

## 5 MUSCULOSKELETAL SYSTEM

### 5.01 NON-STEROIDAL ANTIINFLAMMATORY DRUGS (NSAIDS)

GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
<b>*Acetylsalicylic Acid (Aspirin) Tab Soluble 300mg</b>	EDL	300-900mg every 4-6 hours; max in acute conditions 4g daily, taken after food. [NOT for < 12 yo, Reye's syndrome reported.]
<b>Diclofenac Sodium Tab 25mg, Supp 25mg, 50mg &amp; 100mg (Voltaren)</b>	MSL	All routes (oral/IV/rectal), 25-50mg 3 times daily after food, max 150mg/DAY (for all routes).
<b>Ibuprofen Tab 200mg &amp; Suspension 100mg/5ml (Brufen)</b>	EDL	Adult, 200-400mg 4 times daily, preferably taken after food, max 2.4g/DAY. Pain & fever, child > 7kg, 20-30mg/kg/DAY in divided doses; or 1-2 yo 50mg, 3-7 yo 100mg, 8-12 yo 200mg, 3-4 times daily.
<b>Indomethacin Tab 25mg (Indocid)</b>		Dysmenorrhoea, up to 75mg/DAY; Rheumatic disease, 50-200mg/DAY; Acute gout, 150-200mg/DAY; To be given in divided doses with food. <i>May cause dizziness.</i>
<b>*Ketorolac Trometamol Inj 30mg/ml (Toradol)</b>		Moderate post-operative pain: adult, 10-30mg deep IM (undiluted over 15 seconds), q6-8h prn for 2 days, max 90mg/DAY; elderly & adults < 50kg max 60mg/DAY.

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GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
<b>Paracetamol Suspension 160mg/5ml or Chewable Tab 80mg (Tylenol US brand) (Acetaminophen)</b> [Do not exceed dose listed.]	NF	Child 1-5yo 80-160mg (1-2 chewable tablets or 2.5-5mls); 6-11yo, 160-320mg (2-4 chewable tablets or 5-10mls); dose may be repeated every 4-6 hours, note max 4 doses/DAY.
<b>Paracetamol Suspension 120mg/5ml (generic/IDA) (Acetaminophen)</b> [Do not exceed dose listed.]	EDL	Infant < 3 mth 5-10mg/kg (on doctor's advice only); child 3 mth-1 yo 60-120mg, 1-5 yo 120-250mg; 6-12yo 250-500mg; dose may be repeated every 4-6 hours, note max 4 doses in 24 hours.
<b>Paracetamol Tab 500mg &amp; Effervescent Tab 500mg (Panadol/Tylenol) (Acetaminophen)</b> [Do not exceed dose listed.]	MSL  EDL	Adult, 0.5-1g every 4-6 hours, max 4g daily; child 6-12 yo 250-500mg every 4-6 hours <i>prn</i> (max 4 doses in 24 hours). Dissolve effervescent tablets in a glass of water.
<b>Paracetamol Suppository 125mg, 250mg, 500mg &amp; 1g (Acetaminophen)</b> [Do not exceed dose listed.]	EDL	Rectally, child 1-5 yo 125-250mg, 6-12 yo 250-500mg, adult/child > 12yo 500-1000mg every 4-6 hours (max 4 doses in 24 hours).

**COMMENT/CAUTIONS:**

- All NSAIDs can produce GI side effects like nausea, diarrhoea, peptic ulceration and GI bleeding. This may be reduced by food. Antacids should not be added to NSAIDs since they will affect absorption and efficacy, and may also mask the symptoms of NSAID-induced ulceration. Ibuprofen may cause less severe GI effects but no NSAID is exempt.
- H2 antagonists, proton pump inhibitors and misoprostol should only be prescribed with NSAIDs for patients with peptic ulceration history. It may be used as prophylaxis in elderly if alternatives have been already considered.
- **NSAIDs S/E:** Also hypersensitivity reactions (e.g. rashes, asthma), CNS (e.g. headache/dizziness), blood disorders, rarely hepatic/renal toxicity.
- **Drug interactions:** Commonly with antihypertensives (antagonism of hypotension, increased risk of renal failure with ACE inhibitors), diuretics (increased risk of nephrotoxicity, NSAIDs antagonise diuretic effect of loop diuretics) and warfarin (increased risk of bleeding).
- **Aspirin:** Due to association with Reye's syndrome, aspirin should not be prescribed for < 12 yo unless specifically indicated e.g. juvenile arthritis.
- **Ketorolac injection:** Pain relief may not occur for up to 30 min after injection.

## 5.02 NARCOTIC ANALGESICS (OPIATES &amp; OPIOIDS)

GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
<b>Alfentanil HCl Inj 500ug/ml (2ml)</b> <b>(Rapifen)</b> <b>[Opioids]</b>	<b>N/CD</b> NF	Analgesia: IM 30ug/kg. Use in anaesthesia: depending on procedure duration, IV bolus induction 8-50ug/kg (max 245ug/kg), then cont IV infusion 0.5-3ug/kg/min till 5-10 min before end of surgery, see manufacturer's leaflet for details.  Inject slow IV undiluted over 30 seconds, or dilute 10mg (20ml) in 230ml of D5/NS/LR to give 40ug/ml solution and infuse as above.
<b>Codeine Tab 30mg</b>	<b>N/CD</b> MSL EDL	Adult, 30-60mg 4-6 times daily for pain control, max 240mg/DAY.
<b>Codeine Drops 1mg/DROP</b>	<b>N/CD</b>  EDL	Child, 3mg/kg daily in divided doses for pain control.
<b>Codeine 30mg + Paracetamol 500mg Combination Tablet (Co-Codamol 30/500)</b> <b>(Paracetamol=Acetaminophen)</b>	<b>N/CD</b>	Adult, 1-2 tablets every 4-6 hours, please note maximum 8 tablets daily.
<b>Fentanyl Inj 100ug/2ml (as citrate)</b> <b>[Opioids]</b>	<b>N/CD</b>	Premed: 50-100ug IM 30-60 min pre-surgery, or IV 20-100ug/kg max 150ug/kg total dose. Analgesic: IM 50-100ug. See manufacturer's leaflet for details. <i>Caution: may cause respiratory depression.</i>  Inject IM undiluted into a large muscle mass, or IV undiluted over 2-3 min. For IV infusion, further dilute with D5/NS.
<b>N/CD</b> – Drugs subject to international control under the Single Convention on Narcotic Drugs (1961).		

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GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
<p><b>*Morphine Sulphate Inj 10mg/ml</b> [Opiates]</p>	<p>N/CD MSL</p> <p>EDL</p>	<p>Acute pain: Adult, SC/IM undiluted 2-10mg q4h <i>prn</i>; or slow IV in small boluses of 2-10mg over 4-5 min, titrate to response. Neonates: 25-50 ug/kg with monitoring. Child &lt; 1 yo: 150–200 ug/kg/dose; 1-5 yo: 2.5-5mg; 6-12 yo 5-10mg q 4hrs <i>prn</i>. Premed 1 hr before surgery: adult SC/IM 150-200ug/kg, child IM 50-100ug/kg.</p> <p>Inject IM/SC undiluted; slow IV 10mg diluted in 5-10ml WFI over 5 min, IV infusion diluted in 50-100mls of D5/NS infused at 2mg/min.</p>
<p><b>*Morphine Sustained Release Tab 30mg (SRM-Rhotard)</b> [Opiates]</p>	<p>N/CD NF</p>	<p>30-60mg twice daily for patients stabilised on morphine dose titrate according to severity of pain, see Chart below for conversion from aqueous morphine dose.</p>
<p><b>*Morphine HCl Aqueous Mixture 10mg/5ml</b> [Opiates]</p>	<p>N/CD</p> <p>EDL</p>	<p>5-20mg q4h, titrate according to response in pain relief. Half dose can be given for break-through pain before the next 4 hourly dose. Oral dose is ~2-3 times parenteral dose. [Convert to SR Tab when stabilised.]</p>
<p><b>Pethidine HCl Inj 50mg/ml</b> [Meperidine]</p> <p><b>Caution: May cause excessive drowsiness &amp; respiratory depression.</b></p>	<p>N/CD</p> <p>EDL</p>	<p>Second line therapy (morphine alternative). Acute pain: SC/IM undiluted 50-150mg q4h <i>prn</i> (IM preferred if repeated doses needed). Child: IM 1-2mg/kg q4h, titrate to response. Premed: SC/IM undiluted, adult 50-100mg, child &gt; 1 yo 1mg/kg, 1 hour before surgery.</p>
<p>N/CD – Drugs subject to international control under the Single Convention on Narcotic Drugs (1961).</p>		

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GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
<b>Pholcodine Linctus 5mg/5ml (Pavachol-D)</b>	EDL	For unproductive and persistent cough: adult 5-15ml (1-3 teaspoonfuls) up to 4 times daily; child 6-12 yo 5ml (1 teaspoon) up to 4 times daily, 3-5 yo 5ml up to 3 times daily, 1-2 yo 2.5ml up to 4 times daily.
<b>Tramadol HCl Inj 100mg/2ml &amp; Cap 50mg (Tramal) [Partial opioid agonist]</b>		Adult/child > 14 yo: oral/SC/IM/IV (IM/IV over 2-3 min) 50-100mg q6h; max 400mg in 24 hours. Monitor for respiratory depression.
<b>N/CD</b> – Drugs subject to international control under the Single Convention on Narcotic Drugs (1961).		

**COMMENT/CAUTIONS:**

- **N/CD Narcotic/Controlled Drugs.** Recording required in pharmacy/ward/OR.
- **Morphine S/E:** 20% sedation, 30% nausea/vomiting (usually temporary), 95% constipation.
- **Conversion Chart:**

<b>Morphine Injection</b> (every 4 hours)	<b>Aqueous Morphine</b> (every 4 hours)	<b>Morphine SR Tab</b> (every 12 hours)
Dose / 2	Dose	Dose x 3
5mg	10mg	30mg
10mg	20mg	60mg

(...and so forth according to patient tolerance to side effects and pain relief).

NOTE. See Appendix IV for notes on opioid analgesic use in terminal illness.

## 5.03 ANTI-GOUT PREPARATIONS

GENERIC (TRADE) NAME	CAT.	INDICATION/DOSE
* <b>Allopurinol Tab 100mg</b> <b>[NOTE: DO NOT START TREATMENT DURING AN ACUTE GOUT ATTACK.]</b>	NF  EDL	Gout prophylaxis: Initially 100mg after food with plenty of water; maintenance 200mg 1-3 times daily, max 900mg/DAY in divided doses; child 10-20mg/kg/DAY in divided doses, after food with water.
<b>Colchicine Tab 500ug</b>	NF  EDL	Acute gout attack: initially 1mg after food, then 0.5mg (500ug) every 2-3 hours until pain relief or until vomiting/diarrhoea occurs, or until a total dose 6mg has been reached. Do not repeat course in 3 days. Short-term prophylaxis: 0.5mg 1-3 times daily.

**COMMENT/CAUTIONS:**

- Consider long-term gout prophylaxis only for: 1) persistent hyperuricaemia, 2) > 3 gout attacks/year + hyperuricaemia, 3) gout + hyperuricaemia + renal impairment, 4) chronic tophaceous gout.
- During acute gout attack, an NSAID e.g. indomethacin may relieve inflammation & pain (see Section 5.01 on NSAIDS). Use colchicine where NSAIDs are contraindicated.
- Do NOT give **allopurinol** within TWO WEEKS of an acute attack. During the 1<sup>st</sup> 3 months allopurinol may precipitate an acute attack, so give it with an NSAID or colchicine.
- **Drug Interactions:** Thiazide diuretics may increase risk of allopurinol toxicity.
- **DRUG-INDUCED:** Salicylates, diuretics, pyrazinamide, nicotinic acid and cytotoxic drugs may precipitate gout attacks.

NOTE: For Non-depolarising/Depolarising Neuromuscular Blocking Agents e.g. atracurium, see Chapter 13 Anaesthetics Section 13.04 Muscle Relaxants Used in OR.

NOTE: For Antimuscarinics e.g. atropine, glycopyrrolate and neostigmine, see Chapter 13 Anaesthetics Section 10.05 Antimuscarinics/Anticholinesterases.

NOTE: For Antimigraine Drugs see Chapter 4 Central Nervous System Section 4.06 Antimigraine Drugs.