CLONIDINE PREMEDICATION AND ANESTHETIC EFFECTS

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**Definition:** Clonidine is primarily an α2 agonist used primarily for its antihypertensive effects (α2 to α1 receptor ratio of 200:1). Alpha-2 receptors are adrenoreceptors that are located primarily on presynaptic nerve terminals. Activation of these receptors inhibits adenylate cyclase activity, which in turn decreases the entry of calcium into the neuronal terminal, which limits norepinephrine release. This leads to an overall decrease in sympathetic outflow, causing peripheral vasodilatation, as well as negative chronotropic effects, therefore causing a reduction in blood pressure. This decrease in central sympathetic outflow does not affect baroreceptor reflexes, therefore not causing orthostatic hypotension. Stimulation of these receptors in the central nervous system has also been shown to have sedative properties.

**Premedication Uses:** Clonidine has many desirable effects when used as a premedication for surgery:
- Provides sedation and anxiolysis
- Decreases analgesic dosage requirements
- Decreases overall anesthetic requirements by decreasing MAC
- Provides favorable cardiovascular effects by reducing catecholamine levels, therefore lowering heart rate and blood pressure during anesthesia (however, has not been shown to reduce perioperative ischemia)
- Decreases postoperative oxygen consumption
- When compared with oral midazolam, clonidine was less effective as an anxiolytic but produced a greater anesthetic and analgesic reducing effect.
- Other possible benefits: decreased postoperative shivering, antiemetic effects, decrease in postoperative delirium, inhibition of opioid induced muscle rigidity. Clonidine is also used effectively as an adjunct to opioids and local anesthetics to treat acute and chronic pain.

**Regional Anesthetic Effects:** Clonidine prolongs the duration of peripheral nerve blocks, as well as decreases dosage requirements for epidural and spinal anesthesia. (Clonidine alone has been shown to control intraoperative and postoperative pain when administered intrathecally or epidurally when given in large doses)

**Side Effects:** Clonidine has been shown to cause dose dependent adverse effects such as prolonged sedation (especially in the elderly), hypotension, bradycardia, and dry mouth. Clonidine also mildly potentiates opiate-induced respiratory depression. The rise in intraocular pressure associated with laryngoscopy and intubation is attenuated. Abrupt withdrawal from clonidine my cause hypertensive crises (therefore should be continued throughout the perioperative period). Labetolol can be used to treat the withdrawal syndrome.

**Dexmedetomidine:** Also an α-2 agonist, is more highly selective for the receptor (α-2 to α-1 ratio of 1600:1). Provides the same beneficial effects as clonidine, but with a higher potency and shorter duration of action.

**Drug Reversal:** Adverse clinical effects of clonidine and dexmedetomidine can be reversed with atipamezole (a specific antagonist).

Reference:
