New Study Reveals Wide Variation in Blood Transfusion Practices During Surgery

The Associated Press

According to a new study in the July 2012 print edition of Anesthesiology, blood transfusion, the most common procedure performed in U.S. hospitals1, has wide variation in frequency by surgical procedure and physician as well as wide variation in the hemoglobin trigger used to help decide whether to transfuse.2 The study also showed a significant number of transfusion decisions are made without laboratory hemoglobin measurements. The research adds to the growing clinical evidence highlighting the need for improved blood-management strategies. It also underscores the opportunity for noninvasive and continuous total hemoglobin (SpHb@) monitoring from Masimo (NASDAQ: MASI) to facilitate optimal transfusion decision making to improve patient safety and reduce costs.

In the study, conducted at Johns Hopkins Hospital in Baltimore, Maryland, researchers collected data on 48,086 surgical patients over 18 months and evaluated blood transfusion frequency and hemoglobin triggers by surgical procedure and physician. A total of 2,981 patients (6.2 received an intra-operative red blood cell transfusion, with two-thirds of those patients receiving two or more units. Transfusion rates varied up to threefold between different physicians performing the same procedure ($p<0.05$). The average transfusion hemoglobin trigger used to determine need for blood transfusion varied widely with both surgeons (7.2 g/dL to 9.8 g/dL, $p=0.001$ and anesthesiologists (7.2 g/dL to 9.6 g/dL, $p=0.001$). The ending hemoglobin values after the last recorded transfusion also varied widely for both surgeons (8.8 g/dL to 11.8 g/dL, $p=0.001$) and anesthesiologists (9.0 g/dL to 11.7 g/dL, $p=0.0004$). A recent laboratory hemoglobin measurement was not available when 31% of transfusion decisions were made.

Blood transfusions carry risks. In a previous meta-analysis of 45 studies evaluating the risks of blood transfusion, 42 studies showed a significant link to mortality, infection, or adult respiratory distress syndrome.3 In contrast to the historical belief that withholding transfusions harms patients, multiple randomized controlled trials have now proven that restrictive transfusion practice is safe.4,5,6 This has led recent transfusion guidelines to focus transfusion decisions on the overall patient condition and to suggest hemoglobin transfusion triggers of 6-7 g/dL for most patients and above 7 g/dL only in select, high-risk patients.7,8,9 Blood transfusions are also one of the largest cost centers in hospitals. While the material cost of blood ranges from $200 to $300 per unit, the additional costs from storage, labor, and waste result in an actual cost per unit between $522 and $1,183.10 In addition to the cost of blood itself, each unit of blood transfused increases the cost of care, with even higher costs incurred when patients are transfused at higher hemoglobin levels.11 A recent systematic evaluation of 494 studies concluded that 59% of transfusions were "inappropriate" based on their impact on patient outcomes.12 The risks and costs of blood transfusion paired with unnecessary transfusions led

the Joint Commission in 2011 to introduce new patient blood management measures that hospitals are being encouraged to adopt as a quality indicator.13 The new measures include recording the clinical indication for transfusion along with the hemoglobin value of the patient prior to each unit transfused. With the need to stem rising health care expenditures, the Joint Commission and the American Medical Association have targeted blood transfusion procedures as one of the top procedures to reduce in a "National Summit on Overuse" scheduled for September 2012.14 There is no doubt that clinicians desire the best care for their patients without unnecessary costs, but they are also limited in their precise ability to determine need for transfusion with existing tools.

Estimates of blood loss in the operating room can be inaccurate.

Researchers at Duke University recently reported estimated surgical blood loss exceeded measured blood loss by more than 40% (860mL vs.

611 mL, $p < 0.0001$).15 The likely reason for this discrepancy is the inability to accurately estimate blood loss based on visual inspection of blood and fluid in suction canisters and surgical sponges. While estimating blood loss is challenging and laboratory hemoglobin results are only availably intermittently and are often delayed, transfusion decisions are made in real time. Acknowledging these challenges, the Duke Researchers stated: "Use of bedside hemoglobin concentration devices and continuous, noninvasive hemoglobin monitors may improve transfusion decisions." Masimo's breakthrough SpHb measurement allows clinicians to noninvasively and continuously monitor hemoglobin. Results of an earlier randomized controlled trial conducted by researchers at Massachusetts General Hospital and Harvard Medical School showed that SpHb helped anesthesiologists reduce the frequency of blood transfusion by 87% (from 4.5% to 0.6%, $p=0.03$) and quantity of blood by 90% (from 0.1 to 0.01 units per patient, $p<0.0001$) in 327 patients undergoing orthopedic surgery.16 Dr. Aryeh Shander, Executive Medical Director at the Institute for Patient Blood Management & Bloodless Medicine Surgery and Chief of Anesthesiology and Critical Care Medicine at Englewood Hospital & Medical Center in New Jersey, stated: "The ability of Masimo's noninvasive hemoglobin technology to continuously monitor hemoglobin during surgeries can offer earlier, real-time information that can result in diagnosis leading to interventions other than transfusion.

And fewer unnecessary transfusions can mean improved patient outcomes." This year Masimo launched the Blood Transfusion Related Cost Reduction guarantee program (BTR-CR, "Better Care") to help hospitals improve patient care and reduce costs. BTR-CR guarantees that a hospital's blood transfusion-related cost reductions will be greater than the cost of SpHb monitoring. For more information, contact 888-44BTRCR or visit BTR-CR.

1 AHRQ, Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1997 and 2007.

2 Steven M. Frank, M.D., Will J. Savage, M.D., Jim A. Rothschild, M.D., Richard J. Rivers, M.D., Paul M. Ness, M.D., Sharon L. Paul, B.S., M.S., John A. Ulatowski, M.D.,

Ph.D., M.B.A. "Variability in Blood and Blood Component Utilization as Assessed by an Aesthesia Information Management System." Anesthesiology, July 2012 - Volume 117 - Issue 1 - p 99-106 doi: 10.1097/ALN.0b013e318255e550 3 Marik, P. E. and H. L. Corwin (2008). "Efficacy of red blood cell transfusion in the critically ill: a systematic review of the literature." Crit Care Med 36(9): 2667-74.

4 Carson, J. L., M. L. Terrin, et al. (2011). "Liberal or restrictive transfusion in high-risk patients after hip surgery." N Engl J Med 365(26): 2453-62.

5 Hebert, P. C., G. Wells, et al. (1999). "A multicenter, randomized, controlled clinical trial of transfusion requirements in critical care. Transfusion Requirements in Critical Care Investigators, Canadian Critical Care Trials Group." N Engl J Med 340(6): 409-17.

6 Hajjar, L. A., J.-L. Vincent, et al. (2010). "Transfusion Requirements After Cardiac Surgery: The TRACS Randomized Controlled Trial." JAMA 304(14): 1559-1567.

7 American Society of Anesthesiologists Task Force on Perioperative Blood Transfusion and Adjuvant Therapies: Practice Guidelines for Perioperative Blood Transfusion and Adjuvant Therapies: An updated report by the American Society of Anesthesiologists Task Force on Perioperative Blood Transfusion and Adjuvant Therapies. Anesthesiology 2006; 105:198 -208 8 Napolitano LM, Kurek S, Luchette FA, Corwin HL, Barie PS, Tisherman SA, Hebert PC, Anderson GL, Bard MR, Bromberg W, Chiu WC, Cipolle MD, Clancy KD, Diebel L, Hoff WS, Hughes KM, Munshi I, Nayduch D, Sandhu R, Yelon JA, American College of Critical Care Medicine of the Society of Critical Care Medicine, Eastern Association for the Surgery of Trauma Practice Management Workgroup: Clinical practice guideline: Red blood cell transfusion in adult trauma and critical care. Crit Care Med 2009; 37:3124 -57 9 Society of Thoracic Surgeons Blood Conservation Guideline Task Force, Ferraris VA, Brown JR, Despotis GJ, Hammon JW, Reece TB, Saha SP, Song HK, Clough ER, Society of Cardiovascular Anesthesiologists Special Task Force on Blood Transfusion, Shore-Lesserson LJ, Goodnough LT, Mazer CD, Shander A, Stafford-Smith M, Waters J, International Consortium for Evidence Based Perfusion, Baker RA, Dickinson TA, FitzGerald DJ, Likosky DS, Shann KG: 2011 update to the Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists blood conservation clinical practice guidelines. Ann Thorac Surg 2011; 91:944 - 82 10 Shander, A.,A. Hofmann, et al. "Activity-based costs of blood transfusions in surgical patients at four hospitals." Transfusion 50(4): 753-65.

11 Murphy, G. J., B. C. Reeves, et al. (2007). "Increased mortality, postoperative morbidity, and cost after red blood cell transfusion in patients having cardiac surgery." Circulation 116(22): 2544-52.

12 Shander, A., A. Fink, et al. (2011). "Appropriateness of allogeneic red blood cell transfusion: the international consensus conference on transfusion outcomes." Transfus Med Rev 25(3): 232-246 e53.

13 Gammon HM, Waters JH, Watt A, Loeb JM, Donini-Lenhoff A: Developing performance measures for patient blood management. Transfusion 2011; 51:2500

-9.

14 Joint Commission Perspectives. The Joint Commission Continues to Study Overuse Issues. Volume 32, Number 5, 2012 : 4-8(5).

15 Hill, S., Broomer, B Stover, J, White, W. (2011). Accuracy of estimated blood loss in spine surgery. American Society of Anesthesiologists Annual Conference, San Diego, CA 16 Ehrenfeld JM, Henneman JP, Sandberg WS. "Impact of Continuous and Noninvasive Hemoglobin Monitoring on Intraoperative Blood Transfusions." American Society Anesthesiologists. 2010;LB05 About Masimo Masimo (NASDAQ: MASI) is the global leader in innovative noninvasive monitoring technologies that significantly improve patient care-helping solve "unsolvable" problems. In 1995, the company debuted Measure-Through Motion and Low Perfusion pulse oximetry, known as Masimo SET@, which virtually eliminated false alarms and increased pulse oximetry's ability to detect life-threatening events. More than 100 independent and objective studies demonstrate Masimo SET provides the most reliable SpO2 and pulse rate measurements even under the most challenging clinical conditions, including patient motion and low peripheral perfusion. In 2005, Masimo introduced rainbow SET@ Pulse CO-OximetryTM technology, allowing noninvasive and continuous monitoring of blood constituents that previously required invasive procedures, including total hemoglobin (SpHb@), oxygen content (SpOCTM), carboxyhemoglobin (SpCO@), methemoglobin (SpMet@), and Pleth Variability Index (PVI@), in addition to SpO2, pulse rate, and perfusion index (PI). In 2008, the company introduced Masimo Patient SafetyNetT, a remote monitoring and wireless clinician notification system designed to help hospitals avoid preventable deaths and injuries associated with failure to rescue events. In 2009, Masimo introduced rainbow Acoustic MonitoringTM, the first-ever noninvasive and continuous monitoring of acoustic respiration rate (RRaT).

Masimo's rainbow SET technology platform offers a breakthrough in patient safety by helping clinicians detect life-threatening conditions and helping guide treatment options. In 2010, Masimo acquired SEDLine@, a pioneer in the development of innovative brain function monitoring technology and devices. Masimo SET and Masimo rainbow SET technologies also can be found in over 100 multiparameter patient monitors from over 50 medical device manufacturers around the world. Founded in 1989, Masimo has the mission of "Improving Patient Outcome and Reducing Cost of Care . by Taking Noninvasive Monitoring to New Sites and Applications@." Additional information about Masimo and its products may be found at www.masimo.com.

Forward-Looking Statements This press release includes forward-looking statements as defined in Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934, in connection with the Private Securities Litigation Reform Act of 1995. These forward-looking statements are based on current expectations about future events affecting us and are subject to risks and uncertainties, all of which are difficult to predict and many of which are beyond our control and could cause our actual results to differ materially and adversely from those expressed in our forward-looking statements as a result of various risk factors, including, but not limited to: risks related to our assumptions of the

repeatability of clinical results obtained using the new Masimo Pronto-7 and noninvasive sensor sizes, risks related to our belief that the Pronto-7 enables quick and easy noninvasive spot-checking of hemoglobin (SpHb@), SpO2, pulse rate, and perfusion index at the point-of-care for all patients, as well as other factors discussed in the "Risk Factors" section of our most recent reports filed with the Securities and Exchange Commission ("SEC"), which may be obtained for free at the SEC's website at www.sec.gov. Although we believe that the expectations reflected in our forward-looking statements are reasonable, we do not know whether our expectations will prove correct. All forward-looking statements included in this press release are expressly qualified in their entirety by the foregoing cautionary statements. You are cautioned not to place undue reliance on these forward-looking statements, which speak only as of today's date. We do not undertake any obligation to update, amend or clarify these statements or the "Risk Factors" contained in our most recent reports filed with the SEC, whether as a result of new information, future events or otherwise, except as may be required under the applicable securities laws.

Media Contact: Mike Drummond Masimo Corporation Phone: (949) 297-7434 Email: mdrummond@masimo.com Masimo, SET, Signal Extraction Technology, Improving Patient Outcome and Reducing Cost of Care. by Taking Noninvasive Monitoring to New Sites and Applications, rainbow, SpHb, SpOC, SpCO, SpMet, PVI, rainbow Acoustic Monitoring, RRa, Radical-7, Rad-87, Rad-57,Rad-8, Rad-5,Pulse CO-Oximetry, Pulse CO-Oximeter, Adaptive Threshold Alarm, and SEDLine are trademarks or registered trademarks of Masimo Corporation. The use of the trademarks Patient SafetyNet and PSN are under license from University HealthSystem Consortium.

SOURCE Masimo -0- 07/26/2012 /Web Site: http://www.masimo.com (NASDAQ-NMS:MASI) / CO: Masimo ST: California IN: HEA MEQ SU: PDT SVY PRN -- LA46785 -- 0000 07/26/2012 13:00:00 EDT http://www.prnewswire.c

Source URL (retrieved on *07/30/2014 - 5:59am*):
http://www.mdtmag.com/news/2012/07/new-study-reveals-wide-variation-blood-transfusion-practices-during-surgery?qt-most_popular=0&qt-recent_content=0