JPP September - Penthrox

Day 1.Methoxyflurane was used in the 1960s as an inhaled general anaesthetic, but was removed because of nephrotoxicity (dose related). Re-packaged (low dose) in Europe/UK circa 2020 as [#Penthrox](https://twitter.com/search?q=%23Penthrox) for acute moderate-severe pain relief in adult trauma & short medical procedures e.g dressing change. [#Penthrox](https://twitter.com/search?q=%23Penthrox) is also known as the ‘green whistle’

Day 2:[#Penthrox](https://twitter.com/search?q=%23Penthrox) bottle contains a single dose; conscious pts can self-administer using normal breaths. Rapid onset pain relief after ~6-10 inhalations. Effect duration ~1 hour. A 2nd dose may be given as maximum, but the safe interval between doses is unknown. Maximum total dose in I week =15 ml

Day 2 (cont)In 2022 [#Penthrox](https://twitter.com/search?q=%23Penthrox) cost £17.89 per bottle. Advantages include pain relief without sedation which can speed up interventions & reduce bed occupancy. Also, it is not a controlled drug. Cannot use if head injury, cardiovascular or respiratory instability.

Day 3: [#Penthrox](https://twitter.com/search?q=%23Penthrox) is inhaled as a vapour. Methoxyflurane diffuses rapidly from lungs & into the circulation. The drug is highly lipophilic & has a high volume of distribution. Liver metabolism by CYP2E1/2A6 into more soluble substances e.g fluorine. Renal excretion ~ 60%, with 40% exhaled unaltered, or as CO2. The half-life is unknown

Day 3 (cont) High lipophilicity & volume of distribution for [#Penthrox](https://twitter.com/search?q=%23Penthrox) means the drug deposits in tissue reservoirs, causing slow release over days; Adverse drug effects CAN occur hours/days post administration! Caution re overdose, as well as in elderly & renal/liver disease.

Day 4 [#Penthrox](https://twitter.com/search?q=%23Penthrox) mechanism of action is largely unknown; the drug reduces CNS responsivity to pain with putative interactions with GABA, glutamate & glycine receptors. Monitor post-administration for ADEs e.g drowsiness; it is uncertain if it leads to muscle relaxation at low doses, but monitor as precaution

Day 5: Common ADEs include dizziness, headaches, dry mouth. Serious/rare, liver injury, visual disorders, mood changes. Nephrotoxicity if a high dose is given re accumulation of breakdown products e.g fluoride ions. Higher risk if person on drug enzyme inducers (including alcohol), or if they are a genetically fast metaboliser

Day 6 [#Penthrox](https://twitter.com/search?q=%23Penthrox) -Additive drug-drug interactions (DDIs) with CNS depressants or drugs with nephrotoxic effects are important. Severe DDI with isoniazid & rifampicin re increased risk of renal toxicity. Also DDI with methylphenidate (high risk of HTN and arrythmia) (NOT exhaustive)

Day 7: Abuse risk for [#Penthrox](https://twitter.com/search?q=%23Penthrox) is unknown, but class effects include euphoria, sedation & amnesia

CPD: in addition to the tweets, read the BNF section on Anaesthesia (general), as well as the monograph on methoxyflurane. Another useful source is the Summary of Product Characteristics for Penthrox. See links below

<https://bnf.nice.org.uk/treatment-summaries/anaesthesia-general/>

<https://bnf.nice.org.uk/drugs/methoxyflurane/>

<https://www.medicines.org.uk/emc/medicine/31391#PRODUCTINFO>

1. Penthrox is licensed for use in people over 12 years old

TRUE or FALSE

1. For Penthrox to be effective, someone has to be able to inhale deeply

TRUE or FALSE

1. Penthrox should not be used if there is any level of altered consciousness

TRUE or FALSE

1. Which of the following is TRUE?
2. Penthrox has a strong smell and taste
3. Penthrox is a controlled drug
4. The device releases a liquid spray
5. Penthrox is known to be safe in pregnancy
6. Penthrox can provide rapid onset, but only mild, pain relief

TRUE or FALSE

1. Which of the following is TRUE about Penthrox?
2. It has a very long half life
3. It has a very low volume of distribution
4. The kidneys clear all the inert drug breakdown products
5. It reaches the central nervous system very quickly
6. Alcohol can interact with Penthrox

TRUE or FALSE

1. Penthrox works by activating the opioid system

TRUE or FALSE

1. There are cautions for using Penthrox in the elderly and for those with renal or liver disease

TRUE or FALSE

1. Which of the following is a common adverse drug reaction with Penthrox use?
2. Vomiting
3. Hypertension
4. Dry mouth
5. Mood changes