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<th>Podcast Series</th>
<th>Reynolds Geriatrics Series • USMLE Step 1 Prep 2012</th>
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<tr>
<td>Episode Title</td>
<td>Mission Possible: Aspirin Toxicity</td>
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| Personnel         | Back: Christopher Fox, Randy Atkins, Jong Yoo, Berthina Coleman, and Mohammed Qureshi  
|                   | Front: Erica Griffin, Meera Subash, Skyler McLaurin (from left to right)  
|                   | Not Pictured: Glen Kaudy                        |
| Group Number      | Group 7                                          |
| USMLE Step 1-Style | A 79 year old man has treated his osteoarthritis with aspirin for the past 15 years. The aspirin has always seemed to help ameliorate the pain. The night after consuming a steak and lobster meal, he is woken up with excruciating pain in his metatarsal-phalangeal join of the big toe. Desperate for relief, he takes a hand full of aspirin. Several hours later he presents to the Emergency Department with confusion, nausea, tinnitus, and uncontrollable rapid breathing. Which of the following would be the best treatment for the aspirin toxicity?  
| Question and answers | A) Allopurinol  
|                     | B) Naloxone  
|                     | C) IV Sodium Bicarbonate  
|                     | D) IV Ammonium Chloride  
|                     | E) Flumazenil  |
| Learning Objectives | 1. List the signs and symptoms of salicylate toxicity.  
| The listener should be able to: | 2. Describe a suitable antidote for treating salicylate or aspirin intoxication.  
|                     | 3. Explain the clinical uses of additional drugs and antidotes:  
|                     | ● Allopurinol  
|                     | ● Naloxone  
|                     | ● Sodium Bicarbonate  
|                     | ● Ammonium Chloride  
|                     | ● Flumazenil |
The patient initially took several aspirin to alleviate what seem to be the classic symptoms of gouty arthritis. Gout is caused by the degradation of purines. This leads to a super saturation of uric acid and precipitation of uric acid crystals in joints. The fact that the patient consumed a large meat based meal is also indicative of gout (Schumacher Jr, 2008). The first line treatment for pain of acute gout is NSAIDS, unless contraindicated in the patient (Mayo-Clinic, 2011). In this case, the patient consumed excessive amounts of aspirin, a weak acid, for the pain. Drug toxicities can be more severe in the geriatric population due to a decreased metabolism and clearance of the drug from the body. Aspirin toxicity often presents with CNS disturbances such as confusion, lethargy, and tinnitus. Initially aspirin stimulates the respiratory center in the medulla causing respiratory alkalosis, however, later the acid-base disturbance becomes mixed between respiratory alkalosis and metabolic acidosis (Hunter, Wood, & Dargan, 2011).

1. Allopurinol inhibits xanthine oxidase, the enzyme responsible for the last two reactions that produce uric acid. This drug is used as urate-lowering therapy for chronic gout. It is typically only used in patients with two or more previous gout attacks or if the patient presents with tophi.

2. Naloxone is an opioid antagonist used for opiate intoxication. (Clarke, Torok, Dargan, & Jones, 2009)

3. To treat an intoxication of a weak acid such as aspirin, one option is to alkalinize the urine with IV Sodium bicarbonate. This will cause the neutrally charged aspirin in the urinary space to become charged thus rendering it trapped in the urine and increasing its excretion. According to the Henderson-Hasselbalch equation, when a weak acid is placed into an alkaline environment, it releases its proton and becomes negatively charged. (Kellum, 2010)

4. IV Ammonium chloride would acidify the urine rather than create the desired alkalization. (Kellum, 2010)

5. Flumazenil, a GABA receptor competitive antagonist, is used to treat benzodiazepine intoxication. (Veiraiah, Dyas, Cooper, Routledge, & Thompson, 2010)

Comments
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Keywords
Geriatrics, USMLE step exam, Aspirin toxicity, Salicylate toxicity, Aspirin overdose

References


