Q20 Describe the pharmacological basis of the management of organophosphate poisoning (March 2009)

Organophosphate poisoning:

SOURCE – insecticides, exposure to nerve agents (most commonly seen in farming settings)

PATHOPHYSIOLOGY

- Organophosphates form a covalent bond with acetylcholinesterase, inhibiting the metabolism of acetylcholine.
- This results in high levels of Ach at the neuromuscular junction (both nicotinic and muscarinic receptors), causing a cholinergic crisis

SYMPTOMS

- SLUDGE (salivation, urination, defaecation, gastrointestinal motility, emesis)
- CNS – confusion, anxiety, tremors, seizures
- CVS – bradycardia, hypotension
- RESP – respiratory impairment due to muscle weakness, difficulty clearing secretions

MANAGEMENT

- Remove the patient from the source of poisoning
- PPE for staff – mask, goggles, neoprene gloves and gowns rather than latex as hydrocarbons can penetrate latex
- ABC's and resuscitation as required
- Decontamination – activated charcoal / gastric lavage / whole bowel irrigation unlikely to be effective due to rapid absorption of organophosphates. Clothes should be removed and discarded and the patient bathed with soap and water to remove organophosphates from skin. Irrigate the eyes if ocular exposure has occurred.
- Symptom control
    - Anti muscarinic agents – atropine in large doses will reduce the antimuscarinic effects by competitively antagonizing Ach at the receptor. ETG suggests 1.2-3mg boluses, aiming SBP>80mmHg, HR >80bpm and absence of wheeze, doubling the dose every 5 mins until atropinisation is achieved, followed by an infusion. Glycopyrrolate can be used to reduce secretions post initial atropinisation, however does not cross the BBB so will have no effect on the central cholinergic effects
    - There is no antinicotinic agent so supportive care only for muscle weakness.
    - Benzodiazepines for seizure control

- Definitive treatment
    - Cholinesterase regenerator (an oxime such as pralidoxime) may reactive AchE and prevent the organophosphate-acetylocholinesterase complex ageing and becoming an irreversible bond if given within 48 hrs