**TABLE 18-1 DRUGS FOR RELIEF OF PAIN**

| Generic Name | Dose, mg | Interval | Comments |
|---|---|---|---|
| **Nonnarcotic analgesics: usual doses and intervals** | | | |
| Acetylsalicylic acid | 650 PO | q4h | Enteric-coated preparations available |
| Acetaminophen | 650 PO | q4h | Side effects uncommon |
| Ibuprofen | 400 PO | q4–6h | Available without prescription |
| Naproxen | 250–500 PO | q12h | Delayed effects may be due to long half-life |
| Fenoprofen | 200 PO | q4–6h | Contraindicated in renal disease |
| Indomethacin | 25–50 PO | q8h | Gastrointestinal side effects common |
| Ketorolac | 15–60 IM/IV | q4–6h | Available for parenteral use |
| Celecoxib | 100–200 PO | q12–24h | Useful for arthritis |
| Valdecoxib | 10–20 PO | q12–24h | Removed from U.S. market in 2005 |

| Generic Name | Parenteral Dose, mg | PO Dose, mg | Comments |
|---|---|---|---|
| **Narcotic analgesics: usual doses and intervals** | | | |
| Codeine | 30–60 q4h | 30–60 q4h | Nausea common |
| Oxycodone | — | 5–10 q4–6h | Usually available with acetaminophen or aspirin |
| Morphine | 5 q4h | 30 q4h | |
| Morphine sustained release | — | 15–60 bid to tid | Oral slow-release preparation |
| Hydromorphone | 1–2 q4h | 2–4 q4h | Shorter acting than morphine sulfate |
| Levorphanol | 2 q6–8h | 4 q6–8h | Longer acting than morphine sulfate; absorbed well PO |
| Methadone | 5–10 q6–8h | 5–20 q6–8h | Delayed sedation due to long half-life; therapy should not be initiated with >40 mg/d, and dose escalation should be made no more frequently than every 3 days |
| Meperidine | 50–100 q3–4h | 300 q4h | Poorly absorbed PO; normeperidine is a toxic metabolite; routine use of this agent is not recommended |
| Butorphanol | — | 1–2 q4h | Intranasal spray |
| Fentanyl | 25–100 µg/h | — | 72-h transdermal patch |
| Buprenorphine | 5–20 µg/h | | 7-day transdermal patch |
| Buprenorphine | 0.3 q6–8h | | Parenteral administration |
| Tramadol | — | 50–100 q4–6h | Mixed opioid/adrenergic action |

| | Uptake Blockade | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Generic Name | 5-HT | NE | Sedative Potency | Anticholinergic Potency | Orthostatic Hypotension | Cardiac Arrhythmia | Ave. Dose, mg/d | Range, mg/d |
| **Antidepressants[a]** | | | | | | | | |
| Doxepin | ++ | + | High | Moderate | Moderate | Less | 200 | 75–400 |
| Amitriptyline | ++++ | ++ | High | Highest | Moderate | Yes | 150 | 25–300 |
| Imipramine | ++++ | ++ | Moderate | Moderate | High | Yes | 200 | 75–400 |
| Nortriptyline | +++ | ++ | Moderate | Moderate | Low | Yes | 100 | 40–150 |
| Desipramine | +++ | ++++ | Low | Low | Low | Yes | 150 | 50–300 |
| Venlafaxine | +++ | ++ | Low | None | None | No | 150 | 75–400 |
| Duloxetine | +++ | +++ | Low | None | None | No | 40 | 30–60 |

| Generic Name | PO Dose, mg | Interval | Generic Name | PO Dose, mg | Interval |
|---|---|---|---|---|---|
| **Anticonvulsants and antiarrhythmics[a]** | | | | | |
| Phenytoin | 300 | daily/qhs | Clonazepam | 1 | q6h |
| Carbamazepine | 200–300 | q6h | Gabapentin[b] | 600–1200 | q8h |
| Oxcarbazepine | 300 | bid | Pregabalin | 150–600 | bid |

[a]Antidepressants, anticonvulsants, and antiarrhythmics have not been approved by the U.S. Food and Drug Administration (FDA) for the treatment of pain. [b]Gabapentin in doses up to 1800 mg/d is FDA approved for postherpetic neuralgia.

***Abbreviations:*** 5-HT, serotonin; NE, norepinephrine.

acute hypovolemia, should be monitored closely. NSAIDs can also increase blood pressure in some individuals. Long-term treatment with NSAIDs requires regular blood pressure monitoring and treatment if necessary. Although toxic to the liver when taken in high doses, acetaminophen rarely produces gastric irritation and does not interfere with platelet function.

The introduction of parenteral forms of NSAIDs, ketorolac and diclofenac, extends the usefulness of this class of compounds in the management of acute severe pain. Both agents are sufficiently potent and rapid in onset to supplant opioids for many patients with acute severe headache and musculoskeletal pain.

There are two major classes of COX: COX-1 is constitutively expressed, and COX-2 is induced in the inflammatory state. COX-2–selective drugs have similar analgesic potency and produce less gastric irritation than the nonselective COX inhibitors. The use of COX-2–selective drugs does not appear to lower the risk of nephrotoxicity compared to nonselective NSAIDs. On the other hand, COX-2–selective drugs offer a significant benefit in the management of acute postoperative pain because they do not affect blood coagulation. Nonselective COX inhibitors are usually contraindicated postoperatively because they impair platelet-mediated blood clotting and are thus associated with increased bleeding at the