

## Risk of Tragic Error Continues in Operating Rooms

“There has been a terrible mistake.” This is what the parents were told after it was discovered that epinephrine (adrenaline) instead of lidocaine (Xylocaine™) was found to be in the syringe that had been used to locally infiltrate the ear of a seven year old boy. The incident led to a cardiac arrest and death of the child.<sup>1</sup> A description of this error was shared as a warning in the documentary video “Beyond Blame”, widely distributed by ISMP (US). During the elective procedure, both lidocaine 1% with epinephrine 1:100,000 (10 mcg/mL) (intended for infiltration) and epinephrine 1:1000 (1000 mcg/mL) (intended for topical application) were to be used in the sterile field. However, the high concentration epinephrine 1:1000 topical solution was mistakenly poured into a container labelled “lidocaine with epinephrine”. A 3 mL volume of epinephrine 1:1000 (total dose of 3000 mcg) was used to infiltrate the child’s ear.

ISMP Canada recently received a medication error report in which the circumstances were similar to the event described above. The patient was under general anesthesia for elective surgery. The sterile field included two labelled open glass containers. One held lidocaine 1% with epinephrine 1:100,000 for local infiltration, the other held epinephrine 1:1000 intended for topical application. The latter was inadvertently drawn up into a syringe and used instead of the intended local infiltration solution. The substitution error was discovered soon after the concentrated epinephrine solution was injected into the patient’s nasal mucosa causing an acute rise in heart rate and blood pressure. The patient was transferred to the Intensive Care Unit (ICU) for monitoring. The patient recovered without permanent harm and was discharged home.



**Figure 1a.** An example of an open glass container commonly used in sterile fields for holding topical or injectable solutions. The recent error report described using two glass containers, each labelled, one containing a topical solution and the other an injectable solution.



**Figure 1b.** An example of an open metal container commonly used in sterile fields for holding topical or injectable solutions.

Lidocaine 1% with epinephrine 1:100,000 is commonly used by surgeons to provide local anesthetic effect when injected into tissue. The dilute epinephrine causes vasoconstriction which can improve surgical field hemostasis and visibility, and increase the duration of the local anesthetic effect. High doses of epinephrine (i.e., greater than 1 mcg/kg), typically used parenterally in critical care or resuscitation applications, can cause acute tachycardia, hypertension, and malignant dysrhythmias in otherwise healthy patients.<sup>2</sup> Serious complications, including strokes, myocardial infarctions, and death, can occur with inadvertent intravenous administration of epinephrine.<sup>3</sup>

The following system-based factors contributing to the recent incident were identified by the hospital:

- Similar open containers were used to hold multiple solutions (topical and injectable).
- Multiple solutions (topical and injectable) were simultaneously present in the sterile field.
- Only the sterile glass containers – not the syringes themselves – were labelled.

### Announcement

#### ISMP Canada Fellowship Program Update

Congratulations to Julie Greenall, RPh, BScPhm, who has completed the first Canadian fellowship in Safe Medication Management. Effective January 2005, Julie will be joining ISMP Canada as a full-time Project Leader.

ISMP Canada is also pleased to announce that Dan Perri, BScPhm, MD, FRCPC, an intensivist, and Alex Ho, BSc, MD, FRCPC, an anesthesiologist, have accepted fellowships for 2004/05.



**Figure 2 (from left to right).** 20 mL vial of lidocaine 1% with epinephrine 1:100,000 for local infiltration; 30 mL vial of epinephrine 1:1000 intended for topical application.

- Both local anesthetic and topical epinephrine solutions are clear and colourless.

The hospital reporting the event has implemented the following changes to try to prevent a recurrence:

- Surgeons now infiltrate the surgical site with local anesthetic prior to scrubbing and gowning for ear, nose and throat (ENT) procedures. Subsequent infiltration is seldom required and this, therefore, allows for only one medication (i.e. topical medication) to be present in the sterile field.
- When additional surgical site infiltration is required, the solution is drawn directly into a syringe from the vial immediately prior to use. This obviates the need to use a container to hold the injectable solution and ensures that the solution remains in the original vial until required.

#### References:

1. Martin Memorial Health Systems Document: In Memory of Ben October 13, 1998 – December 14, 1995. distributed with permission by ISMP US, 1996.
2. ISMP Medication Safety Alert. Vol. 7, Issue 6, 2002.
3. ISMP Medication Safety Alert. Vol. 1, Issue 24, 1996.
4. ISMP Medication Safety Alert. Vol. 7, Issue 6, 2002.

In addition, ISMP Canada recommends that hospitals consider the following suggestions to prevent similar events from occurring during ENT procedures:

- Use commercially available products for local infiltration.
- Keep the injectable solution in its original vial until it is drawn up into a syringe immediately before use. This provides an opportunity for a double check (i.e., the surgeon sees the vial held up next to the syringe).
- Follow safe medication labelling guidelines. Each medication container and syringe should be individually labelled.<sup>4</sup> This helps prevent errors when additional solutions are added to the sterile field, surgical conditions change, or when nursing personnel change shift during the procedure. The process of confirming a label by comparing it with the original container provides beneficial redundancy. Recommendations stemming from the US incident (described above) include a second individual checking the labelling process, including a verbal (read aloud) component.
- Ensure that the word TOPICAL is clearly written on the label of any container used to hold a topical solution.
- Ensure that an effective process exists for communicating the rationale for system changes amongst the surgical department members and the operating room team.

ISMP Canada, in co-operation with ISMP (US) and the Canadian Anesthesiologists' Society, will be conducting a review of medication practices in operating suites in order to develop additional specific strategies to enhance patient safety.

#### Acknowledgements:

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ISMP Canada is a national voluntary medication incident and 'near miss' reporting program founded for the purpose of sharing the learning experiences from medication errors. Implementation of preventative strategies and system safeguards to decrease the risk for error-induced injury and thereby promote medication safety in healthcare is our collaborative goal.

To report a medication error to ISMP Canada: (i) visit our website [www.ismp-canada.org](http://www.ismp-canada.org), or (ii) e-mail us at [info@ismp-canada.org](mailto:info@ismp-canada.org), or (iii) phone us at 416-480-4099. ISMP Canada guarantees confidentiality and security of information received. ISMP Canada respects the wishes of the reporter as to the level of detail to be included in our publications.

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