



Case Study

A PYRETHROID INHALATION FROM AERIAL APPLICATION

Emergency Room Note



Locale

Rural Emergency Room



BP: 148/76



Your role

You are the sole provider in a rural ER



Pulse: 114



Established Pt:

"Michael" -- 30 y.o. male



Resp: 24



Temp: 98.0 F



CC:
sore throat, eye irritation,
difficulty breathing

A PYRETHROID INHALATION FROM AERIAL APPLICATION

- 01** Pass out this sheet when the group is ready to begin the new case.
- 02** Ask for a volunteer to serve as scribe.
- 03** Have a student read the contents of this page aloud, then let the discussion begin.
- 04** Discussion for up to 50 minutes is OK.

-MICHAEL-

DAY 1

Michael is a 30-year-old white male who presents to the emergency room complaining of a burning sensation in his throat, difficulty breathing, and skin irritation. Earlier today, he was out taking advantage of a nice spring day, fishing on a large pond 3 miles south of town when a plane flew overhead and sprayed some sort of chemical on the pond. A few minutes after the plane flew over; he smelled a chemical odor and was then consumed by a cloud of mist. While he was gathering his fishing gear to leave, he inhaled a large amount of the chemical and it began to burn his eyes. Knowing that he had to get to the hospital quickly, he began running to his truck, which was parked about a mile away. He started to feel a burning sensation in his throat and lungs when he took a deep breath. Since he was breathing hard while running, he had to slow down and walk to the rest of the way. When he got to his truck he used his albuterol MDI but it did not provide adequate relief. On the drive to the hospital, his skin began to tingle and burn. When he arrived at the ER, he told the receptionist what happened and she came to get you right away. The plane flew over at about 2:30 p.m. and he arrived in the ER at 3:10 p.m.

Past medical history is positive for mild asthma, seasonal allergies and occasional mild eczema.

Past surgical history includes appendectomy 3 years ago.

Michael is single, drinks alcohol occasionally, and has smoked a pack of cigarettes a day for the past 4 years.

Medications include cetirizine 10mg daily, albuterol MDI prn, and an OTC multivitamin, all of which he has taken today.

He is allergic to penicillin (rash).

Physical examination reveals a well developed, mildly obese white male who is anxious and sweating. BP 148/76, P 114, RR 24, T 98. The patient is anxious on the exam table, coughing, but in no acute respiratory distress. HEENT showed round and regular pupils, lacrimation, and bilateral injected conjunctiva. Visual acuity is normal. Nasal turbinates are erythematous with moderate clear nasal discharge. Posterior oropharynx is erythematous with clear postnasal drip. Neck was normal, chest auscultation showed mild end expiratory wheezing, without crackles or rhonchi, and cardiac exam was entirely normal. Abdomen showed a small, well-healed scar in the RLQ, and no other abnormalities. Extremity exam showed no pedal edema and good capillary refill. Skin appears normal with no lesions or rashes.



Please do not pass this sheet out to the students until they have discussed what they learned as a result of their self-directed study. Allow no more than 60 minutes for this discussion.

-MICHAEL-

DAY 2

Chest X-ray showed a narrow, vertical heart, without vascular congestion and clear costophrenic angles. There were no infiltrates and no pneumothorax.

Blood studies at presentation included:

		Normal Values:
WBC	10.5 x 10 ³ / μ L	(4.0 - 10.0 x 10 ³ / μ L)
Hct	40.6 %	(36 - 46%)
Hgb	13.8 g / dL	Hgb 13.8 g / dL
Platelets	262 x 10 ³ / μ L	Platelets 262 x 10 ³ / μ L

Arterial blood gas revealed:

pH	7.43
pO₂	84 mm Hg
pCO₂	34 mm Hg
O₂ sat	93% on room air

EKG, electrolytes, BUN, creatinine, and glucose were normal.

AChE tests were reported by the laboratory as normal with results of 3400 U/L for serum (normal 2900 to 7100 U/L) and 30 U/g of hemoglobin for erythrocytes (normal 24 to 40 U/g).

Reassessment of the patient reveals chest tightness, increased shortness of breath, moderate-severe cough, nausea and a headache. His skin is now much more pruritic, and he has mild erythematous rash in the antecubital flexor surfaces of both arms.

After calling the local spraying service, you learn that they were spraying Sumithrin, a pyrethroid insecticide used in mosquito control.

Physical exam is unchanged except for an increase in wheezes heard throughout all lung fields and he appears more anxious.

BP 166/84

P 128

RR 32

T 98.4



Please do not pass this sheet out until selected students have discussed, for no more than 20 minutes, what they learned as a result of their Day 2 self-directed study. Then, allow no more than 10 minutes to discuss the following Day 3 material.

-MICHAEL-

DAY 3

Upon arrival at the ER, Michael was taken into the decontamination room, undressed and washed with copious amounts of water. His eyes were also irrigated with sterile water and the burning sensation subsided. His clothes were discarded appropriately. He was given 50mg of Benadryl intravenously to alleviate any possible allergic reaction to the chemical. After receiving a bronchodilator treatment, Michael's chest tightness and shortness of breath have improved. He was kept in the emergency room for 6 hours of observation and released. Upon discharge from the ER, he was given a 6 day prednisone taper to decrease the inflammation in his bronchi and will follow up with his primary care provider on Monday.

LEARNING OBJECTIVES

The following were identified as essential objectives in the daily tutor guides for this case.

01

Be able to develop a differential diagnosis of absorption and inhalation injuries.

02

Be able to identify the role of asthma and allergies in the patient's condition.

03

What are risk factors for and clinical presentations of

- Absorption of Pyrethroid insecticides
- Inhalation of Pyrethroid insecticides

04

What complications might occur in patients that have inhaled or absorbed Pyrethroids?

05

What are risk factors for and clinical presentations of

- Absorption of Pyrethroid insecticides
- Inhalation of Pyrethroid insecticides

06

Identify the need for decontamination of the patient.

TUTOR GUIDE: DAY 1

Michael is a patient with a toxic inhalation injury. The discussion on Day 1 should include consideration of the following learning objectives:

- ✔ The students should be able to develop a list of the possible toxins that could cause this injury.
- ✔ The students should be able to identify the role of asthma and allergies in the patient's condition.

YOUR ROLE SHOULD BE:

01

Sit back and observe the students discuss:

- a) what they know;
- b) what they need to know;
- c) what their learning objectives are. Most of the discussion should be student-generated.

02

Make sure the group has discussed which tests and what additional information they would like to see gathered prior to their next meeting. You should ask questions only to stimulate discussion.

TUTOR GUIDE: DAY 2

Students should return to the group with their assignments completed.

The group should then discuss the findings/data/conclusions presented by each student. The group should be encouraged to review how the coverage of material succeeded (or not) and where holes remain (to be filled in by the next round). Allow no more than 60 minutes for this discussion. When the students seem ready, hand out the Day 2 sheet. The process for Day 1 is repeated with the additional data included.

- ✔ The students should be able to identify a diagnosis of:
 - toxic inhalation injury
 - possible allergic reaction to the inhaled substance
- ✔ The students are expected to know:
 - the importance of establishing which chemical the patient was exposed to
 - importance of the correlating history, physical exam findings, lab values and response to treatment.
- ✔ Students should know the risk factors for inhalation, absorption and ingestion of insecticides

YOUR ROLE SHOULD BE:

01

Sit back and observe the students discuss:

- a) what they know;
- b) what they need to know;
- c) what their learning objectives are. Most of the discussion should be student-generated.

02

Make sure the group has discussed which tests and what additional information they would like to see gathered prior to their next meeting. You should ask questions only to stimulate discussion.

TUTOR & STUDENT GUIDE: DAY 3

PBL DAY 3 WRAP-UP & CASE REVIEW SESSION

**25
min**

Selected student presentations based on Day 2 learning objectives: those that students feel are particularly important.

**10
min**

Wrap up: group discussion of day 3 narrative

DEBRIEFING SESSION

**20
min**

Pass out Learning Objectives – group review/discussion
NOTE: ID volunteer to serve as “Day 3 moderator”
The student moderator will ask the underlined questions.

QUESTIONS (To be hosted by the moderator):

1. How well was this case handled by the provider?
What was done particularly well?
What could have been done better?
2. How well was this case handled by our group?
What was done particularly well? (How was our PROCESS?)
What could have been done better?
3. Does anyone have any REFLECTIONS on our thought process/approach?
4. Did we gain any CLINICAL INSIGHTS from this experience?

5. **If we (our group) could begin this pt again** what might we do differently?
6. **For the next case**, IF there is one thing we might want to do differently, what might that be?



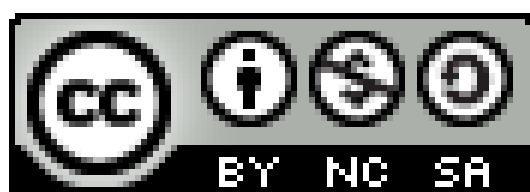
BEGIN NEXT CASE

TUTORS

We would appreciate you providing some feedback on this case. Listen to the debriefing session. Did the students have trouble reaching the objectives? Was there something particularly valuable/troublesome about this case? Please record any important feedback or issues relating to **("Michael")** on this sheet from the wrap up/review session.

This form replaces the "Recording Sheet" that you would normally fill out on Day 3. An envelope has been provided to return this form.

"Michael" [Tutor Name: _____]



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Original case study by: