

**Opioid equivalent doses**

Opioid analgesic	Route	Dose
Codeine	PO	100 mg
Diamorphine	IM, IV, SC	3 mg
Dihydrocodeine	PO	100 mg
Morphine	PO	10 mg
Morphine	IM, IV, SC	5 mg
Oxycodone	PO	6.6 mg
Tramadol	PO	100 mg

- Oral morphine has  $\frac{1}{2}$  the potency of **oral oxycodone**
  - When converting from oral morphine to oxycodone  $\rightarrow$  Use  $\frac{1}{2}$  the dose
- Oral morphine has the  $\frac{1}{2}$  the potency of **injectable morphine**
  - When converting from oral morphine to injectable morphine  $\rightarrow$  Use  $\frac{1}{2}$  the dose
- Oral morphine has the  $\frac{1}{3}$  the potency of **injectable diamorphine**
  - When converting from oral morphine to injectable diamorphine  $\rightarrow$  Divide the dose by 3

Oral morphine to oral Tramadol  $\rightarrow$  X10

Oral morphine to oral Codeine  $\rightarrow$  X10

Oral morphine to oral dihydrocodeine  $\rightarrow$  X10

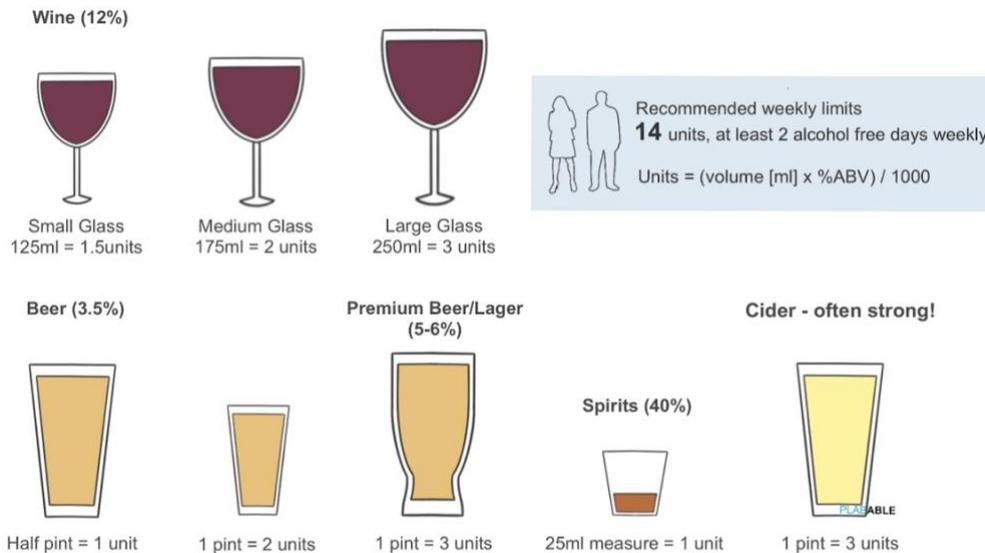
**Chronic stable pain management (somatic)**

1. Start with **oral morphine**
  2. If pain still present  $\rightarrow$  **Oral Oxycodone**
  3. If there's a problem with oral medication
    - Pain is stable (e.g. stable cancer patient)  $\rightarrow$  **Transdermal fentanyl patch**
    - Pain isn't stable (e.g. postoperative)  $\rightarrow$  **IV Morphine**
- Fentanyl patch is contraindicated with  $\rightarrow$  **Paralytic ileus or Night sweats**
  - With night sweats  $\rightarrow$  remove fentanyl patch for 6-8h then add subcutaneous opioids
  - Fentanyl takes around 36h to completely leave the system
  - Amongst all opioids, **codeine phosphate** has the highest rate of side effects such as nausea, constipation and confusion which young patients can often tolerate but not the elderly
  - If conversion from codeine phosphate is required, offer  $\rightarrow$  **Buprenorphine patch**, preferred over fentanyl patch because the opioid conversion mismatch
  - If buprenorphine patch isn't available  $\rightarrow$  **Subcutaneous morphine**
  - Terminal patients with unstable pain on fentanyl patch  $\rightarrow$  **Keep the patch + add Subcutaneous morphine**
  - Please, differentiate between somatic and neuropathic pain
  - Neuropathic pain (e.g. sciatica down the leg, perioral paresthesia)

## Neuroleptic malignant syndrome

- Rare but life-threatening **reaction to anti-dopaminergic** medications
  - Neuroleptic (**Metoclopramide**) or antipsychotic drugs (**haloperidol, clozapine**)
- Onset is usually within a few weeks of starting the medication but can occur anytime
- Features → *High fever, confusion, variable blood pressure, tachycardia, extra-pyramidal symptoms (rigidity and tremors), dystonia, muscle weakness and stiffness*
- Managed by → **Stopping** the drug, **rapid cooling**, dopaminergic agent (**Bromocriptine**)

## Units of alcohol



- 1 unit → 1 spirit
- 2 unit → 1 pint of beer, 1 medium-sized glass of wine (175ml)
- 3 units → 1 pint of premium beer, 1 large-sized glass of wine (250ml), 1 pint of cider
- One unit = 10ml of pure alcohol, the amount of alcohol the average adult can process in 1h
- Units = Strength (ABV) x Volume (ml) ÷ 1000
- For example, a liter of Vodka contains 40 units
- High alcohol consumption: >14 units per week (males), >7 units per week (females)
- No more than 3 units per day, at least 2 days off every week

**Sexual side effects of antidepressants**

Drug	Prevalence	Type of problem _ _ experienced
Selective serotonin inhibitors (SSRIs)	60-70%	All phases of the sexual response. Paroxetine is associated with more erectile dysfunction and vaginal dryness than other SSRIs
Tricyclic anti-depressants (TCAs)	30%	Decreased libido, erectile dysfunction, delayed orgasm, and impaired ejaculation
Venlafaxine	70%	Decreased libido, delayed orgasm, and erectile dysfunction. Rarely painful ejaculation and priapism
Mirtazapine	25%	Decreased libido, delayed orgasm, erectile dysfunction, absence of orgasm
Reboxetine	5-10%	Orgasm abnormalities
Duloxetine	46%	Delayed orgasm
Irreversible monoamine oxidase inhibitors (MAOIs)	40%	Decreased libido, erectile dysfunction, delayed orgasm, and impaired ejaculation. Moclobemide is less likely to cause sexual dysfunction compared with older MAOIs (4% versus 40%).

- **Haloperidol** → blocks dopamine II receptors → Hyperprolactinemia → Erectile dysfunction and gynecomastia
- **Fluoxetine** → Anorgasmia (delayed ejaculation)
- **Paroxetine** → erectile dysfunction and vaginal dryness

## Notes

- First line treatment for neuropathic pain → **Amitriptyline (TCAs)**, *gabapentin (Lyrica)*, *duloxetine* or *pregabalin* can be used
- TCAs (Amitriptyline or Oxybutynin) can cause dry eyes, urinary retention and increase the risk of falls in elderly patients
- **Polypharmacy** → Elderly taking 5 or more medications
- For trigeminal neuralgia → **Carbamazepine (Tegretol)**
- If a skin condition was treated with an antibiotic cream with no resolve after a week → **Change to antifungal**
  - *Fucidin cream* → *Clotrimazole cream*
- **CCB** → Peripheral edema, Gingival hypertrophy, Headache, Bradycardia, Dizziness
  - *Dihydropyridines (Amlodipine and Nifedipine)* → VD
  - *Non-dihydropyridines (Verapamil and Diltiazem)* → reduce vascular permeability and affect cardiac contractility and causes → "Pedal edema"
- **Thiazide** → increased uric acid (*Gout*), *Hyponatremia*, *Hypokalemia*, *Postural hypotension*, ↑glucose, ↑Ca
- **ACE-inhibitors**
  - **A**- Angioedema
  - **C**- Cough → *give ARBs instead*
  - **E**- Electrolyte imbalance (↑K<sup>+</sup>)
- Antihypertensive drugs that cause **hyperkalemia**
  1. *ACE-inhibitors* →... *pril*
  2. *ARBs* →... *sartan*
  3. *K<sup>+</sup>-sparing diuretics* → *Spironolactone (hyperkalemia, hyponatremia, gynecomastia)*
- **LOOP diuretics (furOOsemide)** → HypOOnatremia, HypOOkalemia, HypOOcalcemia, GOOout
- **Asthma drugs**
  - **Salbutamol** (beta II agonist) → *Bronchodilatation* → SE: *Hypokalemia* → *Tremors*
  - **Ipratropium bromide** → *Inhibits bronchoconstriction*
  - **Theophylline** → *Bronchodilatation by relaxing bronchial smooth muscles*
- **Beta-agonists** which are the treatment of asthma can cause → **Tachycardia**, while beta-blockers could worsen the symptoms of asthma
- Bradycardia, hypotension, hypothermia, hypoglycemia (especially in children) → **Propranolol toxicity**
- Doxycycline should be administered with meals in order to avoid any side effects (nausea, vomiting and esophageal irritation)
- The most common side effect of Warfarin → **Intracranial hemorrhage**, watch out for headache, could cause GI bleeding, watch out for stomach pain
- 1ml = 10mg
- 1 mmol/L = 18 mg/dl
- Causes of gingival hyperplasia
  - CCB
  - Phenytoin
  - Ciclosporin
  - AML
- Somatic pain → Pain ladder
- Neuropathic pain → Amitriptyline, Gabapentin
- Muscle spasm → **Baclofen, Diazepam**
- Mechanism of N-acetylcysteine in treating Paracetamol toxicity → **Protection from free radicals**, by acting like a precursor for glutathione synthesis increasing glutathione production and inactivate NAPQI

## Pharmacology

- Mechanism of LMWH or UFH → **Activation of Antithrombin III**
- LMWH → **Inhibits the conversion of prothrombin to thrombin** by activation of antithrombin III
- UFH → **Inhibits the conversion of prothrombin to thrombin + Blocks thrombin**
- Warfarin → **Inhibits vitamin K dependent factor synthesis**
- Management of post-operative vomiting → **IV Ondansetron**, serotonin (5HT3) antagonist, oral routes wouldn't be beneficial as it would be vomited out almost immediately
- IV route is faster than oral route because → **Hepatic first pass elimination**
- **Simvastatin** should NOT be used with Clithromycin or Erythromycin as it can lead to → **rhabdomyolysis and AKI**
- Common indications of spironolactone
  - Ascites: patients with cirrhosis develop 2ry hyperaldosteronism
  - Hypertension
  - Heart failure
  - Nephrotic syndrome
- Drugs that should be put down in patients with **diarrhea** and **vomiting**
  - (D)uretics → ↑ Dehydration
  - (A)CEIs → AKI
  - (M)etformin → Lactic acidosis
  - (N)SAIDs → AKI
- **Methotrexate** is a DMARD and is used to treat RA → SE: GI upset, angular stomatitis, anemia and Pulmonary fibrosis - dyspnea, cough and fever
- **Hydroxychloroquine** is also a DMARD → SE: Visual loss → eye examination is mandatory every 6 months
- A drug used to help reduce craving and side effects of smoking cessation → **Bupropion**
- **Pain ladder**
  1. Simple analgesics → Paracetamol, aspirin, NSAIDs
  2. Weak opioids → Codeine, tramadol, dihydrocodeine
  3. Strong opioids → Morphine, fentanyl patches, diamorphine, oxycodone
  4. Nerve block epidural
- There's no point of taking two opioids, if the patient is started on a strong opioid, the weaker one should be stopped
- Liver metastasis may cause pain due to stretching of the liver capsule, treated with → **NSAIDs** or **steroids**
- **Antiemetics**
  - Due to chemO/radiO → **Ondansetron**
  - Due to ICP (e.g. brain tumors) → **Cyclizine**
  - Bowel obstruction → **Cyclizine**
  - Hyperemesis gravidarum → **Cyclizine** or **promethazine**
  - Metabolic causes (Hormones) → **Haloperidol**, **Levomepromazine**
  - BPPV → **Prochlorperazine** (severe → buccal, less severe → oral)
  - With Parkinson's → **Levomepromazine**
  - Perforated peptic ulcer → **Metoclopramide**
- The dose of normal lease morphine for breakthrough pain should be **1/6 of the total 24-h morphine dose**
  - i.e. calculate total amount used by the patient daily, then calculate the breakthrough dose (1/6 the total)
- **Anticipatory medications** → given to patients "just in case" in end of life situations
  - SC Morphine sulphate
  - SC Midazolam
  - SC Haloperidol
  - SC Hyoscine

#### Pharmacology

- Catastrophic bleeding in a palliative patient → **Midazolam + SC Morphine sulphate**
- Treatment of central hiccups (e.g. stroke, trauma, SOL) → **Chlorpromazine**
- Treatment of peripheral hiccups (e.g. Vagus n. or phrenic n. irritation) → **Metoclopramide**
- Vagus irritation can be caused by gastric stasis and distension
- Phrenic irritation can be caused by liver metastasis
- Cancer-induced bone pain, 1<sup>st</sup> line → **Radiotherapy**, 2<sup>nd</sup> line → **Bisphosphonates + NSAIDs**
- Bone pain may worsen in the first few days of radiotherapy “pain flare”
- When the patient is seizing, it’s impossible to administer medications orally
- IV and IM routes cannot be administered at home