Tylenol (Acetaminophen) Ingestion
California Poison Control 1-800-876-4766

Toxicity
1. > 150 mg/kg is considered toxic and the dosage which N-acetylcysteine (mucomyst) therapy is initiated if the plasma acetaminophen level is unavailable
2. Rumack-Matthew nomogram for the single acute acetaminophen poisoning. Semilogarithmic plot of plasma acetaminophen levels versus time. Cautions for use of this chart: (1) Time coordinates refer to time of ingestion. (2) Serum levels drawn before 4 hours may not represent peak levels. (3) The graph should be used only in relation to a single acute ingestion. (4) The lower solid line 25% below the standard nomogram is included to allow for possible errors in acetaminophen plasma assays and estimated time from ingestion of an overdose. (Adapted from Rumack BH, Matthew H: Pediatrics 55:871-876, 1975.)

![Acetaminophen plasma concentration graph](image)

Pathogenesis
1. Hepatocellular Damage
   a. Acetaminophen is metabolized by cytochrome P450 and glutathione in the liver to a mercapturic acid conjugate
   b. With an overdose, the hepatic stores of glutathione are depleted to <70% of normal resulting in toxic damage by a highly reactive intermediate from the acetaminophen metabolic pathway
Clinical Features
1. **Day 1:** anorexia, diaphoresis, lethargy, malaise, nausea & vomiting, pallor
2. **Day 2:** (Day 1 symptoms disappear) Hepatic necrosis begins:
   a. Abdominal pain and tenderness, hepatomegaly
   b. Elevated AST/SGOT, ALT/SGPT, bilirubin, PT
3. **Day 3 – 4:** (Day 1 symptoms reappear) Hepatic necrosis peaks:
   a. Jaundice, encephalopathy, acute renal failure, bleeding, hypoglycemia
4. **After Day 4:** resolution of symptoms and hepatic dysfunction
   a. Fatalities from: ARDS, cerebral edema, coagulopathy, infection, multiorgan failure

Investigations
1. **Serum**
   a. Liver function tests (Aspartate Aminotransferase (AST)/Serum Glutamic Oxalacetic Transaminase (SGOT), Alanine Aminotransferase(ALT)/Serum Glutamic Pyruvic Transaminase(SGPT), bilirubin), glucose, BUN, Creatinine, PT daily if acetaminophen levels are in the toxic range
   b. Drug screen (for other toxins)
2. **Urine**
   a. Drug screen (for other toxins)

Management
1. California Poison Control 1-800-876-4766
2. Initial management
   a. Airway, Breathing, Circulation
      i. If hemodynamically unstable Normal Saline or Lactated Ringers at 10-20 cc/kg IV
   b. Draw Blood: liver function tests, PT, glucose, BUN, Creatinine
   c. Acetaminophen level (if >4 hours post ingestion)
3. Gastric Lavage
   a. Insert a large bore NG tube and check position
   b. Suction out stomach contents and save for analysis
   c. Place patient on side
   d. Inject 15 cc/kg of saline per lavage
   e. Contraindications: unprotected airway, coma, convulsions
4. Activated Charcoal
   a. 1 g/kg
   b. Not recommended if using oral N-Acetylcysteine

Maintenance Therapy
1. **N-Acetylcysteine (Mucomyst) used for Oral Administration**
   a. Begin within 10 hours of ingestion if possible but may be used as late as 24 hours post ingestion
   c. Indicated if plasma acetaminophen level is in the toxic range or if the level is not available, the ingested dose is >150 mg/kg
   d. Administer orally or via NG tube
e. Loading dose: 140 mg/kg/dose PO diluted in 3 volumes of soft drink
f. Maintenance dose: 70 mg/kg/dose PO q4h x 17 doses (for 3 days)

2. N-Acetylcysteine (Acetadote) used for Intravenous Administration
   a. Loading Dose
      i. Dose 1: 150mg/kg over 30 minutes
   b. Maintenance Dose
      i. Dose 2: 50mg/kg (12.5 mg/kg/hr) over 4 hours
      ii. Dose 3: 100mg/kg (6.25 mg/kg/hr over 16 hours
   c. Patients <40 kg and those requiring fluid restriction
      i. The final concentration should be 40 mg/ml
   d. Patients >40 kg
      i. Loading Dose = Dose 1: in 200 ml 5% Dextrose (800ml/hr)
      ii. Maintenance Dose = Dose2: in 500 ml 5% Dextrose (125ml/hr)
      iii. Maintenance Dose = Dose 3: in 1000 ml 5% Dextrose (62.5ml/hr)
   e. Compatible in D5W

Hepatic Toxicity
   1. Consult Gastroenterologist
   2. Decrease protein intake
   3. Bowel decontamination with neomycin
   4. Antacids to prevent bleeding

Prognosis
   1. Mortality rate is <0.5%
   2. There is no long term sequelae after acute toxicity