

# SURGERY

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### HEPATOBIILIARY

- 573 **Clinical comparison of laparoscopic and open liver resection after propensity matching selection**  
Makoto Meguro, MD, PhD, Toru Mizuguchi, MD, PhD, Masaki Kawamoto, MD, PhD, Shigenori Ota, MD, Masayuki Ishii, MD, Toshihiko Nishidate, MD, PhD, Kenji Okita, MD, PhD, Yasutoshi Kimura, MD, PhD, and Koichi Hirata, MD, PhD, *Sapporo, Hokkaido, Japan*

Our results indicate that laparoscopic liver resection is comparable with the corresponding open procedure in clinical safety and prognostic efficacy for patients with hepatocellular carcinoma. The importance of these findings is to adjust patient characteristics of these operating procedures using a propensity score matching analysis.

### TRAUMA/CRITICAL CARE

- 588 **Operating room to intensive care unit handoffs and the risks of patient harm**  
Lisa M. McElroy, MD, MS, Kelly M. Collins, MD, Felicitas L. Koller, MD, Rebeca Khorzad, MEM, CSSBB, Michael M. Abecassis, MD, MBA, Jane L. Holl, MD, MPH, and Daniela P. Ladner, MD, MPH, *Chicago, IL, and St. Louis, MO*

We performed a failure modes, effects, and criticality analysis of the operating room to intensive care unit handoff and identified process failures at high risk for causing patient harm. The importance of these findings is that they begin to demonstrate the link between handoff quality and clinical outcomes.

- 595 **Daily propranolol prevents prolonged mobilization of hematopoietic progenitor cells in a rat model of lung contusion, hemorrhagic shock, and chronic stress**

Letitia E. Bible, MD, Latha V. Pasupuleti, MD, Amy V. Gore, MD, Ziad C. Sifri, MD, Kolenkode B. Kannan, PhD, and Alicia M. Mohr, MD, *Newark, NJ, and Gainesville, FL*

Propranolol use after injury and chronic stress reduced prolonged hematopoietic progenitor cell mobilization. This work is important because alleviating chronic stress may be a future therapeutic target to improve healing after severe injury.

- 602 **Pertussis vaccination in adult trauma patients: Are we missing an opportunity?**

Brian K. Yorkgitis, DO, Gabriela Timoney, BS, Ali Salim, MD, Polly van den Berg, BA, Amy J. Goldberg, MD, Abhijit Pathak, MD, and Joseph F. Rappold, MD, *Philadelphia, PA, and Boston, MA*

We conducted a survey of tetanus vaccination in US adult trauma centers; many do not provide Tdap. The importance is with the epidemic increase in pertussis, many patients are not vaccinated for pertussis at time of tetanus.

- 608 **Blood transfusion and adverse surgical outcomes: The good and the bad**

Victor A. Ferraris, MD, PhD, Marion Hochstetler, MD, Jeremiah T. Martin, MBBCh, FRCSI, Angela Mahan, MD, and Siby P. Saha, MD, MBA, *Lexington, KY*

We analyzed the effect of transfusion on operative outcomes. There is an insignificant risk of transfusion in the highest risk patients, but low-risk patients have an 8- to 12-fold increased risk of adverse outcomes associated with transfusion.

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USA POSTMASTER: Send address changes to *Surgery*, Elsevier Health Sciences Division, Subscription Customer Service, 3251 Riverport Lane, Maryland Heights, MO 63043.

618 **Splenectomy is associated with hypercoagulable thrombelastography values and increased risk of thromboembolism**

Matthew J. Pommerening, MD, Elaheh Rahbar, PhD, Kristin Minei, MD, John B. Holcomb, MD, Charles E. Wade, PhD, Martin A. Schreiber, MD, Mitchell J. Cohen, MD, Samantha J. Underwood, MS, Mary Nelson, BSN, and Bryan A. Cotton, MD, MPH, *Houston, TX, Portland, OR, and San Francisco, CA*

Splenectomy for trauma may be associated with hypercoagulable temporal trends measured by thrombelastography. The significance of these findings is that splenectomy may be associated with increased risk for thromboembolism after trauma.

627 **Initial screening test for blunt cerebrovascular injury: Validity assessment of whole-body computed tomography**

Adriana Laser, MD, MPH, Joseph A. Kufera, MA, Brandon R. Bruns, MD, Clint W. Sliker, MD, Ronald B. Tesoriero, MD, Thomas M. Scalea, MD, and Deborah M. Stein, MD, *Baltimore, MD*

Whole-body computed tomography is a valid rapid screening test for blunt cerebrovascular injuries in the patient with polytrauma. The significance of this report is changing clinical practice to allow more rapid initiation of treatment and thus a decreased stroke risk.

636 **Should we operate for an intra-abdominal emergency in the setting of disseminated cancer?**

Courtney L. Scaife, MD, Kelly Hewitt, MD, Xiaoming Sheng, PhD, Katie W. Russell, MD, and Mary C. Mone, RN, BSE, *Salt Lake City, UT*

This study reviewed the morbidity and mortality of addressing an abdominal surgical emergency in a patient with end-stage cancer. The important findings of this paper confirm a high 30-day and 6-month postoperative mortality in this patient population.

646 **TRPA1 mediates the effects of hypothermia on the monocyte inflammatory response**

Adrian T. Billeter, MD, PhD, Norman Galbraith, MD, Samuel Walker, BS, Chelsea Lawson, BS, Sarah A. Gardner, BS, Harshini Sarojini, PhD, Susan Galandiuk, MD, and Hiram C. Polk, Jr, MD, *Louisville, KY*

We show here that hypothermia exerts its effects through the transient receptor protein channel A1 (TRPA1). The significance of this finding is that by blocking the TRPA1 channel, the detrimental effects of hypothermia can be reduced.

655 **Predicting progressive hemorrhagic injury from isolated traumatic brain injury and coagulation**

Lindley E. Folkerson, MD, Duncan Sloan, BS, Bryan A. Cotton, MD, MPH, John B. Holcomb, MD, Jeffrey S. Tomasek, MD, and Charles E. Wade, PhD, *Houston, TX*

Using statistical modeling, we identified that isolated TBI patients with a coagulopathy and an intraparenchymal lesion on initial head CT are at an increased risk of PHI and poor outcomes. The significance of this finding is that, by identifying those patients who are most at risk, treatments and therapies can be used earlier to decrease the incidence of PHI.

ONCOLOGY

662 **Sentinel lymph node biopsy is prognostic but not therapeutic for thick melanoma**

Swapnil D. Kachare, MD, MBA, Pateek Singla, BS, Nasreen A. Vohra, MD, Emmanuel E. Zervos, MD, Jan H. Wong, MD, and Timothy L. Fitzgerald, MD, *Greenville, NC*

An analysis assessing the importance of SNB for patient with thick melanoma was performed. The significance of this report is that for clinically node-negative patients with thick melanoma SNB is a staging but not therapeutic procedure.

669 **Improving breast cancer survivors' knowledge using a patient-centered intervention**

Jesus G. Ulloa, MD, MBA, Marian Hemmelgarn, MPH, Lori Viveros, MPH, Patience Odele, MD, Nancy R. Feldman, MD, Patricia A. Ganz, MD, and Melinda Maggard-Gibbons, MD, MSHS, *Los Angeles and Sylmar, CA*

We implemented a survivorship card and tested changes in individual breast cancer knowledge. Our study highlights an intervention that effectively reduces barriers to care in ethnic minorities who demonstrate difficulty with provider communication.

676 **Clinicopathologic features and time interval analysis of contralateral breast cancers**

Erik Liederbach, BS, Rita Piro, BS, Katie Hughes, BS, Rachel Watkin, BS, Chi-Hsiung Wang, PhD, and Katharine Yao, MD, FACS, *Evanston, IL*

The median time interval to develop a contralateral breast cancer is 6.2 years. This report will inform physicians on factors associated with a longer time interval to development of a contralateral breast cancer.

- 686 **Is a diverting ostomy needed in mid-high rectal cancer patients undergoing a low anterior resection after neoadjuvant chemoradiation? An NSQIP analysis**

Evangelos Messaris, MD, PhD, Tara M. Connelly, MB, BCh, MSc, Afif N. Kulaylat, MD, Jennifer Miller, MD, Niraj J. Gusani, MD, MS, Gail Ortenzi, RN, BSN, CCM, Joyce Wong, MD, and Neil Bhayani, MD, *Hershey, PA*

In mid-high rectal cancers receiving nCRT and treated with LAR with or without diverting stoma, there were no differences in surgical outcomes. Receipt of nCRT should not be the driving factor for using a diverting stoma.

- 692 **Opportunity lost: Adjuvant chemotherapy in patients with stage III colon cancer remains underused**

Adan Z. Becerra, BA, Christian P. Probst, MD, Mohamedtaki A. Tejani, MD, Christopher T. Aquina, MD, Maynor G. González, PhD, Bradley J. Hensley, MD, MBA, Katia Noyes, PhD, MPH, John R. T. Monson, MD, and Fergal J. Fleming, MD, *Rochester, NY*

We identified factors associated with receipt of adjuvant chemotherapy in patients with stage III colon cancer as well as temporal trends. The importance of these findings is that there are significant process failures that contribute to suboptimal care.

## COST-EFFECTIVENESS RESEARCH

- 700 **Cost-utility analysis of the use of prophylactic mesh augmentation compared with primary fascial suture repair in patients at high risk for incisional hernia**

John P. Fischer, MD, Marten N. Basta, BA, Jason D. Wink, MD, MTR, Naveen M. Krishnan, MD, MPhil, and Stephen J. Kovach, MD, *Philadelphia, PA, and Washington, DC*

This study provides a cost-utility analysis of primary operative repair compared with prophylactic mesh augmentation of high-risk abdominal fascial closures. The cost-utility analysis demonstrates prophylactic mesh was more effective, less costly, and overall more cost-effective than PSC.

- 712 **Cost effectiveness of nonoperative management versus laparoscopic appendectomy for acute uncomplicated appendicitis**

James X. Wu, MD, Aaron J. Dawes, MD, Greg D. Sacks, MD, MPH, F. Charles Brunicaudi, MD, and Emmett B. Keeler, PhD, *Los Angeles and Santa Monica, CA*

Per our model, nonoperative management of uncomplicated acute appendicitis is less costly and more effective than initial laparoscopic appendectomy. The significance of this finding is that nonoperative management warrants further investigation.

## CLINICAL OUTCOMES/GENERAL SURGERY

- 722 **End-stage renal disease increases the risk of mortality after appendectomy**

Michael C. Smith, MD, Matthew R. Boylan, ScB, Sophia F. Tam, MD, Roseanna Lee, MD, Antonio E. Alfonso, MD, and Gainosuke Sugiyama, MD, *Brooklyn, NY*

We performed an analysis of the Nationwide Inpatient Sample database to examine outcomes of patients with end-stage renal disease who undergo appendectomy. The importance of this finding is to display the increased mortality in this patient population.

- 728 **Perioperative outcomes of delayed laparoscopic cholecystectomy for acute calculous cholecystitis with and without percutaneous cholecystostomy**

Ido Mizrahi, MD, Haggi Maze, MD, Jonathan B. Yuval, MD, Gidon Almog, MD, Miklosh Bala, MD, Natalia Simanovski, MD, Nadeen Abu Ata, MD, Eran Kuchuk, Jacob Rachmuth, MD, Aviram Nissan, MD, and Ahmed Eid, MD, *Jerusalem, Israel*

This study presents that delayed laparoscopic cholecystectomy in patients with previous percutaneous cholecystostomy is associated with greater duration of stay, more readmissions, and, most importantly, greater conversion rate, biliary-related complications, and surgical-site infection. The significance of this report is to increase surgeons' awareness of the fact that patients who required percutaneous cholecystostomy, even after a "cooling" period, may ultimately suffer from a greater-than-usual complication rate.

736 **The pitfalls of inguinal herniorrhaphy: Surgeon volume matters**

Christopher T. Aquina, MD, Christian P. Probst, MD, Kristin N. Kelly, MD, MPH, James C. Iannuzzi, MD, MPH, Katia Noyes, PhD, MPH, Fergal J. Fleming, MD, and John R. T. Monson, MD, *Rochester, NY*

This study demonstrated that low surgeon volume was associated with higher reoperation rates for recurrence and increased healthcare utilization following open inguinal hernia repair. These findings support referral to higher volume surgeons.

764 **Pilot study of a population-based survey to assess the prevalence of surgical conditions in Uganda**

Elissa K. Butler, MD, Tu M. Tran, BA, BS, Anthony T. Fuller, BA, Fredrick Makumbi, PhD, Samuel Luboga, MMed, PhD, Sheila Kisakye, MA, Michael M. Haglund, MD, PhD, Jeffrey G. Chipman, MD, and Moses Galukande, MMed, *Minneapolis, MN, Durham, NC, and Kampala, Uganda*

We piloted a household-based survey in a periurban district of Uganda to estimate the prevalence of surgical conditions and to identify logistical challenges. Importance was to characterize the met and unmet need for surgical care in Uganda.

**GLOBAL SURGERY**

747 **Out-of-pocket expenses incurred by patients obtaining free breast cancer care in Haiti: A pilot study**

Kathleen M. O'Neill, BA, Morgan Mandigo, MSc, Jordan Pyda, MD, Yolande Nazaire, BA, Sarah L. M. Greenberg, MD, MPH, Rowan Gillies, MBBS, and Ruth Damuse, MD, *Boston, MA, Philadelphia, PA, Miami, FL, Mirebalais, Haiti, Milwaukee, WI, and St Leonards, Australia*

In this cross-sectional study, 61 patients receiving breast cancer care free of charge at Hôpital Universitaire de Mirebalais (HUM) in Haiti were interviewed to quantify their out-of-pocket (OOP) medical and nonmedical expenses incurred during the course of treatment and diagnosis. The importance of this study is that despite receiving free care at HUM, more than two-thirds of participants met conservative criteria for catastrophic medical expenses (defined as spending more than 40% of their potential household income on OOP payments), indicating the need for further studies to understand the magnitude of OOP health care expenses for the poor worldwide and its impact on their health outcomes.

756 **Factors associated with delays to surgical presentation in North-West Cameroon**

Chao Long, AB, Ebogo Titus Ngwa Tagang, MD, Rita A. Popat, PhD, Ernest K. Lawong, James A. Brown, MD, and Sherry M. Wren, MD, *Stanford and Palo Alto, CA, and Cameroon, West Africa*

The majority of patients had delays before definitive management surgical problems as the result of multiple nontherapeutic visits to previous health care settings. This work helps inform barriers to expansion of surgical care in Cameroon.

**SURGICAL EDUCATION**

773 **Practice administration training needs of recent general surgery graduates**

Mary E. Klingensmith, MD, Thomas H. Cogbill, MD, Kelli Samonte, MA, Andrew Jones, PhD, and Mark A. Malangoni, MD, *St. Louis, MO, La Crosse, WI, and Philadelphia, PA*

A survey of recent residency graduates was undertaken to assess learning gaps in practice administration principles. The significant finding is that the vast majority of residency graduates wish they had received more practice administration training during residency.

**BARIATRICS**

777 **Assessment of postdischarge complications after bariatric surgery: A National Surgical Quality Improvement Program analysis**

Sophia Y. Chen, BS, Miloslawa Stem, MS, Michael A. Schweitzer, MD, Thomas H. Magnuson, MD, and Anne O. Lidor, MD, MPH, *Baltimore, MD*

In this study, we used the 2005–2013 American College of Surgeons National Surgical Quality Improvement Program database to identify the rate of postdischarge complications, their associated risk factors, and their influence on early hospital readmission after bariatric surgery. The significance of this report demonstrates that postdischarge complications after bariatric surgery represent a substantial source of patient morbidity and provides evidence that implementing strategies to decrease perioperative infection may help to decrease readmissions and enhance overall quality of care in this population.

**PEDIATRICS**

**787 A statewide analysis of specialized care for pediatric appendicitis**

Luke R. Putnam, MD, Linh K. Nguyen, MS, Kevin P. Lally, MD, MS, Luisa Franzini, PhD, KuoJen Tsao, MD, and Mary T. Austin, MD, MPH, *Houston, TX*

Specialized care for pediatric appendicitis leads to less radiation-based imaging with similar outcomes but longer hospital stays. These findings emphasize the impact and role of specialized care for this common condition.

**793 Pediatric reduction mammoplasty: A retrospective analysis of the Kids' Inpatient Database (KID)**

Tahereh Soleimani, MD, Tyler A. Evans, MD, Rajiv Sood, MD, Ivan Hadad, MD, Juan Socas, MD, Roberto L. Flores, MD, and Sunil S. Tholpady, MD, PhD, *Indianapolis, IN*

Our study investigates the potential socioeconomic disparities in pediatric reduction mammoplasty via the Kids' Inpatient Database. The significance of this study is defining these disparities and focus future quality improvement in reduction mammoplasty.

**802 Development of an endoluminal intestinal lengthening device using a geometric intestinal attachment approach**

Farokh R. Demehri, MD, Jennifer J. Freeman, MD, Yumi Fukatsu, MD, Jonathan Luntz, PhD, and Daniel H. Teitelbaum, MD, *Ann Arbor, MI*

We describe a novel catheter device with tapering stiffness allowing for endoluminal intestinal lengthening. The significance of this report is that it demonstrates a clinically applicable approach for the future treatment of short bowel syndrome.

**812 Prevalence and impact of admission hyperfibrinolysis in severely injured pediatric trauma patients**

Ioannis N. Liras, Bryan A. Cotton, MD, MPH, Jessica C. Cardenas, PhD, and Matthew T. Harting, MD, MS, *Houston, TX*

We evaluated fibrinolysis among severely-injured pediatric trauma patients. The significance of this work is identification

of the prevalence and mortality associated with hyperfibrinolysis (LY-30  $\geq 3\%$ ) among pediatric trauma patients.

**819 Bromodomain and extraterminal inhibition blocks tumor progression and promotes differentiation in neuroblastoma**

Sora Lee, PhD, Eric J. Rellinger, MD, Kwang Woon Kim, PhD, Brian T. Craig, MD, Carmelle V. Romain, MD, Jingbo Qiao, PhD, and Dai H. Chung, MD, *Nashville, TN*

This study describes a novel finding that JQ1 treatment inhibits neuroblastoma neurosphere formation and promotes differentiation.

**827 Antioxidant inhibition of steady-state reactive oxygen species and cell growth in neuroblastoma**

Yueming Zhu, PhD, Pritha Paul, PhD, Sora Lee, PhD, Brian T. Craig, MD, Eric J. Rellinger, MD, Jingbo Qiao, PhD, David R. Gius, MD, PhD, and Dai H. Chung, MD, *Chicago, IL, and Nashville, TN*

ROS production is under the control of GRP-R signaling and antioxidant treatment regulates cell proliferation in neuroblastoma. The significance of this finding is that ROS signaling may offer a novel target for therapy in high-risk neuroblastoma.

**ENDOCRINE**

**837 Improvement in patient-reported physical and mental health after parathyroidectomy for primary hyperparathyroidism**

Kyle Zanolco, MD, Zeeshan Butt, PhD, David Kaltman, BS, Dina Elaraj, MD, David Cella, PhD, Jane L. Holl, MD, MPH, and Cord Sturgeon, MD, *Chicago, IL*

We performed computer adaptive testing on patients with primary hyperparathyroidism before and after surgery and found improvement in 5 Patient-Reported Outcomes Measurement Information System domains. Through this testing, patients can now be correctly designated as "symptomatic" and receive proper treatment.

## WOUND HEALING

846 **Angiotensin-1 improves endothelial progenitor cell-dependent neovascularization in diabetic wounds**

Swathi Balaji, PhD, Nate Han, BS, Chad Moles, BS, Aimen F. Shaaban, MD, Paul L. Bollyky, MD, DPhil, Timothy M. Crombleholme, MD, and Sundeep G. Keswani, MD, *Cincinnati, OH, Stanford, CA, and Aurora, CO*

Angiotensin-1 overexpression to treat diabetic wounds restores endothelial progenitor cell recruitment and corrects the diabetic wound healing deficit. This was associated with an increase in matrix metalloproteinase 9 and stem cell factor, without an effect on vascular endothelial growth factor.

## SOCIAL MEDIA

857 **Social media is a necessary component of surgery practice**

Scott R. Steele, MD, Seyed Arshad, BS, Ruth Bush, MD, JD, MPH, Serena Dasani, BA, Kyle Cologne, MD, Joshua I. S. Bleier, MD, Tal Raphaeli, MD, and Rachel R. Kelz, MD, MSCE, for the Society of University Surgeons' Social and Legislative Committee, *Cleveland, OH, College Station and Houston, TX, Philadelphia, PA, and Los Angeles, CA*

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