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## **Bar-coding Surgical Sponges To Improve Safety: A Randomized Controlled Trial**

Greenberg CC, Diaz-Flores R, Lipsitz SR, Regenbogen SE, Mulholland L, Mearn F, Rao S, Toidze T, Gawande AA.

**Objective:** A randomized, controlled trial was performed to evaluate a computer-assisted method for counting sponges using a bar-code system.

**Background:** Retained sponges are a rare and preventable problem but persist in surgery despite standardized protocols for counting. Technology that improves detection of counting errors could reduce risk to surgical patients.

**Methods:** We performed a randomized controlled trial comparing a bar-coded sponge system with a traditional counting protocol in 300 general surgery operations. Observers monitored sponge and instrument counts and recorded all incidents of miscounted or misplaced sponges. Surgeons and operating room staff completed postoperative and end-of-study surveys evaluating the bar-code system.

**Results:** The bar-code system detected significantly more counting discrepancies than the traditional protocol (32 vs. 13 discrepancies,  $P = 0.007$ ). These discrepancies involved both misplaced sponges (21 vs. 12 sponges,  $P = 0.17$ ) and miscounted sponges (11 vs. 1 sponge,  $P = 0.007$ ). The system introduced new technical difficulties (2.04 per 1000 sponges) and increased the time spent counting sponges (5.3 vs. 2.4 minutes,  $P < 0.0001$ ). In postoperative surveys, there was no difference in surgical teams' confidence that all sponges were accounted for, but they rated the counting process and team performance lower in operations randomized to the bar-code arm. By the end of the study, however, most providers found the system easy to use, felt confident in its ability to track sponges, and reported a positive effect on the counting process.

**Conclusions:** Use of automated counting using bar-coded surgical sponges improved detection of miscounted and misplaced sponges and was well tolerated by surgical staff members.