ศูนย์พิษวิทยารามาธิบดี
คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล
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White phosphorus

Properties:

- Colorless or white, transparent, crystalline solid with a waxy appearance
- Distinct garlic-like odor
- Melting point 44 °C
- Highly fat soluble, easily absorbed through the skin

Route of exposure: Dermal, inhalation, ingestion

- Dermal absorption: Significant, especially through damaged skin (solid forms and vapor)
- Burns over 10 to 15% body surface area should be clinically **observed for 24 to 48 hours**.

Monitoring: Circulatory status, EKG, level of consciousness, blood glucose, serum electrolytes (including Ca and P), BUN/Cr, liver function tests, coagulogram

Clinical signs:

Phase 1 (few min-8 hours)	Phase 2 (1-3 days)	Phase 3 (4-8 days) "Multi-organ failure"
Nausea Vomiting Diarrhea Abdominal pain Hypotension Depressed consciousness, coma (severe case) Immediate burns	Apparent improvement (asymptomatic) but laboratory abnormalities often occur	Abdominal symptoms usually recur or worsen Liver damage/jaundice Hypoglycemia Coagulopathy Renal impairment Neurological impairment Acid-base and electrolyte disturbances

- For severe case: develop systemic toxicity within 24 hours
- Death could occur in 24-48 hours for severe cases
- Abnormal ECG including prolonged QT, ST-T wave changes, bradycardia
- Burns are reported be intensely painful

Treatment:

- Primary goal: Stop burning process and immediately remove contaminated clothing
- Aggressive decontamination
    - For skin decontamination: Continuous irrigation with cool water, avoid warm water (may reach autoignition)
    - Remove particles under water
    - Using UV light (Wood's lamp) to determine the residue particles. If there were residue particles, return to decontamination
    - Water or saline-soaked dressings, keep dressing moist until debridement is accomplished
    - Avoid lipid-based ointments
- Supportive Tx: Tx hypotension, seizure, hypocalcemia, consult ophthalmologist for eye exposure
- Disposition: ≥ 10% burns observed for 48 hours and follow up within (4-8 days) (F/U LFT [AST/ALT], BUN/Cr, Ca, P)

References:

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2. White phosphorus: Systemic agent. The National Institute for Occupational Safety and Health (NIOSH). Centers for Disease Control and Prevention [Internet] Available from: https://www.cdc.gov/niosh/ershdb/emergencyresponsecard_29750025.html (cited: April/26/2024)
3. Barqouni L, Abu Shaaban N, Elessi K. Interventions for treating phosphorus burns. Cochrane Database Syst Rev. 2014;2014(6):CD008805. doi:10.1002/14651858.CD008805.pub3