

*Infection prevention*

## Antimicrobial surgical glove reduces risk of microbial passage after perforation

Surgical gloves protect the patient against contaminating hand flora and members of the surgical team against blood-borne pathogens. Although glove integrity is important, little data exist on microbial passage after glove perforations.

Researchers from Ernst Moritz Arndt University, Greifswald, Germany, and the Medical College of Wisconsin, Milwaukee, evaluated microbial passage of *Staphylococcus aureus* and *Brevundimonas diminuta* through a conventional single-thickness latex glove, a double-thickness surgical glove, and a trilayer antimicrobial surgical glove in which the middle layer contains an antimicrobial solution made of chlorhexidine digluconate, didecyl dimethyl ammonium chloride salt, and benzalkonium chloride salt. After exposure periods of 5, 10, 30, and 45 minutes, microbial passage was measured on the inner surface of the perforated test glove.

No difference was found in microbial passage between the single- and double-thickness gloves at 10-, 30-, and 45-minute exposures for *S aureus*.

A significant reduction in microbial passage was found with the trilayer glove compared with the single-thickness glove, at 5-, 30-, and 45-minute exposures for both *S aureus* and *B diminuta*.

When all timed groups were combined, a significant reduction in microbial passage of *S aureus* and *B diminuta* was found with the trilayer glove compared with both single- and double-thickness gloves.

The researchers concluded that microbial passage across surgical gloves can be reduced significantly using antimicrobial glove technology.

Daeschlein G, Kramer A, Arnold A, et al. Evaluation of an innovative antimicrobial surgical glove technology to reduce the risk of microbial passage following intraoperative perforation. *Am J Infect Control*. March 2011;39:98-103.

<http://journals.elsevierhealth.com/periodicals/ymic>

## Management of contaminated nondisposable autologous osteoarticular bone fragments

Intraoperative management of nondisposable autologous osteoarticular bone fragments that have been dropped on the OR floor poses a challenging dilemma to the orthopedic surgeon. These pieces often cannot be discarded because of their unique shape and composition.

This study from the Warren Alpert School of Medicine at Brown University, Providence, Rhode Island, was designed as a 3-phase investigation to identify a readily employable intraoperative management scheme for the surgeon who is faced with a contaminated autologous osteoarticular bone fragment.

Phase 1 quantified the rate of contamination of bone fragments dropped on the OR floor. Phase 2 assessed the feasibility and optimal means of decontaminating bone fragments with normal saline, povidone-iodine, 70% isopropyl alcohol and 2% chlorhexidine gluconate, or 4% chlorhexidine gluconate. Phase 3 assessed the effect of each decontamination process.

The rate of contamination of dropped bone in Phase 1 was 70%. Coagulase-negative *Staphylococcus* was the most commonly cultured organism.

Varying exposure times to chemical agents in Phase II did not make a significant difference in decontamination. Mechanical scrubbing was superior to saline lavage. Bactericidal agents were more effective than normal saline, and povidone-iodine and 4% chlorhexidine gluconate were the most effective decontaminating agents.

Phase 3 showed that fragments treated with normal saline and povidone-iodine retained the greatest number of live cells and the least number of dead cells. Mechanical scrubbing significantly decreased cartilage cell viability compared with saline lavage.

The data suggest that a 5-minute povidone-iodine bath, followed by a 1-minute lavage with saline solution is sufficient to decontaminate a dropped autologous bone fragment without undue cartilage cell toxicity. The researchers do not recommend either 4%

chlorhexidine or a mechanical scrub because they significantly decrease cartilage cell viability.

*Bruce B, Sheibani-Rad S, Appleyard D, et al. Are dropped osteoarticular bone fragments safely reimplantable in vivo? J Bone Joint Surg Am. March 2, 2011;93:430-438.*

[www.ejbjs.org](http://www.ejbjs.org)

## Comparison of 5 protocols for contaminated bone grafts

Occasionally, a bone graft or fracture fragment is dropped on the floor during surgery and becomes contaminated.

The purpose of this study from Case Western Reserve University, Cleveland, Ohio, was to determine an optimal method for sterilizing dropped bone with minimum sacrifice of cell viability.

A set of discarded bone samples from 20 total knee arthroplasty procedures were contaminated with a bacterial broth prepared from cultures taken from the OR floor. Bone samples in each set underwent 5 different decontamination procedures: 1 sample was autoclaved, and 4 samples underwent mechanical agitation in normal saline, 2% chlorhexidine gluconate, or 10% povidone-iodine that was either left wet or dried.

Autoclaving, chlorhexidine gluconate, and dry povidone-iodine sterilized all bone samples. Wet povidone-iodine decontaminated 40% of the samples, and saline decontaminated none.

All methods reduced the average live cell count, but autoclaving and chlorhexidine gluconate left no viable cells. Live cells remained after wet and dry povidone-iodine treatments and saline treatments.

The researchers concluded that 5 serial 15-second washes with mechanical agitation in 10% povidone-iodine, followed by a 15-minute drying period and a saline wash offers effective sterilization of bone grafts while preserving some cell viability in the tissue.

*Bauer J, Liu R W, Kean T J, et al. A comparison of five treatment protocols for contaminated bone grafts in reference to sterility and cell viability. J Bone Joint Surg Am. March 2, 2011;93:439-444.*

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## Latex allergy

### Prevalence of latex sensitization in obstetric patients

Previous studies have shown a greater frequency of latex sensitization in females and a higher incidence of anaphylactic reactions to latex during cesarean sections.

This Italian study evaluates the prevalence of latex sensitization in pregnant compared with non-pregnant patients undergoing surgery.

A total of 294 pregnant women undergoing caesarean section were compared with 294 nulliparous (never pregnant) women with childbirth potential undergoing gynecologic surgery. Before surgery, patients completed a questionnaire and had blood drawn to measure specific immunoglobulin E serum concentrations with a fluorescent enzyme immunoassay test. Skin-prick tests were performed if adverse reactions occurred during surgery. There were no significant differences between the 2 groups in terms of risk factors associated with latex allergy.

Overall, a significantly higher proportion of

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pregnant patients tested positive for latex-specific immunoglobulin E than nonpregnant patients—5.15 vs 1.7%. Moreover, the median serum concentration of immunoglobulin E was higher in pregnant than nonpregnant patients. Two pregnant patients experienced anaphylactic reactions to latex approximately 30 to 50 minutes after starting the c-sections. No anaphylactic reactions occurred in the nonpregnant patients.

The data indicate that obstetric patients have a higher prevalence of latex sensitization than nonpregnant patients. Additional investigations are needed to establish the possible causes of this greater sensitization.

*Draisci G, Zanfini B A, Nucera E, et al. Latex sensitization: A special risk for the obstetric population? Anesthesiology. March 2011;114:565-569.*

[www.anesthesiology.org](http://www.anesthesiology.org)

## Patient safety

### Underbody forced-air vs resistive heating during on-pump cardiac surgery

Perioperative hypothermia is associated with numerous complications, including myocardial ischemia, coagulopathy, and surgical site infection. Though hypothermia is often induced during cardiopulmonary bypass (CPB) to reduce organ damage, it is generally accepted that patients recovering from cardiac

surgery should be normothermic.

Rapid or excessive rewarming after CPB is associated with postoperative neurological and neurocognitive dysfunction. Therefore, patients are slowly rewarmed while they are weaned from CPB followed by slow surface rewarming.

Because cardiac surgery leaves little surface area available for surface warming systems, underbody systems have been developed for these patients. One is an underbody forced-air blanket (Arizant Healthcare Inc, Eden Prairie, Minnesota). This system does not warm the patient's posterior surface because the patient's weight compresses the air conduits, but warm air does heat the patient's sides, and warm air collects under surgical drapes, creating a thermal cocoon. Another is a resistive heating mattress (Inditherm, Rotherham, United Kingdom) that directly heats the patient's posterior skin.

Researchers from ANA Middelheim General Hospital, Antwerp, Belgium, and the Cleveland Clinic, Cleveland, Ohio, conducted a randomized controlled trial to compare the efficacy of Arizant's underbody forced-air warming, Inditherm's underbody resistive heating mattress, and routine surgical draping in 129 cardiac surgery patients. Patients were taken off CPB at a core temperature of 35°C and external warming continued until the end of surgery.

Core temperature was better conserved in the forced-air and resistive warming groups than the routine group; however, forced-air and resistive warming did not differ significantly. After CPB, the rate of

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rewarming was significantly greater in the forced-air group than in the resistive or routine warming groups, while the resistive group did not differ from the routine group.

The researchers concluded that neither active underbody system made a clinically important contribution to thermal management of cardiac patients after CPB. This confirms that patient temperature in the post-CPB period is largely determined by temperature at termination of CPB.

*Engelen S, Himpe D, Sessler D I, et al. An evaluation of underbody forced-air and resistive heating during hypothermic, on-pump cardiac surgery. Anaesthesia. February 2011;66:104-110.*

[http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1365-2044](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1365-2044)

## Effectiveness of forced-air vs vitalHEAT vH<sup>2</sup> warming systems

Maintaining perioperative normothermia significantly reduces morbidity and has become routine. Forced air warming is the most common intraoperative warming strategy, but in patients having large procedures, it may be impossible to warm sufficient surface area with forced-air to maintain normothermia (core temperature of 36.0 °C).

Recently, Dynatherm Medical, Inc (Fremont, California) developed the vitalHEAT vH<sup>2</sup> system that transfers heat through a single extremity using a combination of conductive heat (circulating warm water within soft pads) with mild vacuum, which enhances contact between the heating element and skin surface.

Preliminary (uncontrolled and unpublished) studies suggest that the device is effective, even in open abdominal surgery.

Researchers from the University of Vienna, Austria, and the Cleveland Clinic, Cleveland, Ohio, undertook a study to examine whether core temperatures were lower in patients warmed with forced air or with the vitalHEAT system.

A total of 71 patients undergoing open abdomi-

nal surgery were randomized to the vitalHEAT system on one arm (37 patients) or an upper-body forced-air warming cover (34 patients).

Preoperative core temperatures were similar in each group. Intraoperative core temperatures also were similar with each warming system. The difference in mean temperatures was never more than 0.2°C. After 4 hours of surgery, the average temperature was approximately 36.3°C with the vitalHEAT sleeve and 36.4°C with forced air.

The researchers concluded that both systems transfer comparable amounts of heat, and both appear suitable for maintaining normothermia even in large and long procedures.

*Ruetzler K, Kovaci B, Sessler D I, et al. Forced-air and a novel patient-warming system (vitalHEAT vH<sup>2</sup>) comparably maintain normothermia during open abdominal surgery. Anesth Analg. March 2011;112:608-614.*

[www.anesthesia-analgesia.org](http://www.anesthesia-analgesia.org)

## Surgical trends

### Gastric bypass vs sleeve gastrectomy for diabetes control

Obesity and type 2 diabetes mellitus are closely related and difficult to control by medical treatment, including diet, drug therapy, and behavioral modification. Strong evidence exists that bariatric surgery, mostly gastric bypass procedures, can cure most associated diabetes in morbidly obese patients.

Researchers have hypothesized that changes in gastrointestinal (GI) hormone secretion would favor early improvement of diabetes in gastric bypass procedures that bypasses the duodenum and upper

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jejunum (foregut theory). Others have proposed that weight loss accounts for the resolution of diabetes by more simple, purely restrictive procedures, such as gastric banding and sleeve gastrectomy.

This study from Taiwan evaluates the efficacy of gastric bypass and sleeve gastrectomy for the treatment of type 2 diabetes and tests the foregut theory.

A total of 60 moderately obese patients with poorly controlled type 2 diabetes were randomized to gastric bypass with duodenum exclusion (30 patients) or sleeve gastrectomy without duodenum exclusion (30 patients).

At 1-year follow-up, remission of diabetes was achieved by 93% of the gastric bypass group and 47% of the sleeve gastrectomy group. Gastric bypass patients lost more weight, achieved a smaller waist circumference, and had lower blood glucose and blood lipid levels than the sleeve gastrectomy group. There were no serious complications in either group.

The researchers concluded that gastric bypass surgery is more effective than sleeve gastrectomy for surgical treatment of poorly controlled type 2 diabetes. Duodenum exclusion plays a role in treatment of diabetes and should be assessed.

*Lee W J, Chong K, Ser K H, et al. Gastric bypass vs sleeve gastrectomy for type 2 diabetes mellitus. Arch Surg. Feb 2011;146:143-148.*

[www.archsurg.com](http://www.archsurg.com)

## Perioperative and long-term outcomes of gastric bypass vs gastric banding

The two most common procedures to treat morbid obesity are laparoscopic Roux-en-Y gastric bypass and laparoscopic gastric banding. Gastric banding has been touted as less invasive as well as safer and easier to perform. Few controlled comparative studies, however, have reported perioperative and long-term outcomes of these procedures.

In this two-cohort, pair-matched study from the University of California, San Francisco, researchers examined the perioperative and postoperative complications, reoperations, and 1-year outcomes in 200 morbidly obese patients who underwent either laparoscopic gastric bypass (100 patients) or laparoscopic gastric banding (100 patients) procedures.

At 1-year after surgery:

- both groups had a similar rate of complications (12% of banding vs 15% of bypass patients).
- bypass patients had a higher rate of early complications (11% vs 2%).
- banding patients had a higher rate of reoperations (13% vs 2%).
- bypass patients had better weight loss (64% vs 36%), resolution of diabetes (76% vs 50%), and quality-of-life measures.
- no deaths occurred in either group.

The researchers concluded that when performed

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in high-volume centers by expert surgeons, gastric bypass has a better risk-benefit profile than gastric banding. This information should be provided to patients when discussing bariatric surgery options.

*Campos G M, Rabl C, Roll G R, et al. Better weight loss, resolution of diabetes, quality of life for laparoscopic gastric bypass vs banding. Arch Surg. February 2011;146:149-155.*

[www.archsurg.com](http://www.archsurg.com)

## Standards and regulations

### American Society of Anesthesiologists

*Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration.* The American Society of Anesthesiologists has updated its *Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration.* The guidelines apply to healthy patients having elective procedures.

Preop fasting guidelines are essentially the same as they have been: 2 hours for clear liquids; 4 hours for breast milk; and 6 hours for infant formula, non-human milk, or light meal.

[http://journals.lww.com/anesthesiology/Fulltext/2011/03000/Practice\\_Guidelines\\_for\\_Preoperative\\_Fasting\\_and.13.aspx](http://journals.lww.com/anesthesiology/Fulltext/2011/03000/Practice_Guidelines_for_Preoperative_Fasting_and.13.aspx)

### Food and Drug Administration

FDA expands use of banding system for weight loss. On Feb 16, the Food and Drug Administration approved the expanded use of Allergan Inc's (Goleta, California) Lap-Band system for adults who have failed to lose weight by conservative methods of diet, exercise, or drugs and who have a body mass index (BMI) of 30 to 40 with at least 1 obesity-related comorbid condition.

The Lap-Band system was originally approved by the FDA in 2001 for use in obese adults with a BMI of 35 with at least 1 severe comorbid condition or a BMI of 40, or those at least 100 pounds or more overweight.

<http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm245617.htm>

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