

ESCAPE ROOM SIMULATION: ACUTE LIVER FAILURE

An interactive learning experience

LEARNING OBJECTIVES

- Learners will:
 - **analyze** patient history, lab results, and medication/supplement lists to correctly determine the cause of hepatic injury
 - **manage** drug-induced liver-injury by starting the correct loading dose of N-acetylcysteine
 - **identify the correct** treatment of hepatic encephalopathy caused by acute liver failure by initiating continuous veno-venous hemodialysis

ROLES AND RESPONSIBILITIES



Nurse

Physician

Pharmacist

Physician (which can be a gastroenterology or hepatology fellow)

Interpret laboratory results and lead clinical decision-making processes.

Nurse

Monitor vital signs, medication administration, and assist with setting up and running critical medical equipment

Pharmacist (including pharmacy residents)

Identification of hepatotoxic agents, and calculates medication dosages

Acute Liver Failure

Required collaborative puzzles between nurse, physician, and pharmacist:

- Identify the hepatotoxic agent
- Administer N-acetylcysteine (NAC)
- Order and interpret arterial ammonia
- Initiate continuous venovenous hemofiltration (CVVH)



Timeline Tracker

DID WE PREVENT CEREBRAL EDEMA?



ACT: Complete tasks before time runs out.

INTRODUCTION TO SCENARIO

A patient presents to the emergency room with new-onset confusion, jaundice, and elevated liver enzymes. Together, the team (comprising of a nurse, physician, and pharmacist) must work together to solve 3 puzzles to recognize the diagnosis, and initiate treatment in order to prevent cerebral edema from developing in a timely manner.

Supplement Sleuthing

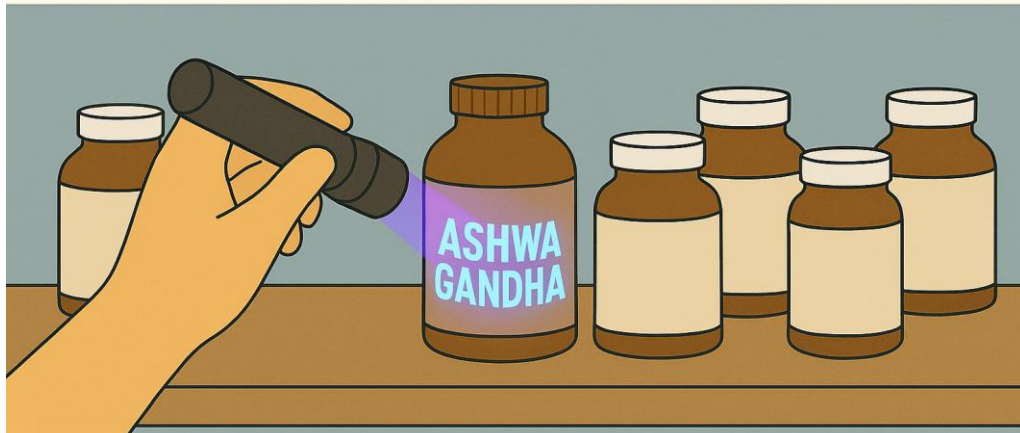
Identify the hepatotoxic agent



CLUE: This herbal supplement causes jaundice, mental changes, and liver injury.

Supplement Sleuthing

Identify the hepatotoxic agent



UV flashlight identifies the hepatotoxic agent

PUZZLE 1

Learners will be asked to search among a group of herbal supplements in various pill bottles that the patient routinely takes. A hidden message revealed by UV light highlights the causative supplement (ashwagandha) and prompts finding the antidote.

NAC Protocol Unlock

Administer N-acetylcysteine



CODE: Use the correct dose to unlock the box.

NAC Protocol Unlock

Administer N-acetylcysteine



ENTER: The correct dose on the keypad.

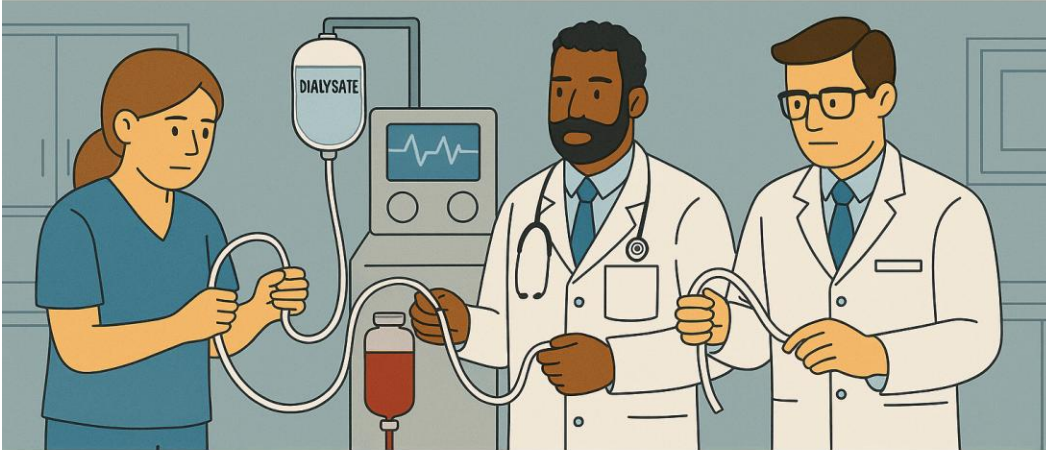
PUZZLE 2

Working together as a team, the participants must calculate the correct loading dose of IV N-acetylcysteine (150mg/kg) multiplied by the patient's weight to use as the code to unlock a locked box.

Within the locked box is a set of lab results from the patient including an elevated arterial ammonia and description of the worsening clinical status of the patient (increased somnolence consistent with hepatic encephalopathy). This then triggers the participants to pursue continuous veno-venous hemodialysis as the next intervention.

CVVH Activation Sequence

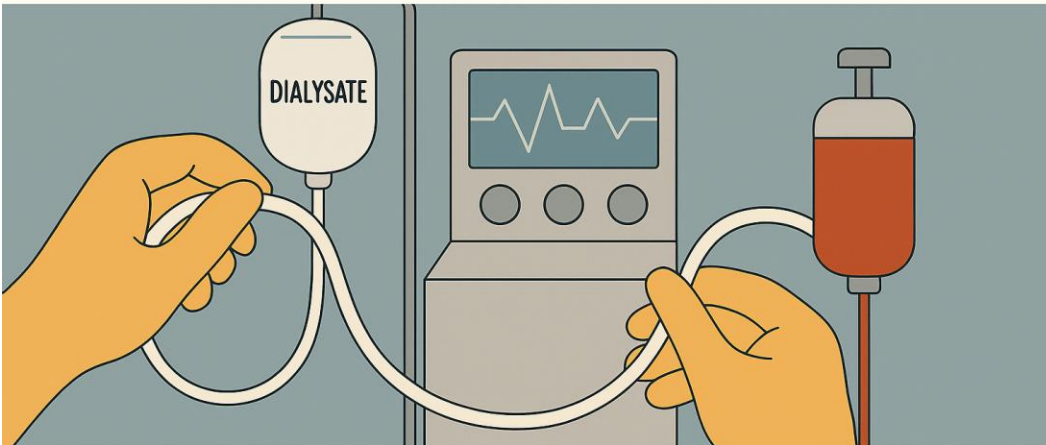
Initiate continuous venovenous hemofiltration



SOLVE: Connect the correct tubing to start the device.

CVVH Activation Sequence

Initiate continuous venovenous hemofiltration



SOLVE: Connect the correct tubing to start the device.

PUZZLE 3

Learners will need to correctly arrange hemodialysis tubing after finding the hidden diagram in order to successfully initiate treatment for the patient.

Summary

DID WE PREVENT CEREBRAL EDEMA?

PLUS+

- What went well in working together?
- What will we sustain for next time?

DELTA-

- What was challenging in our teamwork?
- What will we do differently next time.



Summary of Puzzles

- 1) Supplement Sleuthing (identify the hepatotoxic agent)
- 2) NAC Protocol Unlock (unlock the lockbox with the correct loading dose of NAC)
- 3) CVVH Activation sequence (arrange the tubing to correctly start the patient on treatment)

Debrief using the Plus-Delta Model