



Nurse Advise-ERR™

Educating the healthcare community about safe medication practices

June 2003 ■ Volume 1 Issue 3

Benzocaine topical sprays may cause methemoglobinemia

Topical anesthetic sprays such as **CETACAINE** (benzocaine 14%, tetracaine 2%), and **HURRICAIN** (benzocaine 20%) have been linked to methemoglobinemia, a condition characterized by abnormal levels of oxidized hemoglobin. The oxidized hemoglobin binds so firmly with oxygen that little oxygen is available to tissues. When induced by benzocaine, the most common agent linked to the reaction, methemoglobinemia can result in life-threatening conditions.

used multiple sprays of benzocaine-containing products, or sprays of longer duration than recommended. Since some products that contain benzocaine are available without a prescription, patients also could apply too much spray, gargle too often with a liquid form, or even swallow it.

Prompt recognition and treatment can be challenging because clinically significant elevations of methemoglobin can produce normal pulse oximetry readings, and arterial blood gas readings may not be helpful in diagnosing the condition.

Drawing an arterial blood sample for co-oximetry, which directly measures methemoglobin levels, is needed for evaluation. The brown appearance of arterial blood is also a visual clue to the condition.

Normally, methemoglobin accounts for 1% of circulating hemoglobin. Cyanosis occurs as the level rises above 10%. Anxiety, fatigue and tachycardia appear at levels between 20% and 50%. With levels ranging from 50% to 70%, coma and death may result. About 100 life-threatening cases related to benzocaine have been reported to the FDA. With millions of doses of topical anesthetics used annually for intubation, endoscopic procedures, and various other indications, the condition is estimated to occur much more often than reported.

About 100 life-threatening cases related to benzocaine have been reported to the FDA.

While the condition occurs across a wide age range, some patients may be predisposed to the condition: infants under 6 months of age; elderly patients with cardiac problems; and patients with altered hemoglobin, such as G6PD deficiency or methemoglobin reductase enzyme deficiency. Application of benzocaine products to inflamed areas, which absorb more drug, can also contribute to the problem. See **checkitout!** for recommendations on how to reduce the risk of harm from methemoglobinemia. 

checkitout! ✓✓✓✓

To reduce the risk of harm from methemoglobinemia when using benzocaine topical anesthetics:

- ✓ **Ask patients** who may receive topical anesthetics about their medical history to determine if risk factors for methemoglobinemia (e.g., G6PD deficiency) are present.
- ✓ **Stock just one** topical anesthetic spray to enhance staff familiarity with the product and its proper dosing.
- ✓ **Have pharmacy apply labels** to remind nurses to avoid sprays of longer duration than recommended.
- ✓ **Use a metered-dose spray** product such as **TOPEX** (20% benzocaine) if possible (overdoses are still possible if multiple sprays are used).
- ✓ **Document** the number and duration of sprays applied to keep track of the amount of drug administered.
- ✓ **Consider methemoglobinemia** if cyanosis develops after application of topical anesthetics, even if pulse oximetry readings are normal.
- ✓ **Become familiar** with the treatment of methemoglobinemia if you administer topical benzocaine.
- ✓ **Have supplemental oxygen** and methylene blue (given 1 to 2 mg/kg IV to enhance the oxygen-carrying capacity of hemoglobin) available where benzocaine sprays are used. (Treat G6PD-deficiency patients with transfusion or dialysis, since methylene blue can cause hemolytic anemia in these patients.)
- ✓ **Warn patients** who use topical anesthetics at home (e.g., oncology patients) about methemoglobinemia.

safetywire

 **Need updated compatibility charts** for IV medications and solutions on patient care units? *Facts and Comparisons* publishes a wall chart that is available for purchase by calling 800-223-0554. Or visit this web site to download a free chart that can be posted on your unit: http://www3.us.elsevierhealth.com/MERLIN/nursingdrugupdates/Gahart/solution_compatibility_chart.html. It's also a good idea to call a pharmacist if you have questions. Cont'd on page 2 ▶

All is not as it seems... *Name that order*

 **How many units of insulin should this patient receive?**

DATE 12/24/02 6 units Regular insulin

A The order above is for 6 units of insulin. Placing the dose before, instead of following, the drug name, and too little space between the order date (12/24/02) and the insulin dose (6 units) could result in misreading the dose as 26 units. And it's not just physicians who need to be alert to proper spacing and placement of the dose when writing orders. This was a verbal order recorded by a nurse, and although she knew the correct dose, another nurse reading her entry could have made an error.

Also beware of drug names that end in the letter "L." Overdoses have been reported when a lowercase "L" at the end of a drug name was misread as the number "1." For example, a handwritten, or even clearly typed, order for 25 mcg of **LEVOXYL** (levothyroxine) could be misread as 125 mcg if it appears without proper spacing as "Levoxyl25 mcg," especially since both strengths are available. Or, as the order below illustrates, **TEGRETOL** (carbamazepine) 300 mg BID could be misread as 1300 mg BID.

Tegre+rol 1300mg BID

This actually happened. The patient received only one 1300 mg dose before the mistake was recognized. The fact that the dose had been written over may have caused distraction, contributing to the misinterpretation. Fortunately, the patient's Tegretol level had been low, so the dose did not harm him other than causing lethargy.

Adequate spacing between discrete items within an order, including the drug name and dose, is also crucial on medication history forms, handwritten medication administration records (MARs), preprinted order forms, and in electronic formats such as automated dispensing cabinet screens, computer-generated MARs, and medication labels.

safetywire continued

 **Recruiting new graduates this month?** Graduate nurses may have acquired some unsafe medication practices during their professional education. They may not recognize the potential for errors associated with some abbreviations they learned to use. Or they may misunderstand abbreviations. One graduate nurse misinterpreted the abbreviation "SL," intended to mean sublingual, as "saline lock," and administered a clear oral medication intravenously. Another graduate related the story of how she had carefully written out "units" when documenting an insulin dose, only to have it "corrected" to "U" by her supervisor, despite the graduate's concern that the "U" could be misread as a zero. Unfortunately, medication safety training may not be comprehensive during professional education. Therefore, safe medication practices should be stressed during orientation. Periodic discussions should be held with new nurses about the types of errors that have occurred in your facility as well as those reported in this newsletter. And mentors are a necessity. An enthusiastic mentor can help new nurses quickly assimilate medication safety into their daily practice.

pearls **for patients**

Elevated skin and body temperature can increase fentanyl patch absorption.

DURAGESIC (fentanyl) transdermal patches provide analgesia at predictable concentrations for up to 72 hours. However, the extent of intracutaneous vasodilation and vascularization in the area where the patch is applied influences absorption of the drug. Thus, patients who use hot tubs or saunas; who put heating pads over the patch area; who have a fever; or who engage in extensive physical activity may experience a significant increase in fentanyl absorption. Several examples of opiate toxicity under these conditions serve as a reminder to educate patients and staff about these risks. One patient with cervical cancer used a heating pad on her abdomen in an area away from the patch, but the pad soon slipped over the patch. Several hours later, she was found unresponsive with respiratory depression. Another patient wearing a patch was given a warming blanket during surgery. Her breathing decreased steadily and her pupils became pinpoint. A third patient with HIV was wearing a patch while swimming and hiking at camp. He became tired, then unresponsive. The patch was removed from all patients, and each responded to **NARCAN** (naloxone).



Let ISMP help you educate patients. The well-informed

patient can play a vital role in medication safety. That's why we've introduced **Safe Medicine**, a medication safety newsletter for consumers. This reasonably priced, bimonthly newsletter uses real-life stories to teach your patients the basics of medication safety. Copies can be distributed to residents in your community and to patients and families who visit local hospitals, clinics, and pharmacies. You can even personalize the newsletter with your organization's name and logo. In today's complex healthcare environment, preventing medication errors is everybody's job. Visit www.ismp.org/ConsumerArticles/index.htm to review our premier issue and to learn how to subscribe.

ISMP Survey on Educating Patients about Medications

ISMP invites all **Nurse Advise-ERR** readers to complete this survey about the methods and materials you use to educate patients about medications. To submit your responses, visit www.ismp.org/Survey/Newsletter/NursSurvey200306.asp and enter your answers into a web-based survey tool. If you lack Internet access, fax this form to ISMP at 215-914-1492. Please submit your responses by **July 11, 2003**. Look for the results in the August edition of **Nurse Advise-ERR**.

1. Select the best response to tell us about the methods you use and the resources you have available to educate patients about their prescribed medications.

Methods Used to Educate Patients About Their Prescribed Medications	All Patients	Most Patients	Some Patients	Few Patients	Selected Patient Groups	Not Used
A. Verbal discussion at discharge.						
B. Verbal discussion during drug administration.						
C. Written information printed from a computer program.						
D. Written information developed internally.						
E. Leaflet describing disease, procedure, medication.						
F. Video/television/intranet site.						
G. Other (list).						

2. Select the best response to tell us how frequently you encounter these barriers when educating patients.

Barriers Encountered When Educating Patients About Their Prescribed Medications	Always	Frequently	Sometimes	Never
A. Lack of written materials about drug therapy for patients.				
B. Lack of written materials in the patient's native language.				
C. Lack of written materials suitable for the patient's health literacy/reading level.				
D. Lack of written material about medication error prevention for patients.				
E. Lack of detailed knowledge about a specific medication.				
F. Lack of readily available drug references for nurses.				
G. Lack of pharmacy/pharmacist resources to aid in patient education.				
H. Insufficient time/staffing.				
I. Other (list).				

3. Select the best response to tell us about your experiences with educating patients.

Questions	Yes	No
A. Are you satisfied that the written material you provide to patients covers the most important information in a way that is clear to patients?		
B. Do you have a method for patients to contact you after discharge if they have questions?		
C. Do you require all patients to repeat back an explanation or demonstrate drug administration techniques that you have taught them (e.g., measuring liquid medications; giving injections)?		

4. Choose the options that best describe you and your organization.

- A. Years of Experience: () Less than 2 () 3-10 () 11-20 () Greater than 20
- B. Practice Setting: () Inpatient () Outpatient
- C. Educational Affiliation: () Teaching () Non-Teaching
- D. Type of Facility: () Hospital () Rehabilitation () Long-Term Care () Ambulatory () Other

Thank you for participating!

©2003 Institute for Safe Medication Practices. Permission is granted to subscribers to use material from **Nurse Advise-ERR** for in-house newsletters or other internal redistribution, with proper citation. Reproduction for external use is prohibited without permission. Errors reported in this publication were received through the USP-ISMP Medication Errors Reporting Program. **Editors:** Judy Smetzer, RN, BSN; Susan Paparella, RN, MSN; Hedy Cohen, RN, BSN, MS; Michelle Mandrack, RN, BSN; Michael R. Cohen, RPh, MS, ScD, Susan Dalton. **Institute for Safe Medication Practices, 1800 Byberry Road, Suite 810, Huntingdon Valley, PA 19006.** Tel. 215-947-7797; Fax 215-914-1492; E-MAIL: nursing@ismp.org.