

- **MEDICINAL FORMS** There can be variation in the licensing of different medicines containing the same drug. Forms available from special-order manufacturers include: oral suspension, oral solution, pessary

Tablet

- ▶ **Sildenafil (Non-proprietary)**

Sildenafil (as Sildenafil citrate) 20 mg Sildenafil 20mg tablets | 90 tablet [PoM] £446.33 DT = £446.33

Sildenafil (as Sildenafil citrate) 25 mg Sildenafil 25mg tablets | 4 tablet [PoM] £16.59 DT = £0.72 | 8 tablet [PoM] £0.96-£33.19

Sildenafil (as Sildenafil citrate) 50 mg Sildenafil 50mg tablets | 4 tablet [PoM] £21.27 DT = £0.71 | 8 tablet [PoM] £1.04-£42.54

Sildenafil (as Sildenafil citrate) 100 mg Sildenafil 100mg tablets | 4 tablet [PoM] £23.50 DT = £0.80 | 8 tablet [PoM] £1.44-£46.99 | 12 tablet [PoM] £3.69

- ▶ **Granpidam** (Accord Healthcare Ltd)

Sildenafil (as Sildenafil citrate) 20 mg Granpidam 20mg tablets | 90 tablet [PoM] £424.01 DT = £446.33

- ▶ **Mysildecard** (Mylan)

Sildenafil (as Sildenafil citrate) 20 mg Mysildecard 20mg tablets | 90 tablet [PoM] £379.38 DT = £446.33

- ▶ **Revatio** (Pfizer Ltd)

Sildenafil (as Sildenafil citrate) 20 mg Revatio 20mg tablets | 90 tablet [PoM] £446.33 DT = £446.33

Oral suspension

- ▶ **Revatio** (Pfizer Ltd)

Sildenafil (as Sildenafil citrate) 10 mg per 1 ml Revatio 10mg/ml oral suspension sugar-free | 112 ml [PoM] £186.75 DT = £186.75

VASODILATORS > PERIPHERAL VASODILATORS

Tolazoline

- **DRUG ACTION** Tolazoline is an alpha-blocker and produces both pulmonary and systemic vasodilation.

- **INDICATIONS AND DOSE**

Correction of pulmonary vasospasm in neonates

- ▶ INITIALLY BY INTRAVENOUS INJECTION

- ▶ Neonate: Initially 1 mg/kg, to be given over 2–5 minutes, followed by (by continuous intravenous infusion) maintenance 200 micrograms/kg/hour if required, careful blood pressure monitoring should be carried out, doses above 300 micrograms/kg/hour associated with cardiotoxicity and renal failure.

- ▶ BY ENDOTRACHEAL TUBE

- ▶ Neonate: 200 micrograms/kg.

- **UNLICENSED USE** Not licensed for use in children.

- **CONTRA-INDICATIONS** Peptic ulcer disease

- **CAUTIONS** Cardiotoxic accumulation may occur with continuous infusion (particularly in renal impairment) · mitral stenosis

- **SIDE-EFFECTS** Arrhythmias · blood disorder · chills · diarrhoea · epigastric pain · flushing · haematuria · haemorrhage (with high doses) · headache · hyperhidrosis · hypertension (with high doses) · hypotension (severe; with high doses) · metabolic alkalosis · nausea · oliguria · rash macular · renal failure (with high doses) · thrombocytopenia · vomiting

- **RENAL IMPAIRMENT**

Dose adjustments Lower doses may be necessary.

Accumulates in renal impairment. Risk of cardiotoxicity.

- **MONITORING REQUIREMENTS** Monitor blood pressure regularly for sustained systemic hypotension.

- **DIRECTIONS FOR ADMINISTRATION** For continuous intravenous infusion, dilute with Glucose 5% or Sodium Chloride 0.9%. Prepare a fresh solution every 24 hours. For endotracheal administration, dilute with 0.5–1 mL of Sodium Chloride 0.9%.

- **MEDICINAL FORMS** Forms available from special-order manufacturers include: solution for injection

4.2 Hypotension and shock

Sympathomimetics

Overview

The properties of sympathomimetics vary according to whether they act on alpha or on beta adrenergic receptors. Response to sympathomimetics can also vary considerably in children, particularly neonates. It is important to titrate the dose to the desired effect and to monitor the child closely.

Inotropic sympathomimetics

Dopamine hydrochloride p. 125 has a variable, unpredictable, and dose dependent impact on vascular tone. Low dose infusion normally causes vasodilatation, but there is little evidence that this is clinically beneficial; moderate doses increase myocardial contractility and cardiac output in older children, but in neonates moderate doses may cause a reduction in cardiac output. High doses cause vasoconstriction and increase vascular resistance, and should therefore be used with caution following cardiac surgery, or where there is co-existing neonatal pulmonary hypertension.

In neonates the response to inotropic sympathomimetics varies considerably, particularly in those born prematurely; careful dose titration and monitoring are necessary.

Isoprenaline injection is available from 'special-order' manufacturers or specialist importing companies.

Shock

Shock is a medical emergency associated with a high mortality. The underlying causes of shock such as haemorrhage, sepsis or myocardial insufficiency should be corrected. Additional treatment is dependent on the type of shock.

Septic shock is associated with severe hypovolaemia (due to vasodilation and capillary leak) which should be corrected with crystalloids or colloids. If hypotension persists despite volume replacement, dopamine hydrochloride should be started. For shock refractory to treatment with dopamine hydrochloride, if cardiac output is high and peripheral vascular resistance is low (warm shock), noradrenaline/norepinephrine p. 126 should be added or if cardiac output is low and peripheral vascular resistance is high (cold shock), adrenaline/epinephrine p. 138 should be added. Additionally, in cold shock, a vasodilator such as milrinone p. 129, glyceryl trinitrate p. 137, or sodium nitroprusside p. 120 (on specialist advice only) can be used to reduce vascular resistance.

If the shock is resistant to volume expansion and catecholamines, and there is suspected or proven adrenal insufficiency, low dose hydrocortisone p. 456 can be used. ACTH-stimulated plasma-cortisol concentration should be measured; however, hydrocortisone can be started without such information. Alternatively, if the child is resistant to catecholamines, and vascular resistance is low, vasopressin p. 69 can be added.

Neonatal septic shock can be complicated by the transition from fetal to neonatal circulation. Treatment to reverse right ventricular failure, by decreasing pulmonary artery pressures, is commonly needed in neonates with fluid-refractory shock and persistent pulmonary hypertension of the newborn. Rapid administration of fluid in neonates with patent ductus arteriosus may cause left-to-right shunting and congestive heart failure induced by ventricular overload.

In *cardiogenic shock*, the aim is to improve cardiac output and to reduce the afterload on the heart. If central venous pressure is low, cautious volume expansion with a colloid or crystalloid can be used. An inotrope such as adrenaline/epinephrine or dopamine hydrochloride should