Poisoning – the pharmacists’ perspective

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What’s new in this edition?

- CPG format provides info on levels of evidence & grades of recommendations, which were not present in the 2/2000 edition.
  - Pharmacists can & should facilitate the implementation of evidence-based CPG guidances when drug overdose situations are encountered, esp in healthcare settings.
- New section on Bites & Stings
- Selected classes of medicines
- Really useful annexes!
What can a pharmacist do?

1. Apply expert knowledge of pharmacology & medication use behaviours
2. Conduct education
3. Perform epidemiologic surveillance
4. Support disaster planning
5. Manage antidote inventory & usage
6. Participate in clinical toxicology services
7. Run a drug & poisons information centre

Pharmacist Louis Gdalman of Chicago developed a hospital-based program of poison information and consultation in the 1940s and 1950s that later became the model for the first poison control center (1953).
1. Expert knowledge of pharmacology & medication use behaviours

Our training is useful in drug OD situations:

- Strong background in PK/PD of medications
- Knowledge of dosage forms and pharmaceutics to predict toxicokinetic pathways
- Identify ADRs, drug interactions, and other drug-related problems whose symptoms mimic as drug overdose
- Recommend treatment, including choice & dosing of antidotes
- Trained to conduct literature reviews and apply EBM principles
- Conduct poison prevention at patient level e.g. multiple paracetamol-containing products, drug use by children & elderly, storage of medicines, etc
- Talk to patients about herbal meds (contaminated with adulterants)
- Identify and advise on non-toxic exposures to common household products
- Prevent Rx drug abuse e.g. salbutamol tab, cough mixtures

Pharmacists are constantly challenged to ensure the safe use of medications and, by doing so, to avoid potential toxicity.
Pharmacists provide education programmes for Professionals & the Public

- Organise Poison Prevention Week activities (including seminars, posters, leaflets, & peripherals)
- Ongoing public outreach (schools, libraries, companies)
- Training of interns/fellows
- Education during dispensing

Basic clinical toxicology should be taught to pharmacy undergraduates, and reinforced to those who work in a hospital pharmacy setting.
3. Perform epidemiologic surveillance

Records of poisoning cases: analysis and datamining

→ Detect trends
→ Plan preventive programmes

**e.g. multiple paracetamol syr concentration (infant vs. children)**

160 mg/5ml product now in US drugstores to replace older concentration. Consumer advisory posted by US FDA on 22/12/11 at www.fda.gov/ForConsumers/ConsumerUpdates/ucm284563.htm

**e.g. stonefish envenomation**

- Trend detected at DPIC. Database review and DEM records (2004-2006).
- 30 cases were identified. Median age 28 years, 80% male, and 47% foreign nationals.
- Most incidences occurred on weekends/public holidays (77%), with November having the highest number of cases (n=7). The majority of cases (80%) arrived at the hospital within two hours of envenomation. Symptoms included extreme pain, swelling and redness of the affected limbs.
- Treatment = 24 (80%) patients received hot water soak treatment and 27 (90%) patients received either intramuscular pethidine or diclofenac for analgesia, where nine patients (33%) required additional analgesics after a period of observation.
- Outcome = 17 patients (58%) were treated and discharged, eight (26%) were referred to a specialist for follow-up, and five (16%) were admitted for an average of three days. 13 out of 25 patients (52%) were discharged with antibiotics. One case complained of persistent pain and hyperalgesia five months post-envenomation. One patient required surgical intervention. No deaths and systemic symptoms were reported.
- Stonefish envenomation, though it rarely kills, can cause extreme pain, swelling and erythema, which can be managed with symptomatic treatment.
Pharmacist role in emergency preparedness in PIC context
e.g. chemical spills, HAZMAT or biological warfare.

- Planning and preparedness
- Nerve centre for disaster mgmt
- Support police & SCDF
- Dissemination of clinical toxicology information to professionals, and advisories to the public during crisis though website / hotline

**e.g. chlorine gas poisoning in Singapore**

- Incident at local swimming pool. Patients (n=54) sought treatment in 2 EDs, HAZMAT disaster plan was activated.
- Patients were decontaminated at shower facilities prior to entering the ED. The ED was reorganized to cope with existing patients, as well as large influx of patients from event site.
- Protocol established in coordination with the local drug and poison information center to manage the patients who suffered from chlorine inhalation.
- Injuries = Acute respiratory symptoms were the most common symptoms. Four children and four adults were admitted to the hospital, and the other patients were discharged from the ED after observation. All of the chest x-rays were normal on the day of the chlorine inhalation.
- Outcomes = Most patients were observed in the ED and subsequently discharged. Outpatient review appointments were scheduled. There were no mortalities or significant morbidities, even up to six months after the incident.
- No severe injuries and limited number of admissions, some valuable lessons were learned.

5. Antidotes

List of antidotes & emergency meds is, maintained by pharmacists

Pharmacists role:

→ Take advice of TAT and other govmt bodies, Medical Boards
→ Emergency stockpile inventory mgmt
→ Source for range of obscure antidotes
→ Advise on clinical prescription & administration
SGH Emergency Stockpile – via DEM referral

- Absolute Alcohol 95% INJ (20ml)
- Acetylcysteine 2g/10ml INJ
- Actilyse 50mg (RTPA) INJ
- Activated Charcoal Suspension 50g
- Atropine Sulphate 12mg/2ml INJ
- Bentonite Suspension 7% (300ml)
- Calcium Disodium Edetate 200mg/ml INJ
- Calcium Gluconate Gel 2.5%
- Calcium Leucovorin INJ (Folinic Acid 50mg/5ml)
- Cyanide Antidote Soln A&B
- Dantrolene Sodium 20mg INJ
- Desferrioxamine 500mg Desferal) INJ
- Digibind 40mg INJ
- Dimercaprol 100mg/2ml (Bal) INJ
- Diphenhydramine 50mg INJ
- Diphtheria Antitoxin 10,000 units INJ
- Ethanol 95% (Oral) 200ml
- Factor IX 500u/vial INJ
- Factor VIII 250u/vial INJ
- Flumazenil 0.5mg/5ml INJ
- Glucagon 1mg INJ
- Hepatitis B Immune Globulin 0.5ml INJ
- Hepatitis B Immune Globulin 5ml INJ
- Human Anti-Rabies Immunoglobulin INJ
- Human Anti-Tetanus Immunoglobulin 250u INJ
- L-Thyroxine (T4) 200mcg INJ
- Methylene Blue 1% INJ 5ml
- Naloxone 0.4mg/ml INJ
- PAM (Pralidoxime) 500mg/20ml INJ
- Phosphate Buffers
- Physostigmine 2mg/2ml INJ
- Polyvalent Anti-Snake Venom Serum
- Protamine Sulfate 50mg/5ml INJ
- Rabies Vaccine (Inactivated) 2.5u/vial
- Sea Snake Antivenom INJ
- Sodium Nitrite 3%w/v 10ml INJ
- Sodium Thiosulfate 25% INJ 20ml
- Sodium Thiosulfate 50gm powder
- Varicella Zoster Immunoglobulin INJ
Pharmacists in Singapore are increasingly involved in clinical patient care.

* ED pharmacists are new-ish phenomenon in US. Locally, SGH is in planning stages for this role.

What extra can a pharmacist do in the field of toxicology?

- **DEM**
  - Identification of meds/substances
- **Hospital Inpatient**
  - Develop & implement protocols
- **Outpatient**
  - Educate staff
- Consultant to analytical toxicology laboratories
- Expert witness in legal proceedings
- Safety office of pharmaceutical/chemical industry
6. Clinical toxicology pharmacist

  → Clinical pharmacist involvement improved the identification of poisons and treatment protocols for poisoning. The program could have contributed to reduced fatalities and improved therapeutic outcomes for survivors.

  → pharmacist-based toxicology consultation provided since 1971
  → In two-thirds of the US’ 61 poison control centers, pharmacists with clinical toxicology board certification fulfill one or more leadership positions

Certified Specialists in Poison Information (CSPI), or Diplomates of the American Board of Applied Toxicology (DABAT).
“When we need it, we need it” : a PIC is critical in cases of emergency. However the number of drug OD and poisonings in SG is currently low.

Combined 24/7 DPIC provides better value for money than separate poisons info & drug info hotlines.

Patients’ need for independent unbiased medicines information is high, but no such service exists in Singapore.

Can still contact the various RH’s drug info svces for information, but in emergency pls send pt to A&E or consult toxicologist.
Preventing Accidental Poisonings in Children

Safe Practice Recommendations

All health care practitioners and caregivers play a role in preventing accidental poisonings in children. Take time to educate your patients about strategies to reduce the risk of accidental poisonings by reviewing the following information:

- Keep all meds, including OTC & herbal products, locked in a cabinet or drawer out of the reach and sight of children.
- Never leave medications (including children’s vitamins or iron supplements) on counters or tables, even if they are in child-resistant containers.
- Avoid keeping medications in purses, backpacks, or suitcases where children may explore.
- When children visit other residences, look for potential poisoning dangers and intervene before an accident happens.
- Do not take meds in front of children, because they tend to mimic what adults do.
- **Never refer to medication as candy.**
- Be cautious when medications are out on the counter ready to be used, as many poisonings occur when an adult becomes distracted while taking the medication.
- Use child-resistant caps or containers and be sure they are closed properly after use. Remember that “child resistant” does not mean “child proof.”
- Stay calm and get help immediately if accidental poisoning is suspected.

Visit [www.poisonprevention.org](http://www.poisonprevention.org) to find out how to prevent unintentional poisonings.
Poison Prevention for Adults

Poison proof the home
1. Plants
2. Chemicals
3. Medication

Doctors = PLEASE practice medication safety by giving clear advice on storing & using medication, especially in older adults. Provide written information, as well as a medication list.

Teach patients to understand medication labels

Reading the label will tell you:

- What the medicine is for (indications)
- How to take the medicine (directions)
- What is in the medicine (contents, or active and inactive ingredients)
- What the unusual effects are (warnings)
- What activities you should not do while taking the drug (precautions)
Poison Prevention for Adults

Safe Practice Recommendations

Prescription drugs
- Make sure you have the **correct medicines and they are clearly labeled**. Follow the label's instructions, including dosage. Some medicines are to be taken at different times, so make sure to review the instructions every time you take it. Look for capsules or tablets that differ from others in the container.
- **Review** all your medicines (including food supplements such as vitamins, minerals, or herbs) with your doctor or pharmacist at least once a year or when you start taking a new drug.
- **Never take medicine in the dark.** Turn on a light and make sure you take the right medicine and right dose described on the label. If you need glasses to read, wear them when taking medicine.
- **Never take other people’s prescription drugs.** Take only drugs that are prescribed for you.

Over-the-counter drugs
- **Know what types of over-the-counter drugs to avoid taking with your prescription drugs.** When in doubt, ask your pharmacist or doctor before using an over-the-counter drug.
- Common over-the-counter drugs that can cause problems when taken with other drugs include pain medicine, laxatives, cold medicines, and antacids.
- Compare the active ingredients in medicines before taking two over-the-counter drugs together. Many drugs contain the same active ingredient. You can easily take more than is safe without knowing it.
- Get rid of medicines that have expired or are no longer needed. Ask your local pharmacist how you can return unused, unneeded, or expired prescription drugs to pharmaceutical take-back locations or your local poison center for safe disposal.
Thank You 😊