Nitric Oxide (NO) is a pulmonary vasodilator administered as an inhaled gas. In the US it is delivered in a 0.8% concentration with nitrogen (99.2%).

This compound leads to vasodilatation by binding to the heme moiety of cytosolic guanylate cyclase, thus activating the enzyme. This leads to production of intracellular cyclic guanosine 3', 5'-monophosphate, causing smooth muscle relaxation and vasodilatation.

Nitric Oxide provides better oxygenation because it is administered only to areas of the lung that are ventilated. In these areas it causes vasodilatation, thus improving V/Q matching.

It has systemic absorption but is quickly inactivated once entering the blood supply. It binds with hemoglobin and forms methemoglobin and nitrate when the hemoglobin saturation is 60 – 100%. At lower saturations NO binds with deoxyhemoglobin to form nitrosylhemoglobin. This breaks down to N2O and methemoglobin. Toxicity of NO arises from accumulation of N2O and methemoglobin.

Dosage is usually 20ppm, however has been used from 5-80ppm. It may be administered for up to 14 days, or until the underlying desaturation is resolved. Dosages of greater than 20ppm lead to toxicity.

Uses for NO include:
   a) Treatment of term and near term neonates with hypoxic respiratory failure associated with clinical or echocardiographic evidence of pulmonary hypertension, when it improves oxygenation and can reduce the need for ECHMO.
   b) Treatment of acute increase in pulmonary vascular resistance (PVR) following cardiopulmonary bypass.
   c) Preoperative pulmonary hypertension with specific lesions including total anomalous pulmonary venous return and congenital mitral stenosis
   d) As a diagnostic tool to distinguish reactive pulmonary hypertension from fixed anatomic obstructive disease in post surgical patients or those being worked up for transplantation.
   e) NO is intended for pediatric use, in adults its use is off label.

Contraindications to use of NO include any condition dependent on a right to left shunt.
