Knotless Wound Closure Saves Time, Money

BY BRUCE JANCIN

PHOENIX — Time is money. And with operating room time running $30 per minute or more at many hospitals, some cosmetic surgeons are switching from the hallowed traditional stitching techniques to considerably faster knotless means of wound closure.

Two novel technologies that garnered favorable reviews in studies presented at the annual meeting of the American Academy of Cosmetic Surgery were the Quill bidirectional barbed suture and 3M's Steri Strip S device.

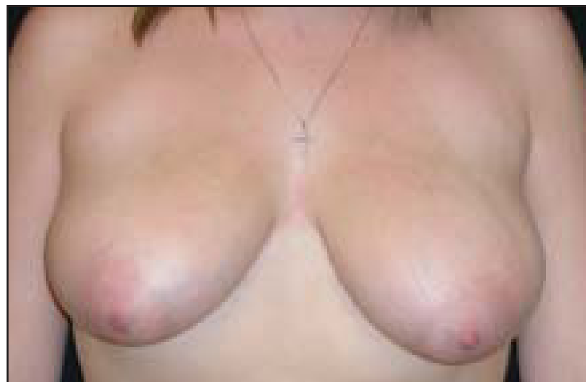
Dr. Michael S. Kluska presented a comparative study involving 40 patients undergoing abdominoplasty or bilateral breast reduction. He closed half of the patients' wounds using traditional techniques, mainly multilayered interrupted individual absorbable sutures with Vicryl 3-0 or Monocryl 3-0 or 4-0. He closed the other half with Angiotech Pharmaceutical Inc.'s Quill double-barbed monofilament absorbable sutures.

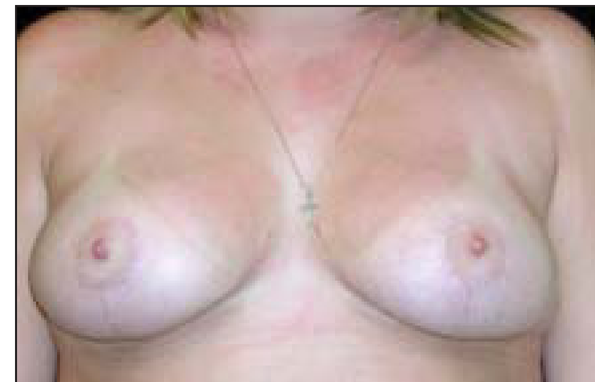
With 22-27 traditional sutures being placed per breast reduction procedure, the cost of material is $325-$375 per patient treated. In contrast, the cost of the eight Quill sutures Dr. Kluska typically uses in breast reduction cases is $240. Moreover, total operating room time averages 2 hours with traditional wound closure versus 1 hour 40 minutes with the barbed suture, a hefty 20-minute savings in OR time.

Similar cost and time savings accrued through the use of barbed sutures in the abdominoplasty patients, noted Dr. Kluska of a plastic and cosmetic surgery center in Greensburg, Pa. The Quill sutures provided other advantages, too. Tissue approximation was better because of the continuous controlled tension achieved along the length of the wound.

"You don't have the scalloping that you get with individual interrupted sutures," he said. "Individual sutures placed in subcutaneous and subcuticular space create microischemic changes, with chronic edema at the wound site. It can be a challenge to tie each suture to create closure without tissue death."

Anecdotally, Dr. Kluska has noted that surgical wounds closed with barbed sutures heal much faster.





PHOTOS COURTESY DR. MICHAEL S. KLUSKA

A patient is shown before undergoing breast reduction surgery (left) and 4 months after the surgery (right) where double-barbed monofilament absorbable sutures were used instead of traditional sutures.

The technique involves placing a Quill suture in the subcutaneous space, bringing both ends out and making sure they're equal in length, then running the suture in one direction while the surgeon or an assistant runs it in the opposite direction.

"You run it very similar to a subcuticular stitch, in a linear U or horizontal fashion. When you finish, you pull it snug, cut it, and you're done. When you pull this suture taut in a linear fashion, the barbs deploy in a helical pattern. It creates a drawstring effect in the tissues," he explained.

Applications for the barbed suture are "pretty much anywhere you do multiple-layer closures in the subcutaneous and subcuticular space," he said.

Separately at the meeting, Dr. Abhishek Chatterjee presented a cost-savings analysis comparing the 3M Steri Strip S (3S) device and conventional sutures for the final layer of skin closure in abdominoplasty or bilateral breast reduction. Unlike prior studies that compared novel methods of wound closure, this analysis incorporated the opportunity cost (the dollar value of an activity that is forgone in order to participate in some other activity—in this case, conventional suture closure). Folding in the opportunity cost provides the truest estimate of the cost savings provided by an innovative device, because it includes the profit a surgeon could earn by doing something else in the time saved by not suturing, explained Dr. Chatterjee of Dartmouth-Hitchcock Medical Center, Lebanon, N.H.

He presented a randomized trial involving 27 abdominoplasty and 23 bilateral breast reduction patients. Each patient had half of their incision closed in traditional fashion using 4-0 polydioxanone (PDS) suture and the other half closed with 3S, all by the same surgeon.

The 3S closure saved 20 minutes in the breast reduction cases and 12 minutes per abdominoplasty. The hospital OR cost was an estimated $30 per minute.

A 3S device cost $14.82, with an average of 16 sutures used for the final layer of skin closure per bilateral breast reduction and 14 per abdominal closure. At $3.75 per PDS suture, the material cost for 3S closure was greater, but this was outweighed by the reduced operating room time.

With incorporation of the opportunity cost into the cost analysis, the true cost savings obtained by using the 3S instead of 4-0 PDS suture was $2,298 per bilateral breast reduction and $1,277 per abdominoplasty, Dr. Chatterjee concluded.

Dr. Chatterjee disclosed receipt of a research grant from 3M to conduct his study. Dr. Kluska indicated he had no financial conflicts of interest regarding his study. ■

Drop in Complications Attests to Utility of Surgical Checklist

BY ROBERT FINN

SAN FRANCISCO — Implementation of a simple checklist to be completed during surgical procedures reduced the overall incidence of complications by 32% and the risk of death by 46%, according to a study by the World Health Organization.

The study measured adherence to six key safety measures before and after implementation of the checklist. Investigators looked at the proportion of operations in which surgeons used a pulse oximeter, took a time-out to confirm the name of the patient and the operative site, conducted an objective airway evaluation, administered antibiotics within 60 minutes before the start of the procedure, and ensured that they had intravenous access and at least 500 cc of blood available, according to Dr. Atul A. Gawande, who shared preliminary results of the study at the annual clinical congress of the American College of Surgeons.

The data are based on 6,775 operations performed at four sites in developed countries (Auckland, New Zealand; London; Seattle; and Toronto) and four in developing countries (Amman, Jordan; Ifakara, Tanzania; Manila; and New Delhi).

At baseline, the eight sites varied widely in the proportion of patients who received all six safety measures. At two of the sites, none of the 675 patients received all six measures. At another, 94.2% of patients received all six measures.

"You would think that these sites lined up by socioeconomics," said Dr. Gawande of Harvard Medical School, Boston. "But in fact, our best performance and our worst performance were seen in our richest sites."

The checklist consists of three parts. The first part was administered before the induction of anesthesia and confirmed such things as the patient's identity, any allergies, and the presence of a difficult airway. The second part, administered before the skin incision, required that all team members introduce themselves and that the surgeon, the anesthesia team, and the nursing team discuss anticipated critical events. The third part, administered before the patient left the operating room, required the team to confirm that sponge counts were correct, specimens were labeled, and any equipment problems had been addressed.

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DR. FLUM

The checklist was designed to be completed in 90 seconds or less, Dr. Gawande said. After it was implemented, overall adherence to the six safety measures rose from 33.5% to 67.4%, whereas reductions were seen in death rates (from 1.3% to 0.7%), surgical site infections (from 4.3% to 3.0%), and complication rates (from 9.6% to 6.5%). All differences were statistically significant.

"So intuitive is the concept of a checklist that I doubt if there's a lot of disagreement that this is a good thing," said Dr. David R. Flum of the University of Washington, Seattle, who described his efforts to implement a similar checklist in hospitals throughout the state of Washington. "

If any of you were having surgery, I'm sure you'd want your docs and your nurses and your anesthesiologists to check off on the things that they know to be important," he added.

But during the question and answer session, one physician expressed concern that checklists would add to already burdensome paperwork requirements. "I just came out of the [Veterans Affairs] system, and to do a shave biopsy, the consent process and the paperwork took probably three times what it took to actually do the procedure," he said. "We really need to stop and think about whether or not everything that you're doing for 100% compliance becomes cost effective and really rational."

In response, Dr. Gawande said, "If [the checklist] is understood to be a regulation, then we've failed. If we instead understand this to be a tool to help people obtain the best possible results they can get ... then it's likely to be very successful."

Dr. Gawande and Dr. Flum indicated that they had no conflicts of interest related to their presentations. ■