

4 hours (or every 12 or 24 hours as modified-release preparations).

Buprenorphine p. 468 has both opioid agonist and antagonist properties and may precipitate withdrawal symptoms, including pain, in patients dependent on other opioids. It has abuse potential and may itself cause dependence. It has a much longer duration of action than morphine and sublingually is an effective analgesic for 6 to 8 hours. Unlike most opioid analgesics, the effects of buprenorphine are only partially reversed by naloxone hydrochloride p. 1440.

Dipipanone hydrochloride used alone is less sedating than morphine but the only preparation available contains an antiemetic and is therefore not suitable for regular regimens in palliative care.

Diamorphine hydrochloride p. 477 (heroin) is a powerful opioid analgesic. It may cause less nausea and hypotension than morphine. In *palliative care* the greater solubility of diamorphine hydrochloride allows effective doses to be injected in smaller volumes and this is important in the emaciated patient.

Alfentanil p. 1413, fentanyl p. 479 and remifentanyl p. 1414 are used by injection for intra-operative analgesia; fentanyl is available in a transdermal drug delivery system as a self-adhesive patch which is changed every 72 hours.

Methadone hydrochloride p. 524 is less sedating than morphine and acts for longer periods. In prolonged use, methadone hydrochloride should not be administered more often than twice daily to avoid the risk of accumulation and opioid overdose. Methadone hydrochloride may be used instead of morphine in the occasional patient who experiences excitation (or exacerbation of pain) with morphine.

Oxycodone hydrochloride p. 487 has an efficacy and side-effect profile similar to that of morphine. It is commonly used as a second-line drug if morphine is not tolerated or does not control the pain.

Papaveretum is rarely used; morphine is easier to prescribe and less prone to error with regard to the strength and dose.

Pentazocine p. 490 has both agonist and antagonist properties and precipitates withdrawal symptoms, including pain in patients dependent on other opioids. By injection it is more potent than dihydrocodeine tartrate p. 477 or codeine phosphate, but hallucinations and thought disturbances may occur. It is not recommended and, in particular, should be avoided after myocardial infarction as it may increase pulmonary and aortic blood pressure as well as cardiac work.

Pethidine hydrochloride p. 490 produces prompt but short-lasting analgesia; it is less constipating than morphine, but even in high doses is a less potent analgesic. It is not suitable for severe continuing pain. It is used for analgesia in labour; however, other opioids, such as morphine or diamorphine hydrochloride, are often preferred for obstetric pain.

Tapentadol p. 491 produces analgesia by two mechanisms. It is an opioid-receptor agonist and it also inhibits noradrenaline reuptake. Nausea, vomiting, and constipation are less likely to occur with tapentadol than with other strong opioid analgesics.

Tramadol hydrochloride p. 491 produces analgesia by two mechanisms: an opioid effect and an enhancement of serotonergic and adrenergic pathways. It has fewer of the typical opioid side-effects (notably, less respiratory depression, less constipation and less addiction potential); psychiatric reactions have been reported.

Weak opioids

Codeine phosphate can be used for the relief of mild to moderate pain where other painkillers such as paracetamol or ibuprofen p. 1203 have proved ineffective.

Dihydrocodeine tartrate has an analgesic efficacy similar to that of codeine phosphate. Higher doses may provide

some additional pain relief but this may be at the cost of more nausea and vomiting.

Meptazinol p. 484 is claimed to have a low incidence of respiratory depression. It has a reported length of action of 2 to 7 hours with onset within 15 minutes.

Postoperative analgesia

A combination of opioid and non-opioid analgesics is used to treat postoperative pain. The use of intra-operative opioids affects the prescribing of postoperative analgesics. A postoperative opioid analgesic should be given with care since it may potentiate any residual respiratory depression.

Morphine is used most widely. Tramadol hydrochloride is not as effective in severe pain as other opioid analgesics. Buprenorphine p. 468 may antagonise the analgesic effect of previously administered opioids and is generally not recommended. Pethidine hydrochloride p. 490 is generally not recommended for postoperative pain because it is metabolised to norpethidine which may accumulate, particularly in renal impairment; norpethidine stimulates the central nervous system and may cause convulsions.

Opioids are also given epidurally [unlicensed route] in the postoperative period but are associated with side-effects such as pruritus, urinary retention, nausea and vomiting; respiratory depression can be delayed, particularly with morphine p. 484.

Patient-controlled analgesia (PCA) can be used to relieve postoperative pain—consult individual hospital protocols.

Pain management and opioid dependence

Although caution is necessary, patients who are dependent on opioids or have a history of drug dependence may be treated with opioid analgesics when there is a clinical need. Treatment with opioid analgesics in this patient group should normally be carried out with the advice of specialists. However, doctors do not require a special licence to prescribe opioid analgesics to patients with opioid dependence for relief of pain due to organic disease or injury.

Other drugs used for Pain Dexibuprofen, p. 1196 · Diclofenac potassium, p. 1197 · Levomepromazine, p. 460 · Mefenamic acid, p. 1208

ANAESTHETICS, GENERAL > VOLATILE LIQUID ANAESTHETICS

Methoxyflurane

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● INDICATIONS AND DOSE

Moderate-to-severe pain associated with trauma (under close medical supervision)

- ▶ BY INHALATION
- ▶ Adult: 3–6 mL as required, avoid administration on consecutive days; administer using inhaler device; maximum 15 mL per week

● IMPORTANT SAFETY INFORMATION

Manufacturer advises methoxyflurane should only be self-administered under the supervision of personnel experienced in its use, using a hand-held *Penthrox*[®] inhaler device.

- **CONTRA-INDICATIONS** Cardiovascular disease · history of liver damage associated with use of methoxyflurane or other halogenated anaesthetics · impaired consciousness · respiratory depression · susceptibility to malignant hyperthermia
- **CAUTIONS** Elderly—increased risk of hypotension · repeated administration more than once every 3 months—increased risk of hepatic injury · risk factors for hepatic impairment · risk factors for renal impairment