

# CLINICAL CONGRESS 2017

OCTOBER 22-26 | SAN DIEGO CONVENTION CENTER | SAN DIEGO, CA

## REPORT:

*A selection of presentations*



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# ACS CLINICAL CONGRESS REPORT

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## ACS Clinical Congress Report 2017

The American College of Surgeons (ACS) Clinical Congress is designed to offer a broad range of substantive opportunities for surgeons to interact with colleagues, participate in discussions, and learn about the latest innovations in our profession. The 2017 ACS Clinical Congress met all of these expectations.

The ACS Clinical Congress Report is a collection of news coverage and video interviews from the meeting. This sampling of reportage by *ACS Surgery News* is meant to convey the essence of the meeting: new ideas, intense debate, and a profound commitment to professional development.

We hope this collection of articles will serve as a reminder of what the Clinical Congress is all about. The 2018 ACS Clinical Congress will be held in Boston, MA, Oct. 21-25. Surgeons will be offered another great opportunity to hear important presentations and updates, meet with colleagues, and witness firsthand the breaking news and unveiling of discoveries in our field. We hope you are inspired to attend.

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# Surgeons weigh treatment options for management of diverticulitis

BY DOUG BRUNK

Frontline Medical News

**SAN DIEGO** – At the annual Clinical Congress of the American College of Surgeons, a panel of experts discussed a wide range of evolving controversies in the management of complicated diverticulitis. The presentations looked at treatment choices and the current evidence upon which to choose the correct course.

## Laparoscopic lavage

John Migaly, MD, FACS, kicked off the session by exploring the current evidence for laparoscopic lavage versus primary resection for Hinchey III diverticulitis. “Over the past two decades there has been a growing utilization of primary resection and reanastomoses with or without the use of ileostomy,” said Dr. Migaly, director of the general surgery residency program at Duke University, Durham, NC. “And most recently over the last 5 or 10 years, there’s been growing enthusiasm for laparoscopic lavage for Hinchey III diverticulitis. The enthusiasm for this procedure is based on [its accessibility] to all of us who operate on the colon in the acute setting.”

According to Dr. Migaly, the use of laparoscopic lavage for Hinchey III diverticulitis has been explored in three published randomized controlled trials to date: the LADIES trial, the DILALA trial, and the SCANDIV trial. The LADIES trial was a multicenter, parallel group, randomized, open-label study conducted at 34 teaching hospitals, including eight academic centers in Belgium, Italy, and the Netherlands (*Lancet*. 2015;386:1269-77). “In the planned data and safety analysis, the trial was suspended because of composite short-term adverse events: They were 39% for laparoscopic lavage and

19% for sigmoidectomy,” Dr. Migaly said. The researchers also found that 76% of lavage patients left the hospital without a second surgery and there was failure to control sepsis in 24% of the lavage group. This led the authors to conclude that lavage is not superior to sigmoidectomy.

The DILALA trial makes the best case for laparoscopic lavage, “but it doesn’t make a very good one,” he commented. The trial was conducted in nine surgical departments in Sweden and Denmark (*Ann Surg*. 2016;263[1]:117-22). Hinchey III pa-



**John Migaly, MD, FACS, is director of the general surgery residency program at Duke University, Durham, NC.**

tients were randomized 1:1 to laparoscopic lavage or the Hartmann procedure. The primary outcome was reoperations within 12 months. An early analysis of the short-term outcomes in 83 patients found similar 30-day and 90-day mortality and morbidity. Its authors concluded that laparoscopic lavage had equivalent morbidity and mortality compared with radical resection, shorter operative time, shorter time in the recovery unit, a shorter hospital stay, but no difference in the rate of reoperation.

“It was found to be safe and feasible,” Dr. Migaly said. One year

later, the researchers presented their 12-month outcomes and came to the same conclusions. Limitations of the data are that it was conducted in nine centers “but they enrolled only 83 patients, so it seems underpowered,” he said. “And there was no mention of the incidence of abdominal abscess requiring percutaneous drainage or episodes of diverticulitis. The data seem a little less granular than the LADIES trial.”

The SCANDIV trial is the largest study on the topic to date, a randomized clinical superiority trial conducted at 21 centers in Sweden and

Norway (*JAMA*. 2015;314[13]:1364-75). Of the 509 patients screened, 415 were eligible and 199 were enrolled: 101 to laparoscopic lavage, 98 to colon resection. The primary endpoint was severe post-operative complications within 90 days, defined as a Clavien-Dindo score of over 3.

The researchers found no difference in major complications nor in 90-day mortality between the two groups. The rate of reoperation was significantly higher in the lavage group, compared with the resection group (20.3% vs. 5.7%, respectively). Four sigmoid cancers were missed in the lavage group, and while the length of operation was significantly shorter in the lavage group, there were no differences between the two groups in hospital length of stay or quality of life.

A meta-analysis of the three randomized controlled trials that Dr. Migaly reviewed concluded that



## 'A reasonable conclusion would be that **data at this point does not support the use of laparoscopic lavage.**'

laparoscopic lavage, compared with resection, for Hinchey III diverticulitis increased the rate of total reoperations, the rate of reoperation for infection, and the rate of subsequent percutaneous drainage (J Gastrointest Surg 2017;21[9]:1491-99). A larger, more recent meta-analysis of 589 patients, including the three randomized controlled trials that Dr. Migaly discussed, concluded that laparoscopic lavage patients, compared with resection patients, had three times the risk of persistent peritonitis, intra-abdominal abscess, and emergency reoperative surgery. Therefore, "A reasonable conclusion would be that data at this point does not support the use of laparoscopic lavage," he said.

### Management of diverticular abscess

The next speaker, David J. Maron, MD, FACS, discussed what to do after successful percutaneous drainage of diverticular abscess: Wait and watch or operate? Diverticular abscess occurs in 10%-57% of patients. It can occur from a perforated diverticulum on the antimesenteric portion of the colon, a mesenteric abscess from a diverticulum in the mesentery, or a pyogenic lymph node. "These abscesses may or may not communicate with the colon itself," he said.

The initial procedure of choice for most patients is abscess drainage via CT-guided percutaneous drainage. "There are some patients who are not candidates for percutaneous drainage, [such as] if the abscess is not accessible to the radiologist, if the patient is anticoagulated, and if the patient requires emergent surgical intervention irrespective of the abscess," said Dr. Maron, a colorectal surgeon who practices at Cleveland Clinic Florida, Weston, FL. "There is also a question of cavity size. Most authors in the literature use a cut-off of 3-4 cm."

The goal is complete drainage of the abscess, and sometimes multiple catheters will be required. One study found that predictors of successful abscess drainage included having a well-defined, unilocular abscess. The success rate fell to 63% for patients who presented with more complex abscesses, including those that were



David J. Maron, MD, FACS, is a colorectal surgeon at Cleveland Clinic Florida, Weston, FL.

loculated, poorly defined, associated with a fistula, and contained feces or semisolid material (Dis Colon Rectum. 1997;40:1009-13).

The 2014 ASCRS Practice Parameters includes the recommendation that elective colectomy should typically be considered after the patient recovers from an episode of complicated diverticulitis, "but some of the data may be calling that into question," Dr. Maron said. In one series of 18 patients with an abscess treated percutaneously, 11 refused surgery and 7 had significant comorbidity (Dis Colon Rectum. 2014;57:331-6). Three patients died of a pre-existing condition and 7 of the 15 surviving patients had recurrent diverticulitis. Three underwent surgery and four were treated medically. The authors found no association between long-term failure and abscess location or previous episodes of diverticulitis.

In a larger study, researchers identified 218 patients who were initially treated with intravenous antibiotics and percutaneous drain (Dis Colon Rectum. 2013;56:622-6). About 10% of the patients required an urgent operation, while most of the other patients underwent elective resection, but 15% of patients did not undergo a subse-

quent colectomy. "Most of these patients were medically unfit to undergo surgery," he noted. Abscess location was more commonly paracolic than pelvic. The mean abscess size was 4.2 cm, and the drain was left in for a median of 20 days. The recurrence rate in this series was only 30%, but

none of the recurrences required surgery. The authors found that abscesses greater than 5 cm in size were associated with a greater risk of recurrence ( $P = .003$ ). They concluded that observation after percutaneous drainage is safe in selected patients.

Based on results from this and other more recent studies, Dr. Maron said that it remains unclear whether surgeons should wait and watch or operate after successful percutaneous drainage of diverticular abscess. The data are "not as robust as we'd like ... most of these are retrospective studies," he said. "There's quite a bit of inherent selection bias, and there is no standardization with regard to length of time of percutaneous drain, rationale for nonoperative management versus elective colectomy. What we do know is that there are some patients who can be managed safely

## Consider how stable patients are likely to be after the perforated segment is taken out. ‘What’s their overall health?’

without surgery. Unfortunately, there is no good algorithm I can offer you: Perhaps larger abscesses can portend a higher recurrence. I don’t think we’ll have a good answer to this until we



**Tracy L. Hull, MD, FACS, is staff surgeon in the department of colorectal surgery at the Cleveland Clinic, Cleveland, OH.**

perform a prospective randomized trial. However, we may learn some data from patients managed by peritoneal lavage and drain placement.”

### Emergency surgery for complicated diverticulitis

The next speaker, Tracy L. Hull, MD, FACS, offered tips on how to determine which procedure to perform at the time of emergency surgery for complicated diverticulitis: the Hartmann’s procedure, primary anastomosis, or primary anastomosis and proximal diversion. First, consider how stable patients are likely to be after the perforated segment is taken out. “What’s their overall health?” asked Dr. Hull, a staff surgeon in the department of colorectal surgery at the Cleveland Clinic, Cleveland, OH. “What are their tissues like? And what’s the degree of contamination?”

Next, consider how to perform the procedure: laparoscopic or open? “But again, you’re going to look at how stable your patient is, what your skill set

is, what equipment is available, and if the patient has had previous abdominal surgeries,” she advised. “In the traditional Hartmann procedure, you resect the perforated segment. You try not

to open any tissue planes that you don’t have to. You do just enough so you can bring up a colostomy; you close the rectum or you make a mucous fistula. The problem with this operation is that up to 80% of these patients have their colostomy closed. That is why there is all this controversy. If there is any question, this [procedure] is always the safest option; there’s no anastomosis.”

What about a performing resection and a colorectal anastomosis? This is done more commonly in the elective situation, “when things are perfect, when you have healthy tissue,” Dr. Hull said. “If you do it in the emergent situation you have to think to yourself, ‘Could my patient tolerate a leak?’ You won’t want to do this operation on a 72-year-old who’s on steroids for chronic pulmonary disease and has coronary artery disease, because if they had a leak, they’d probably die.”

The third procedural option is to resect bowel (usually sigmoid) with colorectal anastomosis and diversion (loop ileostomy). “This is always my preferred choice,” Dr. Hull said. “I always am thinking, ‘Why can’t I do this?’ The reason is, closure of ileostomy is much easier than a Hartmann reversal, and 90% of these patients get reversed.” In a multicenter trial conducted by Swedish researchers, 62 patients were randomized to Hart-

mann’s procedure versus primary anastomosis with diverting ileostomy for perforated left-sided diverticulitis (Ann Surg. 2012;256[5]:819-27). The mortality and complications were similar, but the number of patients who got their stoma reversed was significantly less in the Hartmann’s group, compared with the primary anastomosis group (57% vs. 90%, respectively), and the serious complications were much higher in the Hartmann’s group (20% vs. 0). She cited an article from the World Journal of Emergency Surgery as one of the most comprehensive reviews of the subject.

A systematic review and meta-analysis of 14 studies involving 1,041 patients concluded that “colon resection with primary anastomosis in terms of lower mortality rate and postoperative stay should be interpreted with caution,” due to variable quality of individual studies and the presence of patient selection bias (Int J Colorectal Dis. 2013;28:447-57). Another systematic review and meta-analysis of 4,062 patients found that the primary resection-anastomosis technique is better than Hartmann’s for all considered outcomes (J Surg. 2016;12[2]:43-9).

So what is a surgeon to do? For an anastomosis after resection, “consider patient factors: Are they stable?” Dr. Hull said. “What are their comorbid conditions? You have to think, ‘What is my preference? Am I comfortable putting this back together?’ But a primary anastomosis is feasible, even in the acute setting with or without diverting ileostomy. The laparoscopic approach is typically preferred, but if that’s not in your armamentarium, the open [approach] is just fine. You should always perform a leak test. You can also do on-table colonic lavage if feasible, especially if you have a large stool burden.”

None of the speakers reported having financial disclosures.

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# Cutting-edge research explores gut microbiome

BY MICHELE G. SULLIVAN

Frontline Medical News

**SAN DIEGO** – Surgery appears to stimulate abrupt changes in both the skin and gut microbiome, which in some patients may increase the risk of surgical site infections and anastomotic leaks. With that knowledge, researchers are exploring the very first steps toward a presurgical microbiome optimization protocol, Heidi Nelson, MD, FACS, said at the annual Clinical Congress of the American College of Surgeons.

It's very early in the journey, said Dr. Nelson, the Fred C. Andersen Professor of Surgery at Mayo Clinic, Rochester, MN. And it won't be a straightforward path: The human microbiome appears to be nearly as individually unique as the human fingerprint.

Dr. Nelson comoderated a session exploring this topic with John Alverdy, MD, FACS, of the University of Chicago, Chicago, IL. The panel discussed human and animal studies suggesting that the stress of surgery, when combined with subclinical ischemia and any baseline physiologic stress (chronic illness or radiation, for example) can cause some commensals to begin producing collagenase – a change that endangers even surgically sound anastomoses.

Abdominal surgery seems to be a tipping point for changes in some *Enterococcus* species, causing them to express a collagen-destroying phenotype, said Ben Shogan, MD. He has completed a series of animal studies, capped with some human data, which pinpointed a strong association of these altered forms of normal microflora with anastomotic leaks.

“It's well known that bacteria can change their function in response to host stress,” said Dr. Shogan, a colorectal surgeon at the University of Chicago. “They recognize these factors and

change their entire function. In our work, we found that *Enterococcus* began to express a tissue-destroying phenotype in response to subclinical ischemia related to surgery.”

The pathogenic flip doesn't occur unless there are a couple of predisposing factors, he theorized. “There have to be multiple stresses involved. These could include smoking, steroids, obesity, and prior exposure to radiation – all

gery. Skin sampling was performed before and after opening, with additional postoperative skin samples taken daily while the patient was in the hospital recovering. Dr. Yeh had DNA/RNA data on 431 samples taken from this group.

Preoperatively, the species diversity of the skin microbiome was similar on both sites. On the day of surgery, diversity in both sites decreased,



Heidi Nelson, MD, FACS, is the Fred C. Andersen Professor of Surgery at Mayo Clinic, Rochester, MN.

things that we commonly see in our colorectal surgery patients. But when the right situation develops, we can see a proliferation of collagen-destroying bacteria that predispose to leaks.”

The skin microbiome is altered as well, with areas around abdominal incisions beginning to express gut flora, which increase the risk of a surgical site infection, said Andrew Yeh, MD, a general surgery resident at the University of Pittsburgh, Pittsburgh, PA.

He presented data on 28 colorectal surgery patients, detailing perioperative changes in the chest and abdominal skin microbiome. All of the subjects were adults undergoing colon resection who had not been on any antibiotics at least 1 month before sur-

probably because of the presurgical antiseptic shower routine employed. On postop day 1 and 2, the chest microbiome recovered its diversity, while the abdominal population stayed suppressed. By postop day 3, however, the abdominal microbiome had bloomed, exceeding both its original population and that of the chest skin.

“We saw increases in *Staphylococcus* and *Bacteroides* on the skin – normally part of the gut microflora – in relative abundance, while *Corynebacterium*, a normal constituent of the skin microbiome, had decreased.”

These are all very early observations, though, and the surgical community is nowhere near being able to make any

specific presurgical recommendations to optimize the microbiome, or post-surgical recommendations to manage it, said Neil Hyman, MD, FACS, professor of surgery at the University of Chicago, Chicago, IL.

While it does appear that good bacteria “gone bad” are associated with anastomotic leaks, he agreed that the

right constellation of factors has to be in place for this to happen, including “the right bacteria [*Enterococcus*], the right virulence genes [collagenase], the right activating cues [long operation, blood loss], and the wrong microbiome [altered by smoking, chemotherapy, radiation, or other chronic stressors].”

None of the presenters had any fi-

nancial disclosures. “I think it’s safe to say that developing collagenase-producing bacteria at an anastomosis site is a bad thing, but the individual genetic makeup of every patient makes any one-size-fits-all protocol approach to treatment really problematic,” Dr. Hyman said.

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## SBO in a bariatric patient can mean internal herniation

BY MICHELE G. SULLIVAN

*Frontline Medical News*

**SAN DIEGO** – You get a call from the emergency department at 3:00 a.m. A 48-year-old woman is presenting with fever, nausea, vomiting, and left upper quadrant pain. And the patient says she had a gastric bypass procedure 3 years ago.

Time to panic? Not necessarily, but things can, and occasionally do, go bad for these patients, even if they have had a long-stable bypass, Jennifer Choi, MD, FACS, said in a video interview at the annual Clinical Congress of the American College of Surgeons.

“We do have to remember that our bariatric surgery patients can develop all of the same kinds of problems that anyone else can,” said Dr. Choi, associate professor of clinical surgery, Indiana University School of Medicine, Indianapolis, IN. “Appendicitis, diverticulitis, abdominal wall hernias, and other common things do happen.”

In her book, though, a patient with a gastric bypass who presents with a combination of small-bowel obstruction and pain has an internal herniation until proven otherwise.

“The symptoms can be subtle, and they can either have been building for several weeks or have an acute onset,” Dr. Choi said. These can include nausea, dry heaves, bloating, or nonbilious vomiting. Pain is typically located in the left upper quadrant or mid-back, especially if the hernia is located at one of the two most common spots:

Petersen’s defect. This is the point where the biliopancreatic loop tends to slip under the alimentary loop and become trapped. Imaging will show a typical swirling of blood vessels

scopically, but said that some surgeons prefer an open approach, which is a perfectly sound option.

“The key to a successful repair is to start at the ileocecal valve, because



Jennifer Choi, MD, FACS, is associate professor of clinical surgery at the Indiana University School of Medicine, Indianapolis, IN.

around the herniation, accompanied by dilated small bowel at the point of obstruction.

At the other common herniation point, the site of the jejunojunostomy, the alimentary loop can slip under the biliopancreatic loop. On imaging, the jejunum will be seen in the upper right quadrant.

Both of these can be surgical emergencies, Dr. Choi said. “This needs an operation sooner, rather than later. It needs to be reduced and repaired.”

She typically performs this laparo-

it is consistent and fixed, and run the bowel from distal to proximal to reduce the internal hernia. Then close the defect with a permanent suture,” she said.

Chylous ascites is almost always present in these cases because the herniation traumatizes the lymphatic system, Dr. Choi added. “It doesn’t all always have to be removed at the time of surgery, but just be aware that this is definitely something we do see.”

Dr. Choi had no financial disclosures.

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# Antibiotics found to limit metabolic benefits of bariatric surgery

**BY DOUG BRUNK**

*Frontline Medical News*

**SAN DIEGO** – Antibiotic-associated dysbiosis diminished or eliminated the metabolic benefits of vertical sleeve gastrectomy, results from a mouse study demonstrated.

The finding raises the question of whether patients with suboptimal



**DR. JAHANSOUZ**

outcomes following vertical sleeve gastrectomy may benefit from microbial modulation.

“More work is needed to clarify the role of the microbiome as it pertains to bariatric surgery,” lead study author Cyrus Jahansouz, MD, FACS, said in an interview in advance of the annual Clinical Congress of the American College of Surgeons. “However, it appears that factors that alter the gut microbial composition following surgery, such as antibiotics, can potentially lead to failure of metabolic improvement following surgery.”

According to Dr. Jahansouz of the University of Minnesota Microbiota Transplantation Program, Minneapolis, MN, mechanisms mediating metabolic improvement following bariatric surgery remain incompletely understood.

“Outcomes are also somewhat variable: As many as 40%-75% of patients regain weight in the years following nadir of weight loss,” he said. “Human studies have shown an acute and sustained shift in the gut microbiota, and an altered bile acid profile. Bile acids increase following surgery.”

Meanwhile, mice deficient in Farnesoid X-receptor (FXR) and Takeda G protein-coupled Receptor 5 (TGR5) do not experience metabolic improvement following bariatric surgery; the composition of the microbiome can significantly impact the composition of bile acids.

“By altering the postsurgical composition of mice following bariatric surgery, we eliminate the metabolic benefits of surgery, possibly by altering bile acid profiles,” Dr. Jahansouz said.

For the trial, diet-induced obese mice were randomized to vertical sleeve gastrectomy (VSG) or sham surgery, with or without exposure to antibiotics that selectively suppress mainly gram-positive (fidaxomicin, streptomycin) or gram-negative (ceftriaxone) bacteria on postoperative days 1-4. The researchers characterized fecal microbiota before surgery and on postoperative days 7 and 28. Mice were metabolically characterized on postoperative days 30-32 and euthanized on postoperative day 35.

Mice in the VSG group experienced weight loss and shifts in the intestinal microbiota composition, compared with those in the sham surgery group.

“Antibiotic exposure resulted in sustained reductions in alpha (within sample) diversity of microbiota and shifts in its composition,” the researchers wrote in their abstract. “Different antimicrobial specificity of antibiotics led to functionally distinct physiologic effects. Specifically, fidaxomicin and streptomycin markedly altered hepatic bile acid signaling and lipid metab-

olism, while ceftriaxone resulted in greater reduction in the expression of key antimicrobial peptides.

“However, VSG mice exposed to antibiotics, regardless of their specificity, had significantly increased subcutaneous adiposity and impaired glucose homeostasis without changes in food intake, relative to control mice,” the investigators noted.

Dr. Jahansouz said that he was surprised by the fact that all three antibiotics tested, no matter their specificity in gut bacteria eliminated, resulted in significantly diminished weight loss and metabolic improvement following vertical sleeve gastrectomy in the mouse model. He acknowledged that translating the findings from mice to humans is a key limitation of the analysis.

“There are fundamental physiologic differences between mice and humans that need consideration in all murine models of metabolic disorders,” he

**‘More work is needed to clarify the role of the microbiome as it pertains to bariatric surgery.’**

said. “Therefore, it is critical that insights gained from these models are followed up in human studies.”

The study was funded by the American Diabetes Association and a Minnesota Discovery, Research and Innovation Economy grant from the University of Minnesota. Dr. Jahansouz reported having no financial disclosures.

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# DiaRem score predicts remission of T2D

BY DOUG BRUNK

Frontline Medical News

**SAN DIEGO** – The DiaRem score was effective in predicting remission of type 2 diabetes following laparoscopic sleeve gastrectomy, results from a single-center study showed.

Developed by clinicians at Geisinger Clinic and presented at the annual Clinical Congress of the American College of Surgeons, the DiaRem is a simple score that helps predict remission of type 2 diabetes in severely obese subjects with metabolic syndrome who undergo Roux-en-Y gastric bypass surgery (*Lancet Diabetes Endocrinol.* 2014;2[1]:38-45). Using 259 preoperative clinical variables, four (use of insulin, age, HbA<sub>1c</sub>, and type of antidiabetic medication) were sufficient to develop an algorithm that produces a type 2 diabetes remission (DiaRem) score over 5 years. The DiaRem score spans from 0 to 22 and is divided into five groups corresponding to five probability ranges for type 2 diabetes re-



DR. ROSENTHAL

mission: 0-2 (88%-99%), 3-7 (64%-88%), 8-12 (23%-49%), 13-17 (11%-33%), 18-22 (2%-16%). In an effort to assess the feasibility of using the DiaRem score to predict remission of type 2 diabetes after laparoscopic sleeve gastrectomy, Raul J. Rosenthal, MD, FACS, and his associates conducted a 4-year retrospective review of 162 patients at the Cleveland Clinic Florida, Weston, FL. “This is the first report that uses the DiaRem score for similar subjects that underwent sleeve gastrectomy instead,” Dr. Rosenthal said in an interview in advance of the meeting.

The patients’ mean body mass index was 43.2 kg/m<sup>2</sup>, 33% had a preoperative hemoglobin A<sub>1c</sub> level between 7% and 8.9%, and 22% had an HbA<sub>1c</sub> of 9%. All had a minimum follow-up of 1 year after their laparoscopic sleeve gastrectomy and 67% had follow-up of 3 years or more, said Dr. Rosenthal, professor and chairman of the department of general surgery at Cleveland Clinic Florida.

A total of 58% of patients achieved complete remission of type 2 diabetes,

6% achieved partial remission, and 36% had no remission. Specifically, 96% had DiaRem scores between 0 and 2; 92% had scores between 3 and 7; 50% had scores between 8 and 12; 20% had scores between 13 and 17; and 24% had scores between 18 and 22. “We were pleased to find out that 58% of patients that underwent sleeve gastrectomy achieved complete remission of type 2 diabetes mellitus,” said Dr. Rosenthal, who also directs the clinic’s bariatric and metabolic institute. The researchers also found that 84% of patients achieved remission in 12 months and the rest in 3 years. They observed medication reduction in 93% of the patients.

“Sleeve gastrectomy is a valid bariatric-metabolic procedure in patients with type 2 diabetes,” Dr. Rosenthal concluded. “The main limitation of this study is that it is a retrospective one, and we do not have a control group of patients that underwent gastric bypass or medical treatment to compare.”

The findings were presented at the meeting by Emanuele Lo Menzo, MD. Dr. Rosenthal disclosed that he is a consultant for Medtronic. Dr. Lo Menzo reported having no financial disclosures.

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# Hispanics trail blacks, whites in bariatric surgery rates

BY RANDY DOTINGA

Frontline Medical News

**SAN DIEGO** – A study of procedures at academic centers provides evidence that obese Hispanics in the United States undergo bariatric surgery at a much lower rate than whites and blacks. It also reveals marked regional variations in overall weight-loss surgery.

“Our findings do suggest that severely obese Hispanics are utilizing bariatric surgery much lower than other ethnic groups,” said study coauthor Ninh T. Nguyen, MD, FACS, chair of the de-

partment of surgery at the University of California Irvine Medical Center, Orange, CA, in an interview. “Our research does not specifically address the reasons for this gap in the delivery of care. Further research will need to be done to understand the reasons.”

Dr. Nguyen presented the findings at the annual Clinical Congress of the American College of Surgeons. According to Dr. Nguyen, the researchers undertook the study to better understand how bariatric surgery is delivered across ethnicities and geographic regions in the United States.

The researchers analyzed statistics from the Vizient health care performance database for the years 2013-2015. They focused on patients at about 120 academic centers who underwent 73,119 laparoscopic sleeve gastrectomy, laparoscopic Roux-en-Y gastric bypass, or laparoscopic adjustable gastric banding procedures. The patients were stratified by race and region.

Researchers found that bariatric procedures were performed at a much higher rate in the Northeast academic centers (2.21 per 1,000 obese persons), compared with the Midwest (0.73), South



(0.50), and West (0.33).

The rates for blacks and whites were fairly similar in the Northwest (2.02 and 2.35 bariatric procedures per 1,000 obese persons, respectively), the South (0.59 and 0.63, respectively) and the West (0.45 and 0.43, respectively). There was a wider gap in the Midwest, with whites at 0.69 and blacks at 1.07.

Across the country, however, obese Hispanics were less likely than persons of the other two races to undergo



DR. NGUYEN

weight-loss surgery. The gap was fairly small in the Northeast, where 1.74 per 1,000 obese Hispanics underwent weight-loss surgery, compared with rates of 2.02 and 2.35 among whites and blacks, respectively. But the disparity was much larger in the other regions, with rates at 0.14 in the West, 0.11 in the South, and 0.33 in the Midwest, compared with rates from 0.43 to 1.07 among blacks and whites. The reasons for the surgery gap

are unknown. Dr. Nguyen pointed to several possible explanations: “lack of education of obesity as a disease by the primary care providers and the need for referral to a bariatric surgeon for patients with body mass index greater than 40 kg/m<sup>2</sup> or 35 kg/m<sup>2</sup> with obesity-related comorbidities; poor understanding of the benefits of bariatric surgery and its low risk; lack of understanding of the urgency for treatment by the patient and provider; and hurdles in obtaining coverage for the operation by insurers.” The study authors report no relevant disclosures. [acssurgerynews@frontlinemedcom.com](mailto:acssurgerynews@frontlinemedcom.com)

## Concomitant hiatal hernia repair & LSG common

BY DOUG BRUNK

*Frontline Medical News*

**SAN DIEGO** – Concomitant hiatal hernia repair is significantly more common at the time of laparoscopic sleeve gastrectomy, compared with laparoscopic Roux-en-Y gastric bypass, according to a retrospective analysis.

“GERD [gastroesophageal reflux disease] is common in patients with a high body mass index,” lead study author Dino Spaniolas, MD, said at the annual Clinical Congress of the American College of Surgeons. “In fact, 35%-40% of patients who undergo bariatric surgery are diagnosed with a hiatal hernia, and the majority of them are diagnosed during surgery.”

Dr. Spaniolas, the associate director of the Stony Brook University Bariatric and Metabolic Weight Loss Center, New York, NY, noted that, while the popularity of sleeve gastrectomy has progressively increased over time nationwide, the effect of different bariatric procedures on GERD-related outcomes after bariatric surgery is not that well understood. “A lot of studies have assessed GERD objectively or subjectively before and after surgery,” he said. “Gastric bypass mostly has a positive effect, but the sleeve gastrectomy results are less clear.”

In an effort to assess the differences in practice patterns in the performance of hiatal hernia repair during laparoscopic sleeve gastrectomy (LSG) and laparoscopic Roux-en-Y gastric bypass (LRYGB), the researchers evaluated the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program public use files from 2015.

In all, 130,686 patients were included in the study. Their mean age was 45 years, 79% were female, 75% were white, and their mean body mass index was 45.7 kg/m<sup>2</sup>. Most (70%) underwent LSG, while the remainder underwent LRYGB.

At baseline, a greater proportion of the LRYGB patients had a history of GERD than did LSG patients (37.2% vs. 28.6%, respectively; *P* less than .0001). They were also more likely to have hypertension (54.1% vs. 47.9%; *P* less than .0001), hyperlipidemia (29.9% vs. 23.2%; *P* less than .0001), and diabetes (35.5% vs. 23.3%; *P* less than .0001). Overall, about 15% of patients had a concomitant hiatal hernia repair in addition to their bariatric surgery.

Next, the investigators found what Dr. Spaniolas termed “the GERD paradox”: Although the LRYGB patients were more likely to have GERD before surgery, they were much less likely

to undergo a hiatal hernia repair in addition to their bariatric procedure. Specifically, concomitant hiatal hernia repair was performed in 21% of LSG patients, compared with only 10.8% of LRYGB patients (*P* less than .0001). After investigators controlled for baseline BMI, preoperative GERD, and other patient characteristics, they found that LSG patients were 2.14 times more likely to undergo concomitant hiatal hernia repair, compared with LRYGB patients.

“This is a retrospective review, but nevertheless, I think we can conclude that these findings suggest that concomitant hiatal hernia repair is significantly more common after LSG, compared with LRYGB, despite having less GERD preoperatively,” Dr. Spaniolas said. “This suggests that there is a nationwide difference in the intraoperative management of hiatal hernia based on the type of planned bariatric procedure. This practice pattern needs to be considered while retrospectively assessing GERD-related outcomes of bariatric surgery in the future.”

Dr. Spaniolas disclosed that he has received research support from Merck and that he is a consultant for Mallinckrodt. [dbrunk@frontlinemedcom.com](mailto:dbrunk@frontlinemedcom.com)

# Shaping practice: Z1071 continues to redefine axillary node management

BY MICHELE G. SULLIVAN

*Frontline Medical News*

**SAN DIEGO** – A 2013 breast cancer trial is changing the way lymph nodes are managed in women with node-positive disease who have an axillary pathologic complete response to neoadjuvant chemotherapy.

Emerging additional data support the initial theory of the American College of Surgeons Oncology Group (ACOSOG) Z1071 trial, said Judy C. Boughey, MD, FACS, at the Clinical Congress of the American College of Surgeons: Performing sentinel lymph node surgery after chemotherapy is an acceptable alternative for some women. This change in practice could bestow a profound long-term benefit on the approximately 40% of patients, who have an axillary pathologic complete response after neoadjuvant chemotherapy (NAC) – patients who otherwise might undergo an unnecessary axillary node exploration, which can lead to higher risk of lymphedema, said Dr. Boughey, head of surgical research at the Mayo Clinic, Rochester, MN.

Postchemotherapy sentinel node assessment isn't right for every patient, but it's a conversation worth having for those with the best response to neoadjuvant chemotherapy because they might be suitable candidates, Dr. Boughey said in an interview.

"About 20% of patients who are treated with chemotherapy for their breast cancer receive the chemotherapy prior to surgery. Of those who do receive neoadjuvant chemotherapy, probably half could benefit from this approach," she said. "Lymphedema after axillary dissection is one of the situations patients are most concerned about. This approach is a great one when patients have a good chemother-

apy response, and we want to reliably reassure ourselves that there's no disease left in the axilla without automatically removing all the nodes. Of course, if there is any remaining disease in any of the lymph nodes, the current standard is still to remove all the nodes. This approach, however, optimizes manage-



**Judy C. Boughey, MD, FACS, is head of surgical research at the Mayo Clinic, Rochester, MN.**

ment for patients who have the best response to chemotherapy."

## Neoadjuvant therapy success

Prechemotherapy nodal exploration was routine a decade or so ago and is what many surgeons were most comfortable with, Dr. Boughey said. "We know the false-negative rate, and chemotherapy doesn't interfere with axillary staging. However, it means patients have to go through two surgeries, and, although the chemotherapy does not interfere with the procedure, if any of the sentinel nodes are positive and an axillary dissection is performed at the same setting, then systemic therapy will be delayed. However, most

importantly, when the sentinel node is removed prior to chemotherapy, we lose the ability to assess axillary response to chemotherapy – which correlates with survival."

The biggest drawback of axillary dissection is its potential for lifelong morbidity from lymphedema. "Women know about this. They worry about this, and they want to avoid it if at all possible," Dr. Boughey said.

More effective, targeted chemotherapeutic agents have resulted in higher rates of eradication of disease with neoadjuvant treatment. So this leads to the question: Why not reassess nodes after treatment, when these drugs have had a chance to work? Doing so reduces the one-size-fits-all prescription of axillary dissection and, thus, the number of women with lasting adverse events.

## Some early data supported this theory

In 2009, researchers at the MD Anderson Center reported that sentinel node surgery after chemotherapy in patients with node-negative breast cancer resulted in fewer positive sentinel nodes and decreased unnecessary axillary dissections. Node identification rates were about 98% whether the surgery came before or after treatment. The false-negative rate hovered around 5%. And there were significantly fewer axillary dissections with posttreatment surgery: 20% vs. 36% in women with T2 disease and 30% vs. 51% in those with T3 disease. Importantly, holding off on the surgery didn't lead to higher local-regional failure rates or survival among the 3,746 women treated during 1994-2007.

The American College of Surgeons Oncology Group Z1071 trial was designed to explore this question in patients with node-positive breast cancer.



The Z1071 trial enrolled 756 women who had clinical T0-T4, N1-N2, M0 breast cancer and received neoadjuvant chemotherapy. Patients underwent both sentinel lymph node surgery and axillary lymph node dissection following chemotherapy. The primary endpoint was the false-negative rate of sentinel lymph node surgery after chemotherapy in women who presented

nel node surgery, then the false-negative rate dropped down to about 7%,” Dr. Boughey said. The comparator group pointed out the value of using a clip. The false-negative rate was 13% in patients who didn’t have a clip placed and 19% in the patients whose clip wasn’t retrieved until axillary dissection.

The results of Z1071 and its sub-analyses have popularized nodal clip-

safe, with a false-negative rate around 8%, but also that it could have eliminated complete axillary dissection in about 30% of the cohort.

The study enrolled 153 women with biopsy-proven node-positive breast cancer (T0-3, N1-2) who underwent both sentinel node surgery and complete nodal dissection. Immunohistochemistry of the retrieved sentinel nodes was mandatory, and the presence of any tumor cells in the sentinel node rendered it positive.

The sentinel node retrieval rate was 88%, and the false-negative rate, 8.4%. The study also employed dual tracers of isotope and blue dye in a majority of patients; this was associated with a threefold decrease in the false-negative rate in those patients, dropping it to around 5%. “By using sentinel node biopsy after NAC, axillary node dissection could potentially be avoided in at least 30% of patients who present with node-positive breast cancer,” the study’s team concluded.

## ‘For carefully selected patients with robust NAC response, a postchemotherapy assessment can accurately assess nodal disease.’

with cN1 disease and had at least two sentinel nodes resected; a rate of 10% lower was considered acceptable and would justify the approach.

Of the entire cohort, 40% had a complete pathologic nodal response rate. The sentinel node identification rate was nearly 93%. The false-negative rate among the 525 women with at least two positive sentinel nodes identified and resected, however, was 12.6% – short of the 10% rate investigators needed to deem the study a success, Dr. Boughey said.

But there were some positive findings in subgroup analyses. Among women who had nodes identified with a dual agent mapping (both blue dye and radioactive clipping), the false-negative rate dipped to 10.8%. It was just 9% in those who had more than two sentinel nodes identified.

A recent subanalysis of the Z1071 trial further refined these data. It looked at 170 of the patients with cN1 disease (32%) who had had a clip placed in the positive lymph node at the time of percutaneous biopsy and compared false-negative rates among them with rates in the 355 patients who were not clipped.

“When we looked at them, if the clipped node came out during the senti-

ping, Dr. Boughey said. “When we ran Z1071, clipping wasn’t commonly being performed, but there has been a huge uptake in it now.”

### Confirmatory data

Other recent studies confirm the feasibility of this approach in women who have clinically negative nodes after NAC.

In 2013, the German study SENTINA (sentinel lymph node biopsy in patients with breast cancer before and after neoadjuvant chemotherapy) explored the false-negative rate in women who had sentinel node biopsy before or after neoadjuvant chemotherapy. Overall, it found an unacceptably high false-negative rate of 14% in women with node-positive disease who converted to clinically negative nodal status. However, when the analysis was limited to those cases with at least two sentinel nodes, the false-negative rate was less than 10%, once more suggesting a potential role for sentinel node surgery after neoadjuvant chemotherapy.

In 2015, the Sentinel Node Biopsy Following Neoadjuvant Chemotherapy (SN FNAC) study highlighted the potential effect of sentinel node surgery after NAC. The prospective study showed not only that the strategy was

### Long-term consequences?

It’s increasingly clear that, for carefully selected patients, with robust NAC response, a postchemotherapy assessment can accurately assess nodal disease – especially if dual tracers are employed, several sentinel nodes examined, and the biopsy-proven positive node is resected. What isn’t clear yet is the long-term effect of this strategy, Dr. Boughey said.

“Five years ago, when Z1071 was first being reported, I would discuss it in terms of the controversy, and give the pros and cons,” she said. “But now that we have more information about this strategy under our belts, I feel much more confident. However, we still do not have information on patients with node-positive disease who have been treated with sentinel node only after neoadjuvant chemotherapy and followed for 5 or 10 years. That’s the piece we just can’t have, without time.”

Dr. Boughey had no relevant financial disclosures.

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# Pain management alert: Bariatric surgery ups risk of new, persistent opioid use

BY RANDY DOTINGA

Frontline Medical News

**SAN DIEGO** – Bariatric patients are nearly 50% more likely than general surgery patients to start using opioids after their procedures and continue taking the painkillers for a year, a new study finds. The study was presented at the annual Clinical Congress of the American College of Surgeons.



DR. CARLIN

It's not clear why bariatric patients are at higher risk of continued opioid use, nor whether they are more likely to become addicted. Still, bariatric patients are a target for "intervention, enhanced education, early referral to specialists, protocols minimizing inpatient and outpatient narcotics, opioid-free operations, system-based interventions and prescribing guidelines," said study lead author Sanjay Mohanty, MD, a surgery resident with the Henry Ford Health System, Detroit, MI, who spoke at the meeting.

There's been little research into opioid use among bariatric patients, said Dr. Mohanty. In 2013, a retrospective study found that 8% of 11,719 bariatric patients were chronic opioid users, and more than three-quarters of those

remained so after 1 year. However, that study was completed in 2010, before the height of the opioid epidemic (JAMA. 2013;310[13]:1369-76).

More recently, a 2017 study found that opioid use among 1,892 bariatric patients who weren't using at baseline grew from 5.8% at 6 months to 14.2% at 7 years. The study tracked patients until January 2015 (Surg Obes Relat Dis. 2017 Aug;13[8]:1337-46).

Opioid use after bariatric procedures is common, said the current study co-author Arthur M. Carlin, MD, FACS, vice-chairman of the department of surgery and division head of general surgery with Henry Ford Health System, who spoke in an interview. Dr. Carlin, who is also professor of surgery at Wayne State University School of Medicine, Detroit, MI, said that he's seen patients routinely take morphine via self-controlled drip in the hospital and be prescribed 20-30 pills to take home.

For the new study, researchers tracked 14,063 bariatric patients in the Michigan Bariatric Surgery Collaborative, a group of Michigan hospitals and health systems, from 2006 to 2017.

Of these patients, 73% were opioid-naïve at baseline and 27% were opioid users. At 1 year after procedure, overall use dropped slightly to 24%. However, 905 patients – 8.8% of the initial opioid-naïve group – were new and persistent opioid users.

According to Dr. Carlin, this is almost 50% higher than in patients after general surgical procedures.

These users were significantly more likely to be black (odds ratio 1.67), less likely to have private insurance (OR 0.76), more likely to have income under \$25,000 (OR 1.43), and more likely to have a mobility limitation (OR 1.78).

The researchers also found evidence linking a higher risk of new and persistent opioid use to lack of unem-

ployment, depression, musculoskeletal disorders, tobacco use, and gastric bypass procedures.

Why might bariatric patients in general be more susceptible to new and persistent opioid use? "We don't know the answer," Dr. Carlin said. "Maybe there's some addiction transfer. Or maybe it's something physiologic. We're doing an operation on the gut, and that could have an impact on absorption."

Dr. Carlin said that he's seen **patients routinely take morphine via self-controlled drip in the hospital** and be prescribed 20-30 pills to take home.

As for solutions, Dr. Carlin says "prescribe less, prescribe differently, be more patient-specific. We're looking at different modalities to treat the pain such as nerve blocks during surgery, anti-inflammatories, and muscle relaxants."

And if patients aren't using opioids in the hospital and not having that much pain, he said, physicians don't send any pills home with them.

The next steps should include research into links between opioids and perioperative complications and surgical outcomes, the researchers suggested.

Dr. Carlin and Dr. Mohanty report no relevant disclosures.

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# Inside the Las Vegas crisis: Surgeons answered the call

**BY RANDY DOTINGA**

*Frontline Medical News*

**SAN DIEGO** – Long before the horrific night of Oct. 1, the three trauma centers in the Las Vegas region were ready for a mass casualty event. It was understood among hospital leaders that the city could be the scene of a disaster that would demand a coordinated response from the city’s health care centers.

Then came the deadliest mass shooting in modern American history, and the extensive preparation turned out to have been well worth the time and effort, according to four trauma surgeons who spoke about the medical response to the massacre during a session at the annual Clinical Congress of the American College of Surgeons.

The key is “training, training, training,” said Deborah A. Kuhls, MD, FACS, medical director of the trauma intensive care unit at University Medical Center of Southern Nevada, Las Vegas, NV. Or as her colleague John Fildes, MD, FACS, medical director of the trauma



**DR. KUHLIS**

center, put it, “You plan your response, you practice your response, and you execute your response. Collaboration is what makes these things happen.”

The shooting was unusual in a variety of ways, including the fact that it occurred at a site “that’s almost strategically surrounded by trauma centers,” Dr. Fildes said.

UMC has Nevada’s only Level I trauma center, while Sunrise Hospital & Medical Center has a Level II center.

center, put it, “You plan your response, you practice your response, and you execute your response. Collaboration is what makes these things happen.”

The shooting was unusual in



COURTESY UMC

**Staff of University Medical Center of Southern Nevada operationalized a minutely planned and practiced disaster plan.**

St. Rose Dominican Siena Campus-Siena Campus, in the neighboring city of Henderson has a Level III. The other closest verified trauma center is nearly 500 miles away in Reno, NV

While the trauma centers received hundreds of patients, “every hospital in [Las Vegas] Valley saw patients from this event,” Dr. Fildes said. “There were 22,000 people on scene, and when the shooting started, they extricated themselves and went to safety by one means or another. Some drove home to their neighborhood and sought care there. Some drove until they found an acute care facility, whether it was a trauma center or not. Others were transported by Uber or taxi.”

Wounded patients also walked until they found emergency rooms, he said, and some patients didn’t seek care until they’d driven themselves home to adjacent states like Utah and California.

According to Dr. Fildes, Las Vegas-area hospitals kept in touch with each other by phone, and UMC accepted some transfers from other hospitals.

“We were ready for transfers,” he said, “and we expected more than we got.”

The trauma centers faced a variety of challenges from confusion and false reports to overcrowding and a media onslaught.

Sunrise turned its endoscopy suite into a temporary morgue and sent patients with minor injuries to the pediatric space. At UMC, less critical patients were triaged to the hallway, a postanesthesia care unit, and an ambulatory surgery unit. At St. Rose Dominican Hospital, a community hospital that sees few penetrating trauma injuries, doctors managed to treat dozens of patients with serious gunshot wounds.

“We knew there was a strong possibility this would happen where we live, so we practiced this,” said Sean Dort, MD, FACS, medical director of the St. Rose Dominican’s trauma center. “We have talked and walked through it.”

Indeed, all hospitals in the Las Vegas area take part in regional disaster drills twice a year, and UMC runs other drills during the year, such as an active shoot-



Representatives of the #VegasStrong team at Sunrise Hospital & Medical Center rallied in the aftermath of the unprecedented mass casualty event.

er drill, Dr. Fildes said in an interview. Together, the three hospitals treated hundreds of patients. Three weeks later, a handful were still inpatients.



DR. FILDES

In the aftermath, Las Vegas trauma surgeons are focusing on missed opportunities and lessons learned.

Dr. Fildes

said more attention needs to be paid to how to handle situations when tides of patients bring themselves to the emergency department. “The issue of self-delivery has to be reconsidered, restudied,” he said, and he suggested that it may be a good idea to equip taxis with bleeding control kits.

He said his hospital heard a presentation from a trauma team member who had treated patients during the Pulse nightclub disaster in Orlando last year. “One of their lessons learned was to position all gurneys and wheelchairs near the intake triage area,” he

said. “We did that, and it improved the movement of patients to areas of the hospital that were matched to the intensity of care that they required.”

At Sunrise, the flood of unidentified patients overwhelmed the hospital’s trauma patient alias system, and some names were repeated. “In the future, I think a better naming system should be employed,” said trauma surgeon Matthew S. Johnson, MD.

To that end, he said, the hospital has begun examining how hurricanes are named in order to create an improved system of naming trauma patients who arrive without personal identification.

Of lessons learned, St. Rose Dominican Hospital’s Dr. Dort said that it is crucial to ignore the “noise” – rumors and anecdotes – amid the crisis. “The only reality is what’s in front of you.”

And when it comes to planning, he said, there’s no room for excuses or resistance. “Everyone knew their role,” he said. “You can’t start figuring this out when it happens. You have to push people through it when they don’t want to do it, and they’re busy.”

Dr. Fildes said that the UMC staff

## A resident’s experience

I was at home and in bed with a book when my phone went off at 10:22 p.m. on that Sunday. It was a text message from one of my fellow residents who was on call at Sunrise. She wrote: “Mass casualty incident. Shooting on the Strip. You have to come now.”

I threw on scrubs and drove across town as fast as I could. The back side of the hospital was a mob of ambulances, police cars, and civilian vehicles. I followed a pickup truck with numerous victims in the back seat.

There were multiple blood trails tracking from various parts of the ambulance bay into the ED. Medics were walking from bedside to bedside putting in lines. Two anesthesia attendings were frantically intubating patients. Two nurses were performing chest compressions.

I picked the nearest bed and started assessing patients. I placed two endotracheal tubes and black tagged four more patients within minutes of my arrival.

In the initial moments in the ED and in the OR, I

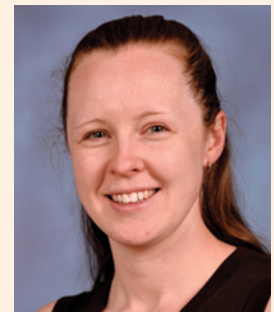
focused on caring for the patient and blocked out any other thoughts or emotions. There was no time and no room for my horror or my tears.

As I went bedside to bedside in the ED, I was practically chanting in my head “airway, breathing, circulation, vital signs, other injuries.”

In the OR, I was working on controlling intra-abdominal bleeding from multiple sources, and again, my training became something of a mantra in my head. “Pack, control bleeding, assess injuries, repair.”

We saw well over 200 patients from the Route 91 shooting and operated on 95 of them within the first 24 hours.

*Dylan Davey, MD, PhD, general surgery resident, PGY-4, Sunrise Hospital & Medical Center.*



DR. DAVEY



were physically and emotionally exhausted by the ordeal, but proud of what they were able to do for these patients, and that pride carried them through the experience. “We had support from all over the country; people sent banners with hundreds of signatures. Something like 1,100 piz-

zas were sent to the UMC staff, and dozens and dozens of surgeons from all over the country offered to come help us.”

Dr. Fildes noted that he is not easily surprised given his daily work, but he was impressed by the generosity and courage of the patients in this crisis sit-

uation. He concluded that, “This was all made possible because of planning, training, commitment by staff, and ultimately, the bravery of the patients.”

Dr. Dort, Dr. Fildes, Dr. Kuhls, and Dr. Johnson had no relevant financial disclosures.

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## Preinjury statin improved survival following TBI

**BY DOUG BRUNK**

*Frontline Medical News*

**SAN DIEGO** – Patients who were on statins prior to sustaining a traumatic brain injury doubled their survival rate over those who were not on the drugs in a retrospective analysis presented at the annual Clinical Congress of the American College of Surgeons.

The study provides preliminary data that can help set a framework to conduct larger, randomized, controlled trials to further evaluate the role of statins, which have been shown in animal models to improve outcomes after traumatic brain injury (TBI).

“According to the Department of Defense, one-third of a million veterans suffered a TBI between 2000 and 2016, while on the civilian side, about 2.5 million TBIs occur every year,” lead study author Adil M. Lokhandwala, MD, said in an interview in advance of the meeting. “TBI carries a high incidence, and the mortality and morbidity that comes after an event can be devastating, with sometimes long-term psychosocial consequences for the individuals involved. When it comes to therapy for TBI, currently there is none. All we have at this time is guidelines from the Brain Trauma Foundation that are mainly focused on the management of TBI. These patients have a very high incidence of schizophrenia, depression,

and PTSD. These are life-long consequences. Some of the affected can’t hold a job; it can be a very morbid condition.”

In an effort to evaluate the effect of pre-injury statins on outcomes after TBI, Dr. Lokhandwala, a general surgery resident at the University of Arizona, Tucson, AZ, and his associates identified all patients aged 40 years and older from the Multiparameter Intelligent Monitoring in Intensive Care (MIMIC) III database with a diagnosis of TBI and ICU length of stay of greater than 24 hours. They divided patients into two groups: those who were on statins and those who were not. The primary outcome was in-hospital survival. Secondary outcomes measures were hospital length of stay and ICU length of stay.



**DR. LOKHANDWALA**

Dr. Lokhandwala, who is also a commissioned officer with the U.S. Army Reserves, reported results from 918 patients with a TBI. Their mean age was 55 years, 76% were white, and 22% were on statins. The overall in-hospital survival rate was 78.6%, while the median Glasgow Coma Scale was 12. The median hospital length of stay and ICU length of stay were 9.1 and 7.2 days, respectively. The researchers observed that, compared with patients who were not on statins, those on statin therapy had significantly higher rates of survival (88% vs. 68.4%; *P* less than .001). However, there was no difference in

hospital or ICU length of stay between the two groups (*P* = .19 and *P* = .39, respectively). On regression analysis after controlling for confounding factors, statin use was found to be an independent predictor of survival (odds ratio, 1.8; 95% confidence interval, 1.5-2.2; *P* less than .001).

“Even though we isolated our patients to TBI, there could have been other causes of their mortality, like a pulmonary embolism or a myocardial infarction,” Dr. Lokhandwala said. “We need to conduct a randomized, controlled trial to follow these individuals and see what their actual mortality is and look at their psychosocial outcomes to see if there’s a long-term benefit to statins. Do these people have decreased incidence of PTSD or are they more functional? Is it easier for them to hold a job or develop social relationships? The impact of post-injury statin use could also be studied.”

He went on to note that many studies have shown that aggressive team-based rehabilitation can improve outcomes in TBI patients. “Would we be able to include statin use in such a program to see if statins further improve outcomes faster or are there individuals that don’t benefit as much?” Dr. Lokhandwala asked. “This study sets up a framework to show that there is a strong association and to take this further in a more structured trial to see if there is any potential for therapeutic use in TBI.”

Dr. Lokhandwala reported having no financial disclosures.

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# Firearms injury toll of \$3 billion just ‘a drop in the bucket’

BY RANDY DOTINGA

Frontline Medical News

**SAN DIEGO** – The true impact of firearms injuries may be greatly underestimated, according to a study presented at the annual Clinical Congress of the American College of Surgeons.

An analysis released earlier this month estimated that firearms injuries cost nearly \$3 billion a year in emergency department and inpatient treatment costs. The real cost is likely to be 10-20 times higher, said the lead author of the study, Faiz Gani, MD, a research fellow with the Johns Hopkins Surgery

**Cost estimates don't take into account follow-up care, rehabilitation, disability, or future surgical procedures.**

Center for Outcomes Research, Baltimore, MD.

“This is just a drop in the bucket,” Dr. Gani said in an interview at the meeting.

Dr. Gani and his colleagues launched their study (*Health Affairs*. 2017;36[10]:1729-38) to better understand the cost of firearms injuries, including nonfatal and accidental injuries.

Most estimates of the cost of firearm injuries are outdated or focused on states or single trauma centers, he said. “Contemporary [costs] for emergency rooms are unknown,” he said. “Also, the numbers come down and

[climb] up. It's important to continually study this.”

The statistics are especially important to surgeons who handle these injuries. “A lot of times the surgeon is the primary health care provider if the patient is injured severely. It's important that we as surgeons know what's going on.”

The researchers retrospectively analyzed data from the Nationwide Emergency Department Sample of the Healthcare Cost and Utilization Project for the years 2006-2014. They identified 150,930 patients who appeared alive in emergency departments over that period with firearms injuries, and they estimated the total weighted number at 704,916.

They found that the incidence of firearms injury admissions actually fell during 2006-2013 (from 27.9 visits per 100,000 people to 21.5;  $P < .001$ ) but bumped up by 23.7% to 26.6 during 2013-2014 ( $P < .001$ ).

Not surprisingly, more men were injured than women: 45.8 firearms-injured men per 100,000 patients presented at emergency departments, compared with 5.5 firearms-injured women. Assaults (49.5%) and accidents (35.3%) accounted for most cases, followed by attempted suicides (5.3%) and legal intervention (2.4%).

Those who were assaulted had a higher likelihood of being poor, while those who tried to kill themselves were more likely to have the highest incomes among firearms-injured patients.

The average costs of emergency and inpatient care for patients injured by firearms were \$5,254 and \$95,887, respectively, collectively amounting to about \$2.8 billion each year.

Dr. Gani mentioned that the estimation of the cost and impact of firearms injuries don't account for people who died of firearms injuries before reaching the emergency department, he says, including patients who committed suicide and died at home.

The cost estimates also don't take into account follow-up care, rehabilitation, and lifelong disability. The surgical portion of the cost is likely to be much higher because the study doesn't take future surgical procedures into account, he said.

Based on estimates by the Centers for Disease Control and Prevention of the impact of the injuries, Dr. Gani argued that the true annual cost could be 10 or 20 times the nearly \$3 billion estimated by the study.

Discussant Elliott R. Haut, MD, FACS, a trauma surgeon at Johns Hopkins Medicine in Baltimore, agreed that the study estimates of cost and impact estimated in the study represent a small part of a larger toll. Some families and individuals can pay those costs more than once. He recalls hearing from family members of firearm victims who recognize him because they've been at the hospital for other shooting incidents. “We've all heard someone say, ‘You were here the last time when my brother/cousin/uncle was shot,’” he said.

Future research should focus on better understanding the long-term cost of firearm injuries and the influence of socioeconomic and demographics, Dr. Gani said.

Dr. Gani and Dr. Haut reported no relevant disclosures.

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DR. GANI



# Generational perspective: Surgical trainees more trusting of risk tool estimates

**BY RANDY DOTINGA**

*Frontline Medical News*

**SAN DIEGO** – Researchers say that they’ve developed an easy and inexpensive way to instantly track divergences in thinking by faculty and students as they ponder cases presented in Mortality and Morbidity (M&M) conferences. They’ve already produced an intriguing early finding: Interns and junior residents hew more closely than do their elders to estimates provided by a surgical risk calculator.

The research has the potential to shed light on problems in the much-maligned M&M, says study leader Ira Leeds, MD, of Johns Hopkins University, Baltimore, MD. He presented the study findings at the annual Clinical Congress of the American College of Surgeons.

“This project demonstrates that educational technologies can reveal important gaps in surgical education,” said Dr. Leeds in an interview.

At issue: the M&M conference, a mainstay of medical education. “This has been defined as the ‘golden hour’ of surgical education,” Dr. Leeds said. “By discussing someone else’s complications, you can learn how to handle your own in the future.”

However, he added, “there’s very little evidence that we’re currently learning from M&M.”

Dr. Leeds and his colleagues are studying the M&M’s role in medical education to see whether it can be improved. The new study, a prospective time-series analysis of weekly M&M conferences, aims to understand the potential value of a real-time feedback system. The idea is to develop a way

to alert participants to discrepancies in their perceptions about cases.

The researchers turned to a company called Poll Everywhere, whose technology allowed them to collect instant opinions about M&M cases from those in attendance. During 2016-2017, 110 faculty, residents, and interns used Poll Everywhere’s smartphone app to do two things – make guesses about the root causes of adverse events and estimate the risk of complications from surgical procedures over the next 30 days.



**DR. LEEDS**

“We can see all the results streaming in real time,” said Dr. Leeds, noting that the service cost \$600 per year.

The participants, about two-thirds of whom were male, included faculty (35%), fellows and senior residents (28%), and interns and junior residents (37%). They’d been trained an average of 9 years.

The 34 M&M cases represented a mixture of surgical specialties, including oncology, trauma, transplant, and others.

In terms of the root cause analysis, the technology allowed researchers to instantly detect if the guesses of faculty and students were far apart.

The researchers also compared the risk estimates from the participants to those provided by the NSQIP Risk Calculator. They found that the participants tended to boost their estimate of risk, compared with the calculator, by an absolute mean difference of 7.7 percentage points.

“They were overestimating risk by nearly 8 percentage points,” Dr. Leeds said. This isn’t surprising, since other research has revealed a trend toward overestimation of risk by physicians,

compared with calculators, he added.

There wasn’t a major difference between the general level of higher estimation of risk among faculty and senior residents (mean of 8.6 and 7.2 percentage points higher than the calculator, respectively). But interns and junior residents estimated risk higher than the calculator by a mean of 4.9 percentage points.

What’s going on? Are the less experienced staff members outperforming their teachers? Another possibility, Dr. Leeds said, is that “the senior surgeons are better picking up on nuances that aren’t being captured by predictive models or the underdeveloped intuition of a junior trainee.”

Rachel Dawn Aufforth, MD, of Johns Hopkins Medicine, Baltimore, MD, who served as discussant for the presentation by Dr. Leeds, said she looks forward to seeing whether this technology can improve resident education. She also wondered why estimates via the risk calculator were chosen as a baseline, especially considering that surgeons tend to estimate higher levels of risk.

“One of the things we’ve been trying to do is look at time-series differences,” Dr. Leeds said. “Are they getting better over an academic year? And does that vary by faculty, especially for interns? The calculator isn’t changing or learning on its own.”

In the big picture, the study shows that “collecting real-time risk estimates and root cause assignment is feasible and can be performed as part of routine M&M conferences,” he said.

The study was funded in part by Johns Hopkins University School of Medicine Institute for Excellence in Education. Dr. Leeds reports no relevant disclosures.

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# When surgery hurts the surgeon: Ergonomics of prevention

BY MICHELE G SULLIVAN

*Frontline Medical News*

**SAN DIEGO** – Work-related musculoskeletal disorders are practically inevitable for surgeons, eventually occurring in more than 90%, no matter what type of surgery they practice.

At the annual Clinical Congress of the American College of Surgeons, this eyebrow-raising fact was presented with a sobering addendum: No one seems to be doing much about it.

“There are some ergonomic guidelines for surgeons out there, but most surgeons don’t know about them,” said Tatiana Catanzarite, MD, who has conducted research on this topic.

When she began looking into the problem of work-related injuries among surgeons, she was surprised at the dearth of published research. It’s

**‘Three-D interactive visualizations allow us to rotate and investigate specific motor activities.’**

no wonder then, said Dr. Catanzarite, that most surgeons learn proper work posture on the fly and may or may not be using the most efficient and mechanically sound instrumentation angles when performing surgery.

Dr. Catanzarite, a female pelvic medicine and reconstructive surgery fellow at the University of California, San Diego, CA, has just published a literature review on surgeon ergonomics. But reading about how to stand, how to hold instruments, and even how to sit at a robotic surgical console is no



Tatiana Catanzarite, MD, is a surgical fellow at the University of California, San Diego, CA.

match for having an observer on the ground guiding and reinforcing work posture, she said. Unfortunately, that’s an unrealistic expectation for most surgeons, so Dr. Catanzarite is borrowing video-gaming technology to address the situation, she said in an interview.

She has adapted a popular video game motion-capture system that uses an infrared laser projector and a computer sensor to capture video data in three dimensions. The sensing range of the depth sensor is adjustable, and the software is capable of automatically calibrating the sensor based on the physical environment, accommodating the presence of obstacles and using infrared and depth cameras to capture a subject’s 3-D movements.

The system doesn’t require bulky wearable components, “making it an ideal technology for the live operating room setting,” Dr. Catanzarite said. “In order to effectively assess surgical ergonomics, a less intrusive approach is needed, which can deliver precise reports on the body movements of the surgeons, as well as capture the temporal distribution of different postures and limb angles.”

Dr. Catanzarite is using the system to launch an ergonomics assessment tool she calls Ergo-Kinect. The system will record surgeons’ movements in real time, gathering data about how they stand, move, and operate their instruments.

“Three-D interactive visualizations allow us to rotate and investigate specific motor activities from the collected data,” she said. The technology enables them to capture the movements of the surgeon and assign an ergonomic score for each movement. “Eventually we may be able to develop a system that can warn surgeons in real time if they are performing an activity which may be harmful from an ergonomics standpoint,” Dr. Catanzarite said.

The research is in its earliest phase – Dr. Catanzarite has only scanned a few surgeons. But she will continue to accrue data in order to eventually construct a system that could help surgeons of the future avoid the painful, and sometimes debilitating, physical costs of their career.

Dr. Catanzarite reported having no financial disclosures.

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# Surgeons paid a price for presidential procedures

BY RANDY DOTINGA

*Frontline Medical News*

**SAN DIEGO** – A surgical team was forced to perform a delicate oral procedure on a rocking yacht while making sure to preserve presidential whiskers. A domineering doctor ignored fellow physicians while a president spent months dying in agony. And, after helping to save the leader of the free world, the leader of the American College of Surgeons found himself viciously attacked by his own colleagues.

When a quartet of ill U.S. presidents developed major medical problems, an audience at the annual Clinical Congress of the American College of

Surgeons learned, their treating physicians ended up with major headaches of their own.

President Grover Cleveland, for example, required his surgical team to remove an oral tumor in total secrecy in 1893, depriving him of a big chunk of his upper palate. “The president had a mustache, and the mustache had to be left alone, and there could be no scars,” said the Hospital for Special Surgery’s J. Patrick O’Leary, MD, FACS, who spoke in a session sponsored by the ACS Surgeons History Group.

The only light came from a single incandescent bulb, and the procedure was performed at sea, on a yacht anchored off Long Island, NY.

“If you were presented with these parameters as a surgeon today, my guess is that you would have demurred on taking on this project,” Dr. O’Leary said. “It was a prescription for a disaster.”

President Cleveland survived for another 15 years. President James Garfield, a fellow Civil War veteran, wasn’t so fortunate. In 1881, he was astonishingly unlucky, the unwitting victim of a fumbling physician who dominated his care after an assassin shot him in the chest.

That physician, Willard Bliss, MD, dismissed other doctors who knew the president well and isolated this gregarious man from friends and family. He also ignored emerging



Lady Bird Johnson visits her husband, President Lyndon B. Johnson, after his gallbladder surgery in 1965.

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knowledge about germ control. And he fed President Garfield a heavy diet that the digestively sensitive president probably couldn't have tolerated in the best of times. The result: endless vomiting, the loss of almost 80 pounds, and an unsuccessful rectal feeding regimen.

Toward the end of the president's gruesome summer-long decline, Dr. Bliss told all but two doctors to stay away, John B. Hanks, MD, of the University of Virginia, Charlottesville, VA, said in his presentation. Then the president died of a wound that Dr. Hanks said would have been survivable with proper care even in the 1880s.

History has been unkind to Dr. Bliss, in part because his patient died. But another presidential physician faced bizarre post surgery scorn from his ACS colleagues, even though his patient lived, according to Justin Barr, MD, FACS, of Duke University, Durham, NC.

In 1956, surgeon Isidor Ravdin, MD, FACS, of the University of Pennsylvania, Philadelphia, PA, was called in when President Dwight D. Eisenhower needed surgery for a bowel obstruction.

A team of physicians agreed that the president needed surgery. "They felt they were dealing with an elderly, sick

patient who'd been in shock during his illness and had recently suffered a myocardial infarction," Dr. Barr said. "They unanimously decided to proceed with a bypass over resection."

It's clear today that the physicians made the correct choice, Dr. Barr

**'If you were presented with these parameters as a surgeon today, my guess is that you would have demurred on taking on this project. ...It was a prescription for a disaster.'**

said. But his colleagues attacked Dr. Ravdin, who later complained that criticisms multiplied in direct ratio to distance from the operating room.

At the time, Dr. Ravdin was chair of the ACS Board of Regents. The entire board accused him of violating college policies regarding "ghost surgery" (performing procedures without the patient's knowledge) and "itinerant

surgery" (traveling to perform a procedure and then leaving).

Dr. Ravdin acknowledged that he had performed itinerant surgery to some extent, but he denied the ghost surgery charge. In fact, he and the president became friends.

His colleagues also attacked him over his decision to not perform a resection procedure. "They were accusing him of not only being an unethical surgeon, but also an incompetent one," said Dr. Barr, who calls the allegations "truly bewildering."

Also bewildering: President Lyndon B. Johnson's choice to display his gallblad-

der surgery scar to the press in 1965, spawning one of the most infamous photos of his presidency.

Few surgeons see their handiwork so prominently displayed. Fortunately for them, the operating theater was in a naval hospital, not on a boat. And, as far as we know, no one fretted over the fate of a single facial hair.

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## Strict OR attire policy had no impact on SSIs

**BY DOUG BRUNK**

*Frontline Medical News*

**SAN DIEGO** – Implementation of strict operating room (OR) attire policies did not reduce the rates of superficial surgical site infections (SSIs), according to an analysis of more than 6,500 patients.

"It's estimated that SSIs occur in 2%-5% of patients undergoing inpatient surgery. They're associated with significant patient morbidity and mortality and are a significant burden to the health care system, accounting for an

estimated \$3.5 to \$10 billion in health care expenditures," study author Sandra Farach, MD, said at the annual Clinical Congress of the American College of Surgeons,

In February 2015, the Association for periOperative Registered Nurses published recommendations on operating room attire, providing a guideline for modifying facility policies and regulatory requirements. It included stringent policies designed to minimize the exposed areas of skin and hair of operating room staff. "New attire policies were met with some criticism as there

is a paucity of evidence-based data to support these recommendations," said Dr. Farach, who helped conduct the study during her tenure as chief resident of general surgery at the University of Rochester Medical Center, New York, NY.

Following a department of health site visit, two tertiary care teaching hospitals imposed strict regulations on operating attire. This included covering of the head, hair, eyes, and all facial hair, as well as banning the use of skull caps. Dr. Farach and her associates hypothesized that this interven-



tion would reduce incisional SSIs. They also sought to determine whether more stringent regulation of these policies would result in a greater decrease in SSIs by comparing SSI rates at the two institutions. The researchers que-



DOUG BRUNK/FRONTLINE MEDICAL NEWS

**Sandra Farach, MD, a pediatric surgeon at Le Bonheur Children's Hospital, Memphis**

ried the institutional American College of Surgeons National Surgical Quality Improvement Program database for all patients undergoing surgery in the 9 months before implementation of the new OR policies (from September 2014 to May 2015) and compared it with time-matched data from 9 months after implementation (from September 2015 to May 2016) at the two hospitals. They used univariate and multivariable analyses to examine patient, clinical, and operative factors associated with incisional SSI. Secondary endpoints included length of stay, mortality, and major/minor complications.

A total of 6,517 patients were included in the analysis: 3,077 in the preimplementation group and 3,440 patients in the postimplementation group. The postimplementation group tended to be older and had significantly higher rates of hypertension, dialysis

treatments, steroid use, and systemic inflammatory response syndrome, as well as higher American Society of Anesthesiologists classification scores. "However, they had a significantly lower BMI, incidence of smoking and COPD, and a higher incidence of clean wounds, which would theoretically leave them less exposed to SSIs," said Dr. Farach, who is now a pediatric surgical critical care fellow at Le Bonheur Children's Hospital in Memphis.

Overall, the rate of SSIs by wound class increased between the preimplementation and postimplementation time periods: The percent of change was 0.6%, 0.9%, 2.3%, and 3.8% in the clean, clean-contaminated, contaminated, and dirty/infected cases, respectively. When the review was limited to clean or clean-contaminated cases, SSI increased slightly, from 0.7% to 0.8% ( $P = .085$ ). There were no significant differences in the complication rate, 30-day mortality, unplanned return to the OR, or length of stay between preimplementation or postimplementation at either hospital.

When Dr. Farach and her associates examined the overall infection rate, they observed no significant differences between preimplementation and postimplementation rates of incisional SSI (0.97% vs. 0.96%, respectively;  $P = .949$ ), organ space SSI (1.20% vs. 0.81%;  $P = .115$ ), and total SSIs (2.11% vs. 1.77%;  $P = .321$ ). Multivariate analysis showed that implementation of OR changes was not associated with an increased risk of SSIs. Factors that did predict high SSI rates included preoperative SSI (adjusted odds ratio, 23.04), long operative time (AOR, 3.4), preoperative open wound (AOR, 2.94), contaminated/dirty wound classes (AOR, 2.32), and morbid obesity (AOR, 1.8).

"A hypothetical analysis revealed that a sample of over 495,000 patients would be required to demonstrate a 10% incisional SSI reduction among patients with clean or clean-contaminated wounds," Dr. Farach noted. "Nevertheless, the study showed a numerical increase in SSI during the study period.

Policies regarding OR attire were universally unpopular. As a result, OR governance is now working to repeal these new policies at both hospitals."

Given the rarity of SSI in the population subset which is relevant to the OR attire question (clean and clean-contaminated wounds, 0.7%), designing a study to prove effectiveness of an intervention (i.e., a 10% improvement) is totally impractical to conduct as this would require nearly a half a million cases, said Jacob Moalem, MD, FACS, the lead author of the study who is an endocrine surgeon at the University of Rochester.

**'Policies regarding OR attire were universally unpopular. As a result, OR governance is now working to repeal these new policies.'**

At the meeting, a discussant suggested that conducting such a study is feasible; however, "I would strongly argue that putting that many people through such a study, when we know that these attire rules have a deleterious effect on surgeon comfort and OR team dynamics and morale, would not be prudent," Dr. Moalem said. "We know that surgeon comfort, ability to focus on the task at hand, and minimizing distractions in the OR are critically important in reducing errors. In my opinion, by continuing to focus on these unfounded attire restrictions, one would be far more likely to actually cause injury to a patient than to prevent a wound infection."

The researchers reported having no financial disclosures.

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# Bouffant vs. skull cap: Deep dive on surgical hat type found no link to SSI risk

BY DOUG BRUNK

Frontline Medical News

**SAN DIEGO** – Surgeon preference for bouffant versus skull caps does not significantly impact superficial surgical site infection (SSI) rates after accounting for surgical procedure type, results from an analysis of a previously randomized, prospective trial showed.

“We are all aware of the current battle that is taking place over operating

**‘Surgeon preference should dictate the choice of headwear in the operating room. ...There are many other issues we need to be focusing on in surgery, and this probably doesn’t have to be one of them.’**

room attire based on the differences between the AORN [Association of periOperative Registered Nurses] recommendations and ACS guidelines,” lead study author Shanu N. Kothari, MD, FACS, said at the annual Clinical Congress of the American College of Surgeons.

“To date, no strong evidence exists that bouffant caps have lower surgical site infection risk, compared to skull caps. We had an opportunity to review previously prospectively collected data at our own institution to see what impact, if any, surgical headwear has on SSI infection risk.”

In 2016, Dr. Kothari, director of

minimally invasive bariatric surgery at Gundersen Health System, La Crosse, WI, and his associates published results from a prospective, randomized non-inferiority trial on the impact of hair removal on surgical site infection rates (J Am Coll Surg. 2016;223[5]:704-11). Patients were grouped by the attending surgeons’ preferred cap choice into either bouffant or skull cap groups. Their analysis concluded that hair left on the abdomen had no impact on

surgical site infection rates. “What is unique about this study is that two independent certified research nurses independently assessed every wound in that trial,” he said.

For the current study, the researchers re-examined the data by conducting a multivariate analysis to determine the influence of surgical cap choice on SSIs. Overall, 1,543 patients were included in the trial. Attending surgeons wore bouffant caps and skull caps in 39% and 61% of cases, respectively. Bouffant caps were used in 71% of colon/intestine, 42% of hernia/other, 40% of biliary cases, and only 1% of foregut cases. Overall, SSIs occurred in 8% and 5% of cases in which attending surgeons wore a bouffant and skull cap, respectively ( $P = .016$ ), with 6% vs. 4% classified as superficial ( $P = .041$ ), 0.8% vs. 0.2% deep ( $P = .120$ ), and 1% vs. 0.9% organ space ( $P = .790$ ). However, when the researchers adjusted for the type of surgery and surgical approach (laparoscopic vs. open), they observed no difference in SSI rates for skull cap, compared with bouffant cap.

“Surgeon preference should dictate the choice of headwear in the operating room,” Dr. Kothari commented. “What I would encourage is perhaps a summit between thought leaders in



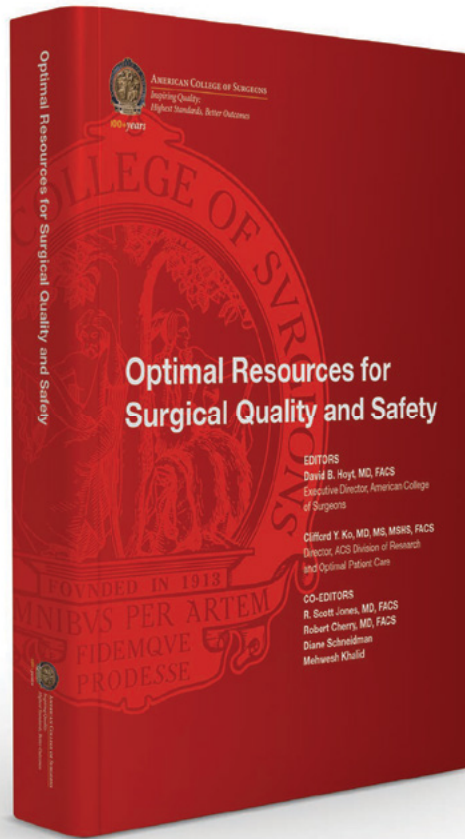
**Shanu N. Kothari, MD, FACS, is director of minimally invasive bariatric surgery at Gundersen Health System, La Crosse, WI.**

the ACS and the AORN, [to conduct] a true review of evidence and come up with a universal guideline. There are many other issues we need to be focusing on in surgery, and this probably doesn’t have to be one of them.”

“In general, there is a complete and utter absence of any scientific evidence whatsoever for most of the things we are told to do in terms of wearing what we do in the OR,” said invited discussant E. Patchen Dellinger, MD, FACS, professor of surgery at the University of Washington, Seattle, WA. “In fact, there are prospective randomized trials showing that wearing a [face] mask does not reduce surgical site infection, although I’ve been wearing a mask in the OR for approximately 48 years.”

Dr. Kothari reported having no relevant financial disclosures.

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