

# Hyperglycemia Increases Postop Infection Rate

BY BRUCE JANCIN  
Denver Bureau

NEW YORK — Postoperative hyperglycemia boosts the 30-day risk of infectious complications—regardless of preoperative glucose level or whether a patient has diabetes—according to a study of 995 patients undergoing general or vascular surgery in non-ICU settings.

The clinical implications of this finding are that postoperative blood glucose monitoring should be a routine part of patient management, and that maintaining euglycemia postoperatively is a simple intervention that could significantly reduce postoperative infection rates, Dr. Selwyn O. Rogers Jr. said at the annual meeting of the American Surgical Association.

More than 2 million postoperative infections occur annually in U.S. patients. Tight postoperative glucose control has previously been shown to reduce the risk of wound infection in diabetic patients and to lower morbidity and mortality in cardiac surgery patients, as well as in critically ill patients in surgical ICUs. But the impact of perioperative hyperglycemia on postoperative infection risk hadn't previously been studied in noncardiac surgery patients in non-ICU settings—the sort of patients general surgeons see every day, said Dr. Rogers of Brigham and Women's Hospital, Boston.

Dr. Rogers reported on 995 consecutive patients who underwent major general or vascular surgery at Brigham and were enrolled in the observational American College of Surgeons National Surgical Quality Improvement Program. The program's goal is to reduce preventable surgical morbidity and mortality by 25% by 2010.

Postoperative infections—including wound infections, pneumonia, sepsis, urinary tract infections, and septic shock—occurred within 30 days in 117 of the 995

study participants, or 11.7%. The incidence was 15.3% among the 13% of subjects who had diabetes and 8.8% in non-diabetic patients. Patients who developed postoperative infections had a mean postoperative blood glucose level of 142 mg/dL and were significantly older as well as more likely to have received more than two units of RBCs intraoperatively.

A multivariate regression analysis showed only three significant predictors of postoperative infections: emergent surgery and a higher American Society of Anesthesiologists classification—which are factors beyond control—and postoperative

hyperglycemia, which is readily manageable. A postoperative blood glucose level 40 mg/dL higher than normal was independently associated with a 30% increased risk of postop infection. And a postop blood glucose greater than 180 mg/dL was associated with an adjusted twofold increase in infection risk.

**Maintaining euglycemia postoperatively is a simple intervention that could reduce infection rates.**

DR. ROGERS

relationship between postoperative hyperglycemia and the risk of surgical site infections, which account for roughly one-quarter of all postoperative infections occurring annually in U.S. patients. Prevention and prompt treatment of postop hyperglycemia, therefore, could potentially have a major favorable impact on the quality of surgical services, he noted.

Dr. Hiram C. Polk Jr. observed that the fascination with tight blood glucose control in surgical patients is only 7 or 8 years old. The pendulum has recently begun to swing away from tight control, but this careful study will push it back, he predicted.

Dr. Polk added that in his own ongoing prospective study of surgical practices at small community hospitals, he has been struck by the uniformly careful attention given to avoiding hypothermia, in contrast to the spotty performance regarding perioperative blood glucose monitoring.

"Hypothermia is being avoided in 98% of cases. On the other hand, nearly one-third of all diabetics are not monitored for intraoperative glucose during long surgical procedures. And 29% of people with very high glucose in the holding area don't get their blood glucose monitored at all," said Dr. Polk, senior professor of surgery at the University of Louisville (Ky.).

Strict perioperative blood glucose control is routine only in cardiac surgery, because of the abundant evidence that it influences outcomes, Dr. E. Patchen Dellinger pointed out, adding that it's irrational not to apply the same practice in other fields of surgery.

"Clearly the biology is the same," argued Dr. Dellinger, professor and vice chairman of surgery and chief of the general surgery division at University of Washington Medical Center, Seattle.

"There are still nonbelievers who are unconvinced of this important relationship," commented Dr. Dana K. Andersen, professor and vice chair of surgery at Johns Hopkins University, Baltimore. ■



## Mafenide Tied to Infections in Burn Patients

BY PATRICE WENDLING  
Chicago Bureau

CHICAGO — The use of topical mafenide acetate on burn wounds was associated with a higher incidence of fungal infection than was silver sulfadiazine in a retrospective analysis of 111 patients.

The chart review was initiated after physicians at the regional burn center of Miami Valley Hospital, Dayton, Ohio, observed more fungal infections after replacing the application of saline soaks for 24 hours followed by silver sulfadiazine 1% cream (Silvadene) with only the application of mafenide acetate 5% solution (Sulfamylon) as the topical antibiotic of choice for initial antimicrobial therapy.

The change in protocol was made in 2002 in an effort to improve patient outcomes, and has since been reversed, said research coordinator Ryan Shapiro, on behalf of principal investigator Dr. R. Michael Johnson, at the annual meeting of the American Burn Association.

From 1998 to 2006, 42 patients were treated twice daily with silver sulfadiazine, and 69 with mafenide acetate solution. The silver sulfadiazine group was significantly younger than the mafenide acetate group (mean age, 38 vs. 48 years), less likely to have a central line (16 vs. 43 patients), and more likely to have shorter ICU stays (4 vs. 10 days) and shorter total hospital stays (23.5 vs. 34 days).

Nonsignificant differences between

the silver sulfadiazine and mafenide acetate groups included mean total body surface area burned (27% vs. 29%), inhalation injury (14 vs. 25 patients), and mortality (6 vs. 13 patients).

Univariate analysis showed that patients receiving mafenide acetate solution had twice the rate of burn infection or systemic fungal infection (48%) than did patients receiving silver sulfadiazine (24%), reported the investigators, who disclosed no relevant conflicts of interest.

Patients receiving mafenide acetate also had four times the rate of systemic fungal infections (27.5%) than

did patients receiving silver sulfadiazine (7%). Both outcomes were statistically significant.

Significant predictors of fungal infection on univariate analysis included age, length of ICU stay, total length of stay, presence of a central line, and use of mafenide acetate.

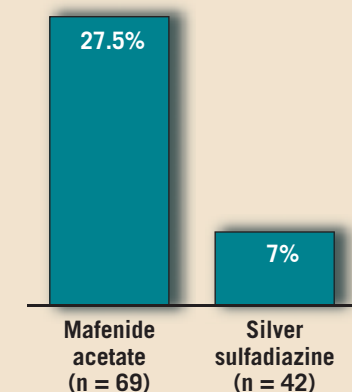
However, in multivariate logistic regression analysis, only length of ICU stay and total length of stay remained as independent predictors of fungal infection, according to Dr. Johnson, chief of plastic surgery at Miami Valley Hospital, and colleagues.

The overall higher fungal infection rate in the series was higher than expected, and could be the result of an increase in the age of patients being treated rather than the choice of topical antibiotic, the investigators noted.

Although the protocol was changed back to using silver sulfadiazine cream in 2006, mafenide acetate is still used in the burn unit at the physician's discretion, they indicated.

Audience member Dr. Debra A. Reilly, director of the burn center and a surgeon at the University of Nebraska Medical Center in Omaha, recounted similar problems with mafenide acetate and fungal infections, but cautioned the audience not to discard the drug, calling it a "very useful product" with a long track record. She suggested adding the antifungal nystatin, with the caveat that it must be combined with mafenide acetate suspension and not mafenide acetate solution. ■

### Rate of Systemic Fungal Infection Raised With Mafenide



Note: Based on data for burn patients treated from 1998 to 2006.  
Source: Dr. Johnson

ELSEVIER GLOBAL MEDICAL NEWS

## Fluoroquinolone Resistance Rises

WASHINGTON — Fluoroquinolone resistance rose significantly over an 8-year period in hospitalized adults aged 65 and older with gram-negative bacterial infections, according to a report at the annual meeting of the American Geriatrics Society.

The safety and bioavailability of fluoroquinolones (FQs) have made them a popular choice for treating infections in older adults, wrote Jon P. Furuno, Ph.D., of the University of Maryland, Baltimore, and his colleagues in a poster presented at the meeting.

They collected microbiology data from all cultures that tested positive for gram-negative bacteria in patients aged 65 years and older admitted to the University of Maryland Medical Center between January 1998 and December 2005.

They analyzed 1,839 *Escherichia coli*, 554 *Proteus mirabilis*, 1,044 *Pseudomonas aeruginosa*, 1,068 *Klebsiella*, and 480 *Enterobacter cloacae* isolates.

FQ resistance increased significantly across all species, from 8.4% in 1998 to 26.9% in 2005. Species-specific significant increases in the percentage of resistant isolates were observed from 1998 to 2005 for *E. coli* (2.8% vs. 30.6%), *P. mirabilis* (7.4% vs. 39.3%), and *Klebsiella* (1.7% vs. 9.3%). Resistance rates in *P. aeruginosa* and *E. cloacae* increased from 1998 to 2005, but the differences were not statistically significant.

The investigators recommended that prescribers consider the evidence of rising FQ resistance when choosing antibiotics for hospitalized older adults.

The study was funded by NIH, the CDC, and the Infectious Diseases Society of America. Dr. Furuno did not disclose any financial conflicts.

—Heidi Splete