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Over the Counter Overdose: A Case of Tylenol Toxicity

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Over the Counter Overdose: A Case of Tylenol Toxicity

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Abstract:

We report a case of a 51 year old man presenting to the Emergency Department (ED) with suicidal ideations (SI) endorsing intentional overdose of acetaminophen. Just as important as the clinical presentation, it is equally important to obtain a detailed history of patient's presentation leading to the ED visit when evaluating a suicide attempt. Often times when attempting to treat patients that carry out SI, we often are found in the middle of patient refusing medical care and our duty to do what is best for the patient. Tylenol (acetaminophen) is a common over the counter (OTC) medication available to the public. Management of Tylenol overdose follows a standard outline of things to observe and intervene on. In this case, we discuss how Tylenol overdose is managed in a clinical setting through a patient who had an intentional overdose.

Case Presentation:

A 51 year old male presented ambulatory to triage endorsing he "took a bunch of Tylenol" and when asked to quantify the amount in triage, he reported "24 (tablets) and I guess 325 mg." Patient reported he took the medications an hour prior to hospital arrival. He endorsed he took the medication to kill himself and that "he wants to die." Patient denied any other active complaints on presentation. Denied visual or auditory complaints, nausea, vomiting, abdominal pain, chest pain, shortness of breath, numbness or tingling. Patient was immediately searched by security and changed to hospital paper scrubs per emergency room protocol. On physical exam, patient was awake, protecting his airway, and appeared in no acute distress. No evidence of self-inflicted wounds were noted and patient had overall unremarkable gross physical exam.

Patients vitals in the ED were: BP 189/94, HR: 64, Temperature: 98F, RR: 19, Pulse ox: 99% room air.

Emergency room physician immediately discussed case with NJ Poison Control who recommended to start patient on activated charcoal and obtain basic toxic labs and with a repeat Tylenol level at 4 hours from presentation. Patient initially was combative to staff, threatening to leave and being uncooperative when attempting to obtain IV access and administering charcoal. Patient was noted to throw the charcoal at the wall and continued to yell profanity at staff as well as kicked and spat at staff. Medical sedation was attempted by ED staff and a one to one was ordered for patient's safety. Labs were collected however patient continued refusing charcoal.

Pertinent labs that came back included acetaminophen level of 169.4 and urine drug screen positive for cocaine with liver function tests (LFTs), coagulation panel, and basic metabolic panel (BMP) coming back unremarkable. Case was discussed with Poison control who recommended starting patient on Acetylcysteine (Acetadote) with having a repeat Tylenol level 2 hours prior to completion. Patient at this time ripped out his IV and started endorsing homicidal ideations. Decision was made to intubate patient for medical safety and medical healing. IO was placed for medication administration followed by a central line for adequate access as patient had difficult IV access. OG tube was placed in which activated charcoal was administered. Patient was admitted to the intensive care unit for ventilator and Tylenol overdose management.

In the ICU, patient received Acetadote infusion at 1 hour, 4 hour, and 16 hour respectively with a repeat Tylenol level obtained at the total 19 hour infusion mark. Patients Tylenol level at the 4 hour mark came back as 49.3 and by the 19 hour mark it was less than 10. LFTs and coagulation panel remained unremarkable during the timeline as well. Patient was successfully extubated on day one of hospital stay after completion of Tylenol overdose treatment. Close psychiatric outpatient follow up and monitoring was set up for the patient after he was seen by psychiatry and deemed appropriate for discharge to home.

Discussion:

Tylenol overdose accounts for over 56000 emergency department visits, 2600 hospitalizations and 500 deaths per year in the United States [1]. With more than 60 million Americans consuming acetaminophen on a weekly basis, understanding the presentation and management of acetaminophen overdose is imperative for an emergency department physician [1]. Tylenol has a good safety profile at therapeutic levels however it can cause severe toxicity if taken in large amounts [3]. The maximum daily dose of Tylenol is 4 grams in adults which can be consumed at rate of 650 mg to 1000 mg every 4 to 6 hours [7].

Tylenol is absorbed rapidly by the gastrointestinal tract and reaches therapeutic levels in 30 minutes to 2 hours with overdose levels peaking at 4 hours [5]. The elimination half-life of the medication is 2 hours but can be as long as 17 hours in patients with hepatic dysfunction and comorbidities [5].

The clinical presentation of Tylenol overdose entails [4]:

- First stage (30 minutes to 24 hours) the patient may be asymptomatic or may have emesis
- Second stage (18 hours to 72 hours) there may be emesis with right upper quadrant pain and hypotension
- Third stage (72 hours to 96 hours) there may be liver dysfunction with renal failure, coagulopathies, metabolic acidosis, and encephalopathy.
- Fourth stage (4 days to 3 weeks) marked by recovery

The diagnosis of acetaminophen toxicity is based on serum levels of the drug with other pertinent lab markers including liver function tests and coagulation profile. Co-ingestion can be important and as a result, urine drug screen, EKG and metabolic panel may be useful. If serum levels fall into the toxic range based on the Rumack-Matthew Nomogram, then treatment should be started. A level greater than 150 mcg/mL at 4 hours from ingestion is considered toxic [1, 8].

Treatment of acetaminophen overdose depends on when the drug was ingested. If patient presents within 1 hour of ingestion, GI decontamination may be attempted. In alert patients activated charcoal can be considered. N-acetyl-cysteine (NAC) is the definitive treatment for all patients with high acetaminophen levels [4]. The medication primary works by preventing the binding of NAPQI to hepatic macromolecules, acts as a substitute for glutathione, and reduces NAPQI back to acetaminophen [4]. NAC can be administered both intravenously (IV) and orally however IV is shown to decrease length of hospital stay and may be better tolerated for patients compared to oral form. Ultimately patients with deteriorating signs following Tylenol overdose such as renal failure, encephalopathy and coagulopathy need a referral with transplant surgeon [4].

Conclusions:

Although in this case the patient had an intentional overdose, increased awareness and understanding of Tylenol dosing and toxicity needs to be ensured for general public. Often times because certain medications are not controlled via prescriptions, people assume the medication cannot be toxic in lethal amounts. Physicians, pharmacists, and healthcare professionals in general need to ensure when advising people they can take OTC medications, they remind them too much of the medication can cause an adverse profile. With more education, although intentional drug overdose may not decrease, unintentional overdoses hopefully starts to decline.

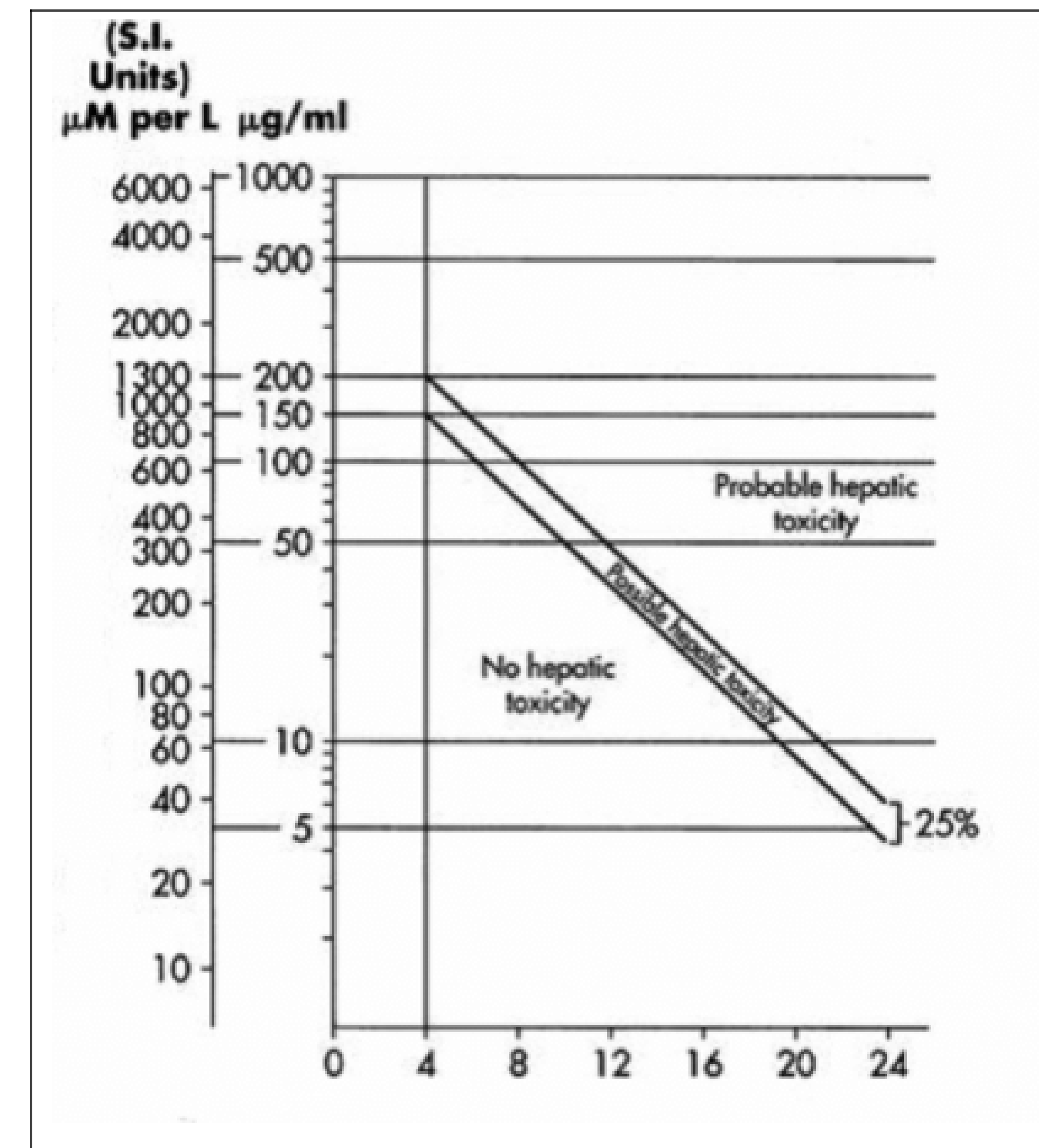
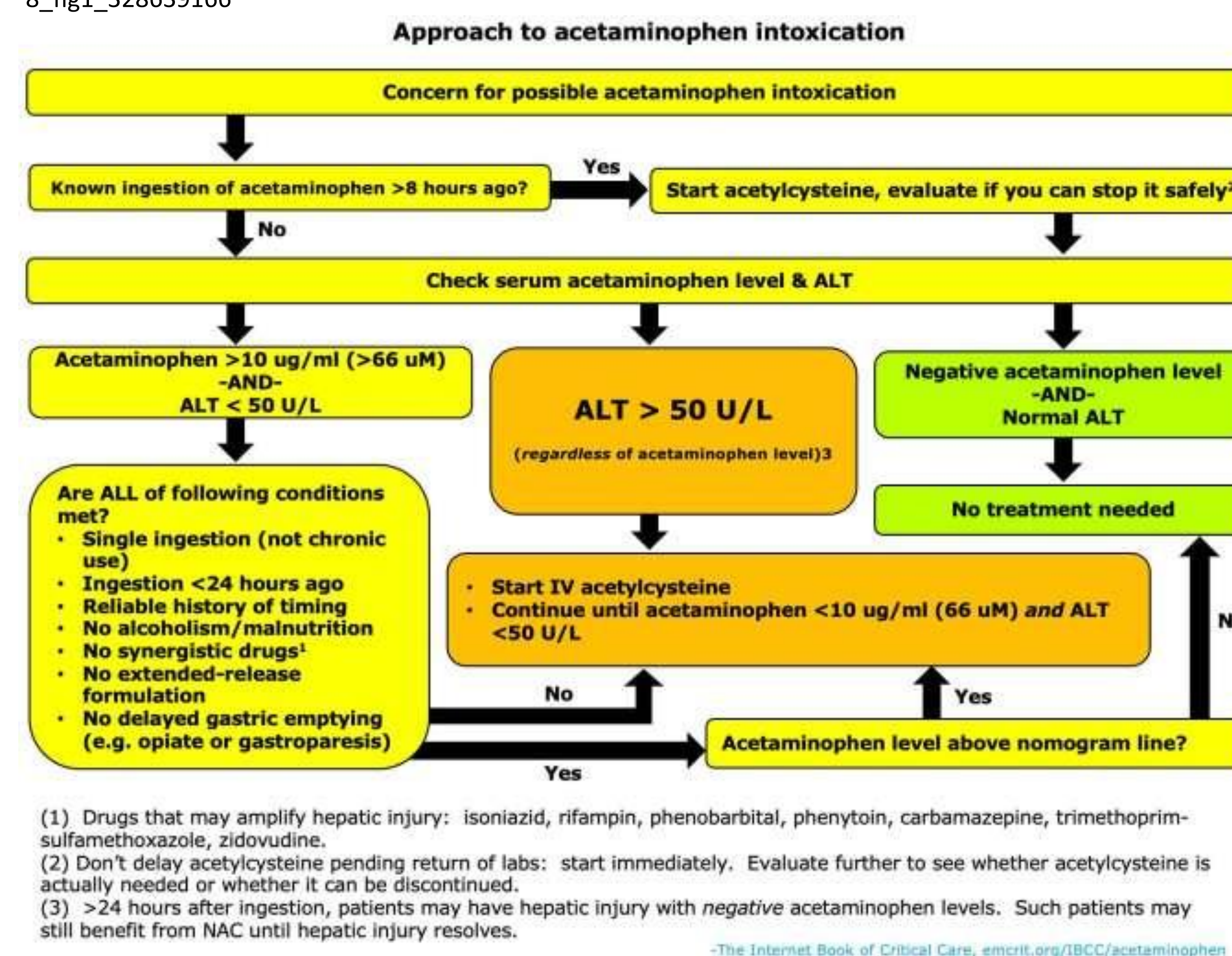


Figure 1: Modified Rumack-Matthew nomogram

Source: https://www.researchgate.net/figure/Modified-Rumack-Matthew-nomogram-adapted-from-reference-8_fig1_328639166



(1) Drugs that may amplify hepatic injury: isoniazid, rifampin, phenobarbital, phenytoin, carbamazepine, trimethoprim-sulfamethoxazole, zidovudine.
(2) Don't delay acetylcysteine pending return of labs: start immediately. Evaluate further to see whether acetylcysteine is actually needed or whether it can be discontinued.
(3) >24 hours after ingestion, patients may have hepatic injury with negative acetaminophen levels. Such patients may still benefit from NAC until hepatic injury resolves.
-The Internet Book of Critical Care, emcrit.org/ibcc/acetaminophen

Figure 2: Approach to Acetaminophen Intoxication

Source: <https://emcrit.org/ibcc/acetaminophen/>

References:

Available on request