. May cause hypokalaemia. Phlebitis has been reported.
Compatibility	Fluids: Glucose 5%, glucose 10%, glucose in sodium chloride solutions, glucose 5% in Hartmann's, Hartmann's, sodium chloride 0.9%, sodium chloride 0.45% Y site:[10,11,12] Amino acid solutions, adrenaline hydrochloride, alfentanil, alprostadil, amiodarone (for amiodarone strength≤15 mg/mL)[10], amikacin, atenolol, atracurium besylate, atropine sulfate, azithromycin, aztreonam, calcium chloride, calcium gluconate, capreomycin, caspofungin, ceftizoxime, ciprofloxacin, clarithromycin, clindamycin phosphate, clonidine, dexmedetomidine, digoxin, diltiazem, dopamine, doxycycline, enalaprilat, ephedrine, epinephrine HCL, epoetin alfa, erythromycin lactobionate, fentanyl, fluconazole, gentamicin, glycopyrrolate, ketamine, labetolol, leucovorin, levofloxacin, lidocaine, linezolid, lorazepam, magnesium sulfate, methylprednisolone sodium succinate, metronidazole, milrinone, morphine sulfate, multiple vitamin injections, naloxone, netilmicin, nitroglycerin, norepinephrine, octreotide, ondansetron, pamidronate, pancuronium, papaverine, pentoxifylline, potassium acetate and chloride (refer to special comments), procainamide, propranolol, protamine, pyridoxine, ranitidine, remifentanil, rocuronium, sodium acetate, streptokinase, succinylcholine, thiamine HCL, tobramycin, tolazoline, urokinase, vancomycin, vasopressin, vecuronium, verapamil, voriconazole, zidovudine.
Incompatibility	Fluids: Sodium bicarbonate, alkaline solutions, diluents that contain sodium bisulfite and ethanol. Y site:[10,11] Aciclovir, alteplase, aminophylline, amphotericin B cholesteryl sulfate complex, amphotericin B conventional colloidal, amphotericin B lipid complex, amphotericin B liposome, ampicillin, azathioprine, benzylpenicillin, cefalotin, cefazolin, cefotaxime, cefoxitin, ceftriaxone, cefuroxime, chloramphenicol sodium succinate, cloxacillin, dexamethasone, diazoxide, fluorouracil, folic acid (sodium salt), ganciclovir, heparin, hydrocortisone sodium succinate, ibuprofen lysine, indometacin, oxacillin, penicillin G potassium, penicillin G sodium, pentobarbital, phenobarbital, phenytoin, piperacillin, piperacillin-tazobactam, sodium bicarbonate, sugammadex, sulfamethoxazole-trimethoprim, ticarcillin, ticarcillin-clavulanate
Stability	Reconstituted solution – Dobutrex brand only: Stable for 6 hours at 25°C and 24 hours at 2 to 8°C. Diluted solution – other brands: Stable for 24 hours at 25°C. Solutions may turn pink and colour will increase with time but with no significant loss of potency. Discard solutions that are hazy or contain particles.
Storage	Vial: Store below 25°C. Protect from light. Discard remaining solution after use.
Excipients	
Special comments	A 1983 report by Kirschenbaum HL[12] observed change in colour when dobutamine was mixed with potassium chloride 20 meq/10 mL. However, Trissel's clinical pharmaceutical database on parenteral compatibility reports compatibility with potassium acetate and chloride.[10]
Evidence	**Efficacy** Treatment of hypotension in preterm infants: Dobutamine is less effective than dopamine at increasing blood pressure in hypotensive infants but this may not change the clinical outcome. A single study[2] reported left ventricular output increased with dobutamine compared to a decrease with dopamine (LOE I, GOR C) [3].

Treatment of low systemic blood flow: Dobutamine increased superior vena cava (SVC) flow with little change in blood pressure, whereas dopamine increased blood pressure with little change in SVC flow. There was no difference in clinical outcome (LOE II, GOR C) [4-6].

Summary: Dobutamine is recommended to increase cardiac output in neonates with myocardial dysfunction and unchanged or increased systemic vascular resistance (SVR).

In conditions with low SVR (e.g., septic shock) dobutamine is not the appropriate first drug of choice[1].

Safety

No evidence of an effect on the incidence of adverse neuroradiological sequelae (severe periventricular haemorrhage and/or periventricular leucomalacia), or on the incidence of tachycardia. Insufficient data confirming long term benefit and safety of dobutamine [3]. Common side effects reported were ventricular arrhythmias, tachycardia, hypotension and chest pain (children) (LOE III-2, GOR B) [7].

Pharmacokinetics

Dobutamine concentrations positively correlated with infusion dosages. Range of values vary widely between patients despite similar doses [7]. Short half-life around 2 minutes [8].

Practice points

References

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Appendix

Infusion tables to assist with concentration selection

Table 1: Infusion rates when using dobutamine concentration **1 mg/mL**
(suggested weight <1 kg)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	**Approximate microgram/kg/minute**									
0.5	3	7	10	13	17	20	23	27	30	33
1	2	3	5	7	8	10	12	13	15	17
1.5	1	2	3	4	6	7	8	9	10	11
2	1	2	3	3	4	5	6	7	8	8
2.5	1	1	2	3	3	4	5	5	6	7
3	1	1	2	2	3	3	4	4	5	6
3.5	<1	1	1	2	2	3	3	4	4	5
4	<1	1	1	2	2	3	3	3	4	4
4.5	<1	1	1	1	2	2	3	3	3	4
5	<1	1	1	1	2	2	2	3	3	3

Table 2: Infusion rates when using dobutamine concentration **2 mg/mL**
(suggested weight 1 to <2 kg)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	**Approximate microgram/kg/minute**									
0.5	7	13	20	27	33	40	47	53	60	67
1	3	7	10	13	17	20	23	27	30	33
1.5	2	4	7	9	11	13	16	18	20	22
2	2	3	5	7	8	10	12	13	15	17
2.5	1	3	4	5	7	8	9	11	12	13
3	1	2	3	4	6	7	8	9	10	11
3.5	1	2	3	4	5	6	7	8	9	10
4	1	2	3	3	4	5	6	7	8	8
4.5	1	1	2	3	4	4	5	6	7	7
5	1	1	2	3	3	4	5	5	6	7

Table 3: Infusion rates when using dobutamine concentration **5 mg/mL**
(suggested weight ≥2 kg)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	**Approximate microgram/kg/minute**									
0.5	17	33	50	67	83	100	117	133	150	167
1	8	17	25	33	42	50	58	67	75	83
1.5	6	11	17	22	28	33	39	44	50	56
2	4	8	13	17	21	25	29	33	38	42
2.5	3	7	10	13	17	20	23	27	30	33
3	3	6	8	11	14	17	19	22	25	28
3.5	2	5	7	10	12	14	17	19	21	24
4	2	4	6	8	10	13	15	17	19	21
4.5	2	4	6	7	9	11	13	15	17	19
5	2	3	5	7	8	10	12	13	15	17

$$\text{Dose (microgram/kg/min)} = \frac{\text{Rate (mL/hr)} \times \text{Concentration (microgram/mL)}}{\text{Weight (kg)} \times 60}$$

$$\text{Rate (mL/hr)} = \frac{60 \times \text{Dose (microgram/kg/min)} \times \text{Weight (kg)}}{\text{Concentration (microgram/mL)}}$$

VERSION/NUMBER	**DATE**
Original 1.0	26/05/2025
REVIEW	26/05/2030

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