

Nonsteroidal anti-inflammatory drugs (NSAIDs) are a drug class FDA-approved for use as antipyretic, anti-inflammatory, and analgesic agents. These effects make NSAIDs useful for treating muscle pain, dysmenorrhea, arthritic conditions, pyrexia, gout, migraines, and used as opioid-sparing agents in certain acute trauma cases.

NSAIDs are typically divided into groups based on their chemical structure and selectivity: acetylated salicylates (aspirin), non-acetylated salicylates (diflunisal, salsalate), propionic acids (naproxen, ibuprofen, acetic acids (diclofenac, indomethacin), enolic acids (meloxicam, piroxicam) anthranilic acids (meclofenamate, mefenamic acid), naphthylalanine (nabumetone), and selective COX-2 inhibitors (celecoxib, etoricoxib).

Topical NSAIDs (diclofenac gel) are also available for use in acute tenosynovitis, ankle sprains, and soft tissue injuries. Listed below are the FDA-approved NSAIDs

Non-selective NSAIDs: Diclofenac, Diflunisal, Etodolac, Fenoprofen, Flurbiprofen, Ibuprofen, Indomethacin, Ketoprofen, Ketorolac, Mefenamic acid, Meloxicam, Nabumetone, Naproxen, Oxaprozin, Piroxicam, Sulindac, Tolmetin.

COX-2 Selective NSAIDs: Celecoxib, Rofecoxib, Valdecoxib (However, rofecoxib and valdecoxib were withdrawn from the market in 2004 and 2005, respectively)

Administration

Most commonly, NSAIDs are available as oral tablets. According to the package insert, the dosage for the most common over-the-counter NSAIDs are as follows:

Ibuprofen: for 200 mg tablets, 1 to 2 tablets every 4 to 6 hours while symptoms persist. The daily limit for ibuprofen is 1200 mg.

Aspirin regular strength: for 325 mg tablets, 1 to 2 tablets every 4 hours, or 3 tablets every 6 hours. The daily limit for aspirin is 4000 mg.

Naproxen sodium: for 220 mg tablets, 1 to 2 tablets every 8 to 12 hours. The daily limit for naproxen sodium is 660 mg.

Topical NSAIDs are also available (diclofenac sodium 1.5% topical solution, diclofenac hydroxyethyl pyrrolidine 1.3% patch, and diclofenac sodium gel 1%). They are most useful for treating pain due to soft-tissue injuries and osteoarthritis.

Specific NSAIDs can also be administered parenterally; for example, intravenous ibuprofen is available, given as a 30-minute infusion; this can be used as a non-opioid analgesic to manage pain and can also reduce fever. Trials have shown that using intravenous ibuprofen and morphine in postoperative adult patients can lower the total use of morphine. For treating pyrexia, an initial 400mg dose then 400 or 100 to 200 mg every 4 to 6 hours as needed. For the treatment of pain, 400 to 800 mg, every 6 hours as needed, is the recommended dose regimen. Ketorolac is also available for parenteral administration.



Adverse Effects and Contraindications and Toxicity

NSAIDs have well-known adverse effects affecting the gastric mucosa, renal system, cardiovascular system, hepatic system, and hematologic system.

Gastric adverse effects: The damage is more likely in a patient that has a prior history of peptic ulcers.

Renal adverse effects: Complications that can occur include acute renal dysfunction, fluid and electrolyte disorders, renal papillary necrosis, and nephrotic syndrome/ interstitial

nephritis.

Cardiovascular adverse effects: Diclofenac seems to be the NSAID with the highest reported increase in adverse cardiovascular events.

Hepatic adverse effects are less common; NSAID-associated risk of hepatotoxicity (raised aminotransferase levels) is not very common, and liver-related hospitalization is very rare. Among the various NSAIDs, Diclofenac has a higher rate of hepatotoxic effects.

Hematologic adverse effects are possible, typically only posing a problem if the patient has a history of gastrointestinal ulcers, diseases such as hemophilia and thrombocytopenia, and in some perioperative cases.

Other minor adverse effects include anaphylactoid reactions that involve the skin and pulmonary systems, like urticaria and aspirin-exacerbated respiratory disease.

According to the package insert, NSAIDs are also contraindicated in patients:

With NSAID hypersensitivity as well as in patients who have experienced an allergic reaction (urticaria, asthma, etc.) after taking NSAIDs

Who have undergone coronary artery bypass graft surgery

During the third trimester of pregnancy

NSAID toxicity can manifest as GI bleeding, hypertension, hepatotoxicity, and renal damage. Typically, acute NSAID overdose is asymptomatic or has negligible gastrointestinal symptoms. However, other symptoms of toxicity complications may include metabolic acidosis, coma, convulsions, and acute renal failure. Also, NSAIDs can confer gastrointestinal damage, causing decreased gastric mucosa production. Nephrotoxicity can also occur with NSAID use. Lastly, neurologic toxicity can present with drowsiness, confusion, nystagmus, blurred vision, diplopia, headache, and tinnitus.

Monitoring and Management

Recommended monitoring includes a complete blood count, renal tests, and hepatic panel. These recommendations are for use in rheumatoid arthritis patients who use NSAIDs chronically and who have no comorbidities nor history of complications. Monitoring is less common in patients not considered high risk for NSAID toxicity. However, NSAIDs are either contraindicated, or their use requires monitoring in patients with liver or renal problems.

The general public widely uses NSAIDs because of their wide range of commonly encountered indications. Patient education on the use of NSAIDs is an important piece of care that providers need to pay attention to because of the many possible adverse effects on multiple different organ systems. Because these adverse effects occur at a much higher rate in patients with specific comorbidities, it is crucial for physicians, nurses, and pharmacists to pay close attention to a patient's history and to educate the patient accordingly on risks and dosing.

The treating clinician will initiate therapy, whether for a short or long-term regimen. The pharmacist will need to verify the dosing and administration and check for potential drug-drug interactions. Pharmacists should also offer patient counseling on how to best use their NSAID and minimize adverse events; this is particularly the case when the patient uses NSAIDs as an OTC (on-the-counter) agent. Nursing must also take a careful medication history and include OTC NSAID use, so the clinician can make an informed choice for prescribing NSAID therapy. Nurses, pharmacists, and clinicians all need to be cognizant of the signs and symptoms of NSAID toxicity or adverse effects to make changes to the patient's regimen as needed.

The healthcare team should communicate and work together to ensure that each patient receives the proper dose for their specific condition and comorbidities, high enough for efficacy but as low as possible to reduce the incidence of adverse effects. Through collaborative interprofessional teamwork, NSAID therapy can confer maximum benefit with minimal downside.

Source:

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