Avoiding Surgical Complications: Lessons from Aviation Safety and Cognitive Science with Video Demonstration

PROGRAM CHAIR
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Target Audience
Educational activities are developed to meet the needs of surgical gynecologists in practice and in training, as well as, other allied healthcare professionals in the field of gynecology.

Accreditation
AAGL is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The AAGL designates this live activity for a maximum of 1.25 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

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General Session 2:
Avoiding Surgical Complications: Lessons from Aviation Safety and Cognitive Science with Video Demonstration

Faculty: William H. Parker, M.D.
Michael Grabowski and Jack Barker, United Airlines Pilots, Farr R. Nezhat, M.D.

Course Description

No doctor or nurse wakes up in the morning planning to harm a patient. However, approximately 98,000 Americans die each year as a result of medical errors. Operating rooms are complex, high anxiety and hierarchical environments, and are a major source of medical errors.

This presentation will address proven airline checklist safety principles, communication skills and team training for the operating room, pre-op and post-op units. Proper use of checklists has been shown to decrease surgical site infections, return to the OR, and surgical mortality by 50%. Use of a common language can avoid communication errors and team training encourages free communication about safety concerns. Perceptual issues during surgery can be recognized and compensated for once they are understood. Standardized use of these principles has been shown, in multiple studies, to improve patient outcomes.

Dr. William Parker is author of Understanding Errors During Laparoscopic Surgery and a past president of the AAGL. Jack Barker, PhD is an Airbus pilot and aviation safety instructor who conducted team dynamics research for the Air Force and NASA. Mike Grabowski is an Airbus pilot, former F-15 pilot and an instructor of Crew Resource Management.

Learning Objectives

At the conclusion of this activity, the participant will be able to: 1) Apply proper communication techniques in the operating room; 2) implement consistent use of OR safety checklists; 3) recognize how limitations of human perception may be compensated for in the OR; and 4) recognize how effective OR leadership can improve teamwork and patient safety outcomes.

(See next page for Video Demonstration description and objectives)
Video Demonstration of Bladder, Ureter and Vascular Injury

Course Description

This course provides a pre-recorded surgical demonstration of laparoscopic management of bladder ureteral and vascular injuries.

Course Objectives:

At the conclusion of this activity, the participant will be able to: 1) Identify various types of bladder, ureteral and vascular injuries; 2) review various methods for prevention of bladder ureteral and vascular injuries; and 3) identify and manage intentional and unintentional bladder and ureteral and vascular injury and repair.
PLANNER DISCLOSURE
The following members of AAGL have been involved in the educational planning of this workshop and have no conflict of interest to disclose (in alphabetical order by last name).
Art Arellano, Professional Education Manager, AAGL*
Viviane F. Connor
Consultant: Conceptus Incorporated
Frank D. Loffer, Executive Vice President/Medical Director, AAGL*
Linda Michels, Executive Director, AAGL*
Jonathan Solnik
Other: Lecturer - Olympus, Lecturer - Karl Storz Endoscopy-America

SCIENTIFIC PROGRAM COMMITTEE
Arnold P. Advincula
Consultant: CooperSurgical, Ethicon Women's Health & Urology, Intuitive Surgical
Other: Royalties - CooperSurgical
Linda Bradley
Grants/Research Support: Elsevier
Consultant: Bayer Healthcare Corp., Conceptus Incorporated, Ferring Pharmaceuticals
Speaker's Bureau: Bayer Healthcare Corp., Conceptus Incorporated, Ferring Pharm
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Ceana H. Nezhat
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Speaker's Bureau: Conceptus Incorporated, Ethicon Women's Health & Urology
William H. Parker
Grants/Research Support: Ethicon Women's Health & Urology
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Consultant: Covidien, CareFusion, TransEnterix
Stock Shareholder: TransEnterix
Speaker’s Bureau: Covidien, Abbott Laboratories
Other: Proctor - Intuitive Surgical
FACULTY DISCLOSURE
The following have agreed to provide verbal disclosure of their relationships prior to their presentations. They have also agreed to support their presentations and clinical recommendations with the “best available evidence” from medical literature (in alphabetical order by last name).
Jack Barker
Other: Owner - Mach 3 Healthcare Safety Training
Michael P. Grabowski*
Farr R. Nezhat
Consultant: Genzyme, Plasma Surgical
William H. Parker
Grants/Research Support: Ethicon Women's Health & Urology
Consultant: Ethicon Women's Health & Urology

Asterisk (*) denotes no financial relationships to disclose.
**Surgical Complications:**

Lessons from Aviation Safety and Cognitive Science

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### Disclosure

- William H. Parker
  - Grants/Research Support: Ethicon Women's Health & Urology
  - Consultant: Ethicon Women's Health & Urology

- William Parker, Jack Barker, Mike Grabowski
  - Partners in Mach 3 Healthcare Safety Training

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### Patient Safety Program

- **Jack Barker, PhD**
  - Team dynamics research for the AF and NASA
  - Airbus Pilot and aviation safety instructor teaching Crew Resource Management courses.

- **Mike Grabowski, MBA**
  - Former F-15 pilot and T-38 Talon instructor pilot
  - Airbus Captain and Crew Resource Management Instructor.

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### The 1999 IOM Report

- 44,000-98,000 Deaths/year due to medical errors
- AHRQ data suggests this number is trending **upward**
- AHRQ - expense at $5M/year for a 700 bed hospital

- Stats from a "retrospective" chart review
- Sources: To Err is Human: Building a Safer Health System and http://www.ahrq.gov/qual/errors.htm

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### How Hazardous Is Health Care? (Leape)

- DANGEROUS (p<1/1000)
- ULTRA-SAFE (p<1/100M)

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- Total lives lost per year
- Number of encounters for each fatality

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% Adverse Events in Hospitals

Surgical Complications Worldwide (industrialized)
- 234,000,000 surgeries/year
- 3-16% major complications,
- Peri-operative deaths 0.4 - 0.8%
187,200 deaths/year

AVIATION
Crew Resource Management
- Flying’s first 100 years
  - Safety advancements written in blood
  - Technological plateau of the late 60’s
  - New safety advancements couldn’t stop fatalities
- Eastern 401

Eastern Airlines Flight 401

Precedent NASA: Why?

EAL 401
Crew Resource Management

- Pilots now selected for skill, plus
  - Ability to learn from errors
  - Willingness to accept help from flight crew
  - Use all available resources to make decisions

Airline Fatality Rates

- 1970 = 11.5
- 1995 = 3.4
- 2000 = 1.5
- 2004 = 0.9
- 2008 = 0.7
- 2010 = 0.0
- 2011 = 0.0

# Fatal Crashes / Million Departures

Miracle on the Hudson

“Sully”

Sullenberger
- Took over flying the plane
- Found place to land

Skiles - co-pilot
- Tried to relight the engines
- Sent distress signal
- Prepared plane for water landing

Dail, Dent, Welsh - attendants
- Prepared passengers for emergency landing
- Helped with life vests
- Opened doors
- Helped passengers evacuate - 3 minutes

Flight 1549 Teamwork

- Complex environment
  - Hierarchical
  - Emotional
  - High stakes, high anxiety

Operating Room = Cockpit

All 165 people on board Flight 1549 survived
The Goal

Turn High Performing Individuals Into a High Performance Team
Make Teamwork the NORM in the Operating Room

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Wrong-Site Surgery

- Colorado Malpractice Database, 2002-2008
- “Never-Events”
- 107 wrong-site procedures
  - 38 - Significant harm
  - 5 - Major harm
  - 1 death
- Attributed to lack of “time out” in 72% of cases

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Surgical Complications Explained

1) Some surgeons are not very good
2) Perhaps other factors contribute to complications

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Misperception

- Hard Wired
  - Perceptual information is highly filtered
    - 11,000,000 bits/second perceived
    - 40 bits/second consciously processed
  - Err towards familiar and expected

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Confirmation Bias

Confirmation bias
- Decision, then discount contradictory evidence
  “Tunnel vision”

Good Collaboration Defined
- Nurses
  “having their input respected”
- Doctors
  “nurses who follow their instruction”

Error Chains: The Good News
Error Chains Can Be Broken!!

HOW?

Root Causes of Sentinel Events
(All categories; 1995-2004)
Communication problems

- Root cause in 84% of all patient events with serious or fatal outcomes
- 67% of communication breakdowns occurred with or between physicians

References: JCAHO 2003;
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Different Communication Styles

MD
- Trained to solve problems, direct & concise
- “Just give me the headlines”

RN
- Trained to be narrative & descriptive...giving report
- May wait for direction

Complicating factors: gender, national culture, medical hierarchy, prior relationships

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Healthcare Team Briefing

Introduce all team members
Identify roles/responsibilities
Discuss potential problems/concerns
Emphasize climate of open communication
  - “Please speak up”
  - “Any questions?”

Always Remember!

“It Is Not Who Is Right But What Is Right”

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Communication Failure in the OR

- Prior to team training
  - 56 errors in 75 hours of observation
- After team training
  - 20 errors in 75 hours  ↓65%

Halverson A: Surgery 2010

Good communication makes teams work
Team behaviors either save lives or costs lives.....
Which team do you want to be on???

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Communication Tools

- Active Listening
- Inquiry
- Advocacy
- SBAR
- CUS Words

The High and The Mighty (1954)

Advocacy: How do you do it?

GET PERSON'S ATTENTION
REACH DECISION
EXPRESSION CONCERN
“I am concerned”
PROPOSE ACTION
STATE PROBLEM

MARCH 10, 1989 DRYDEN, CANADA
AIR ONTARIO FLT 1363 a FOKKER F28 crashed during takeoff. The accident was caused in part by icing on the aircraft's critical surfaces. 24 people perished.
Common Language
- I am **CONCERNED**!  
- I am **UNCOMFORTABLE**!  
- This is a **SAFETY ISSUE**!

Never hesitate to CUS but only when appropriate!

Liability Claims
- Claims with **substantial harm** to patients
  - 90% - a team member knew something wrong
    - Kept silent
    - Was ignored

“Patients pay a high price for dysfunctional teamwork”

Some Things Are Worth The Risk!
- What’s the worst thing that can happen to you if you advocate for something and are not well received?
- What is the worst thing that can happen if you don’t advocate?

Remember: you should get your say but you may not get your way

Situational Awareness is:
- **Knowing** where you’ve been...
- **Knowing** where you are...
- **Anticipating** where you might soon find yourself

Laparoscopy: Advantage

**Situation Awareness**
Everyone Can See

Surgeon Can Ask for Help

- Encourage involvement
- Assistant surgeon
- Nurses
- Anesthesiologist
Fear/Stress
- Reaction / state of arousal
  - Tachycardia
  - Momentary Autism
    - Vision restricted
    - Narrowing of attention

Deliberate Thinking
- Slow Down
- Suppress Reaction

- Apply Pressure to Vessel
- Take a deep breath
- Wait a few seconds to regain composure

Building Team Situational Awareness
- Using your wingman
  - Seek clarification when uncertain – inquiry?
  - Anticipate possible complications – reassess?
  - Cross-check and verify what is said – readback?
  - Ask team members to “please speak up”
WHO Checklist Survey

- Surgeons, Anesthesiologists, Nurses
  - Easy to use – 80% yes
  - Personally observed error averted – 78% yes
  - Would you want checklist used if you were having surgery? 93% yes

Surgical Safety and Patient Outcomes

- Netherlands – 11 hospitals with excellent outcomes
  - 6 hospitals trained, 5 control hospitals
- Training of surgeons and pre-op, OR, PACU staff
  - 3760 patients before checklist
  - 3820 patients after checklist

Benefits

- Decreased
  - Errors in O.R.
  - Surgical Morbidity and Mortality
  - Length of Stay
  - Malpractice Claims
  - Decreased Staff Turnover

- Increased
  - Overall Patient Care
  - Patient Satisfaction
  - MD & Staff Quality-of-Work Life
DOES TEAM TRAINING/CRM WORK?

ARMY COORDINATION TRAINING (ACT)

“No doctor, nurse or tech wakes up in the morning planning to harm a patient.”
Wachter R. Internal Bleeding 2004

But......

“No doctor, nurse or tech wakes up in the morning planning to harm a patient.”
Wachter R. Internal Bleeding 2004

“Everybody makes mistakes, and if we don’t figure out a way to prevent those mistakes, patients will be harmed.”
Pronovost P. Safe Patients, Smart Hospitals 2010

QUESTIONS?

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References

- To Err is Human: Building a Safer Health System and http://www.ahrq.gov/qual/errors.htm
- Zhan C, Miller MK. Excess length of stay, charges, and mortality attributable to medical injuries during hospitalization. JAMA 2003;290:1868-1874
CULTURAL AND LINGUISTIC COMPETENCY

Governor Arnold Schwarzenegger signed into law AB 1195 (eff. 7/1/06) requiring local CME providers, such as the AAGL, to assist in enhancing the cultural and linguistic competency of California’s physicians (researchers and doctors without patient contact are exempt). This mandate follows the federal Civil Rights Act of 1964, Executive Order 13166 (2000) and the Dymally-Alatorre Bilingual Services Act (1973), all of which recognize, as confirmed by the US Census Bureau, that substantial numbers of patients possess limited English proficiency (LEP).

California Business & Professions Code §2190.1(c)(3) requires a review and explanation of the laws identified above so as to fulfill AAGL’s obligations pursuant to California law. Additional guidance is provided by the Institute for Medical Quality at http://www.imq.org

Title VI of the Civil Rights Act of 1964 prohibits recipients of federal financial assistance from discriminating against or otherwise excluding individuals on the basis of race, color, or national origin in any of their activities. In 1974, the US Supreme Court recognized LEP individuals as potential victims of national origin discrimination. In all situations, federal agencies are required to assess the number or proportion of LEP individuals in the eligible service population, the frequency with which they come into contact with the program, the importance of the services, and the resources available to the recipient, including the mix of oral and written language services. Additional details may be found in the Department of Justice Policy Guidance Document: Enforcement of Title VI of the Civil Rights Act of 1964 http://www.usdoj.gov/crt/cor/pubs.htm.

Executive Order 13166, “Improving Access to Services for Persons with Limited English Proficiency”, signed by the President on August 11, 2000 http://www.usdoj.gov/crt/cor/13166.htm was the genesis of the Guidance Document mentioned above. The Executive Order requires all federal agencies, including those which provide federal financial assistance, to examine the services they provide, identify any need for services to LEP individuals, and develop and implement a system to provide those services so LEP persons can have meaningful access.

Dymally-Alatorre Bilingual Services Act (California Government Code §7290 et seq.) requires every California state agency which either provides information to, or has contact with, the public to provide bilingual interpreters as well as translated materials explaining those services whenever the local agency serves LEP members of a group whose numbers exceed 5% of the general population.

If you add staff to assist with LEP patients, confirm their translation skills, not just their language skills. A 2007 Northern California study from Sutter Health confirmed that being bilingual does not guarantee competence as a medical interpreter. http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2078538.