





Operating Room Set up and Breakdown: How Instrumentation Errors Impact Surgical Cases

BY PATTI KONCUR, CRCST, CHMMC, ACE – IAHCSSM CLINICAL EDUCATOR

Certified Instrument Specialist (CIS) lessons provide members with ongoing education in the complex and ever-changing area of surgical instrument care and handling. These lessons are designed for CIS technicians, but can be of value to any CRCST technician who works with surgical instrumentation.

Earn Continuing Education Credits:

Online: Visit www.iahcsmm.org for online grading.

By mail: For written grading of individual lessons, send completed quiz and \$15 to:
Purdue University - Online Learning
Young Hall, Room 527
155 S. Grant Street
West Lafayette, IN 47907

Subscription Series: Purdue Extended Campus offers an annual mail-in or online self-study lesson subscription for \$75 (six specific lessons worth 2 points each toward CIS recertification of 6 hours). Call 800.830.0269 for details.

Scoring: Each online quiz with a passing score is worth 2 contact hours toward your CIS recertification (6 hours) or CRCST recertification (12 hours).

More information: IAHCSSM provides online grading service for any of the Lesson Plan varieties. Purdue University provides grading services solely for CRCST and CIS lessons. Direct any questions about online grading to IAHCSSM at 312.440.0078. Questions about written grading are answered by Purdue University at 800.830.0269.

LEARNING OBJECTIVES

1. Describe the basic routines for Operating Room case set up
2. Discuss the impact an incomplete or soiled case cart or surgical tray has on case set up
3. Review surgical case breakdown processes and how time restrictions affect these processes

A case-ready Operating Room (OR) is one that is properly cleaned and staged with case-specific instrumentation. A case-ready OR helps ensure OR providers have everything they need to deliver exceptional care and positively influences the surgical team, patient and surgical outcome.

The surgical team typically comprises the surgeon, OR nurse (RN Circulator), anesthesiologist, nurse anesthetist, physician assistant, surgical technologist and peri-anesthesia technologist. Surgical team members typically follow routines for OR set up and breakdown. They also ensure that the OR is thoroughly cleaned to establish the sterile field, and staged with all instruments and equipment specific to the upcoming surgery. All surgical team members adhere to the principles of asepsis and implement those principles for every surgical procedure to reduce the risk of the patient acquiring a surgical site infection (SSI).

Ensuring patient safety in the OR begins before the patient enters the surgical suite and includes attention to all applicable types of preventable errors, including instrumentation errors. Today's Sterile Processing department (SPD) deals with more diverse instrumentation and more advanced processing equipment than in the past. Surgeons, the primary users of these instruments, are increasingly aware of the challenges that often exist with instrument handling, and the role the surgical staff play in the complete reprocessing cycle; however, there is often a gap between what SP professionals know about the factors and challenges associated with instrument turnaround and what the surgical team members require or demand. Teamwork and effective, ongoing communication between surgical team members and SP professionals are essential.

This lesson addresses correct processes for ensuring that an OR is case-ready and the ways instrumentation errors that occur before set up, during set up and



during surgery can impact the surgical case. This lesson also reviews how time restrictions can affect the process of OR breakdown.

Objective 1: Describe the basic routines for Operating Room case set up

OR set-up routines may vary from facility to facility; however, the principles of asepsis remain the same. What follows are standard OR set-up routines:

- All surgical procedures require an assortment of general instrumentation and procedure-specific instrumentation. The day before surgery, case cart assembly begins with a surgeon and a procedure-specific pick sheet. The pick sheet details the instruments, trays and supplies needed for the case (the pick sheet does not contain the exact same information listed on the preference card). The day of surgery, the case cart with sealed sterile instrument trays is sent to the OR.
- The OR nurse manages all necessary care inside the surgical suite. The OR nurse, often assisted by a Certified Surgical Technologist (CST) and scrub technician, study the OR schedule in detail prior to the surgery to carry out duties effectively. The OR nurse knows the instruments, equipment and supplies needed in order to provide appropriate items without loss of time.
- The CST assists the nursing staff in preparing the OR environment for the surgical procedure.
- The OR nurse cross checks the surgeon's preference card against the instruments, supplies and equipment that have been "pulled" for the procedure to confirm everything needed to prepare the sterile field for the surgical procedure is present. The preference cards are physician and procedure specific and list all items needed for the case, including items such as the

robotic console and electrosurgical unit. The card also lists instructions on how to position and drape the patient, and any specific details pertaining to the procedure and surgeon performing it.

- The CST damp dusts the room and verifies that all furniture (e.g., IV stands, sitting stools, anesthesia provider's cart) and equipment (e.g., electrosurgical unit and suction system) are in the OR prior to opening the sterile items. Each item is checked for proper function.
- Surgical team members adhere to sterile technique when opening sterile instrument sets, packages and peel packs. If the instruments were not wrapped and sterilized during the preceding shift, the OR nurse will ensure that instrument sets are placed in the autoclave.
- When the surgical team begins to open sterile items, traffic in and out of the OR is monitored and controlled. OR traffic flow and the number of door openings during a procedure have been linked to higher airborne bacterial counts and the potential for increased postoperative infection.
- Sterile supplies are placed on the tables or stands, opened and set up as close to the time of surgery as possible (and for one surgery only). The packs and sets are opened in the order in which the scrub will need them. Packages are positioned so the flaps are on top.

Objective 2: Discuss the impact an incomplete or soiled case cart or surgical tray has on case set up

To effectively perform surgical procedures, surgeons require instrumentation that is clean, functional, complete and sterile. When instrumentation sets are incomplete or not acceptable for use, patient care is delayed, and a negative domino effect can result. Delays in the OR are costly and cause operational problems that can

affect the case load for the remainder of the day. In addition, surgeons have a schedule with specific times for surgery, usually followed by office hours. When OR expectations are not met, a patient's care can be delayed or adversely affected, which affects not only the surgical team but also the patient and their loved ones.

SP managers strive to provide optimal service line inventories for instruments, supplies and equipment. Efficient supervision of these three inventories supports the surgeon and the service, whether it is general surgery, orthopedics, plastic surgery, urology, cardiovascular, gynecology or another specialty. SP managers must also manage instrument sets and surgical equipment to meet the time constraints of scheduling and case turnover.

Instrument availability problems can begin in the SPD when many used case carts are permitted to sit for long periods of time; this practice allows blood and bioburden to dry and remain on the devices, which makes cleaning and decontamination more difficult. Another delay can occur if instruments are not placed back in the proper location. Incomplete case carts that are not ready for the surgical procedure can occur when SP technicians cannot locate the correct instrument.

When proper protocols are not followed, spotting, staining or rusting can also occur on instruments; if not addressed prior to the device(s) being placed in instrument trays for surgery, this can jeopardize patient safety and increase infection risks.

Each surgical case is attached to a procedure, which generates a preference card that includes the instrumentation requirements for the case. The database for each piece of equipment and instrumentation supporting the preference card has an equipment conflict alert capability. When the



system reaches its maximum instrument requirement, the scheduling system alerts the scheduler of a conflict. If schedulers pass the conflict messaging without making note, they can cause overbooking of instrumentation.

In addition, surgeons often add elective cases without any awareness that instruments are in use or unavailable. As a rule, add-on cases override scheduled procedures and use the available instrumentation. Timely communication among schedulers, the OR resource coordinator, instrument technicians, and SP professionals is critical for keeping the schedule running smoothly and ensuring that sufficient instrumentation is available for surgical cases. Communication and teamwork are essential to ensure a smooth surgical case.

Missing instruments cause surgical delays and, many times, result in the need to open additional sterile sets to complete the original set. A missing instrument can significantly disrupt OR efficiency.

Soiled instruments cause delays in surgery while a clean set is obtained. If a soiled instrument is placed on the sterile field, the entire case may have to be broken down, with new instruments and drapes obtained and the room being reset. This is costly for the facility due to the extra supplies and time required.

Objective 3: Review surgical case breakdown processes and how time restrictions affect these processes

Standardized OR turnover procedures are crucial for a timely preparation of the surgical suite for the next scheduled procedure. The breakdown process involves many individuals, in addition to the OR nurse and CST, and can include anesthesia technicians, equipment technicians, biotechnicians and OR cleaning staff.

A major focus of surgery departments is to improve the efficiency of OR

turnover time. As a routine, the OR nurse or CST maintains sterility of the Mayo stand and keeps a minimum number of sterile instruments on the stand in the event the surgeon may need to perform an additional procedure before the patient is transported out of the OR. Remaining instruments on the Mayo stand may include: a knife blade, four Crile or Kelly hemostats, curved Mayo and Metzenbaum scissors, two Army-Navy or Richardson retractors and two needle holders.

During breakdown of the OR, the OR nurse or CST must follow standard precautions to prevent contact with blood and body fluids. They must also apply the principles of economy of motion by establishing a logical, sequential routine for breaking down the sterile field.

Personal protective equipment (PPE) should be worn when breaking down the sterile field to protect against exposure to bloodborne pathogens. The first scrub, the individual who knows the location of sharps and contaminated items, is the one who is responsible for breaking down the sterile field and applying the principles of point-of-use (POU) treatment (the beginning of the instrument cleaning process).

Sharps should be handled and discarded according to facility policy and Occupational Safety and Health Administration standards that address sharps safety.

Standard routines for breaking down the sterile field include the following:

- Adhering to the facility's process for identifying instruments that need repair and removing them from service;
- Referring to the instrument manufacturer's instructions for use (IFU) regarding recommended cleaning solutions for instruments;
- Wiping instruments from the Mayo

stand with a sterile water-soaked sponge to remove gross soil and placing the instruments inside the appropriate instrument container. To prevent damage, heavy instruments should be placed on the bottom of the container and lighter/smaller instruments should be placed on top;

- Placing sharp instruments (Gelpi retractors, reamers, trocars) in a separate basin;
- Placing delicate instruments back into their container to prevent damage;
- Flushing lumened instruments with sterile water;
- Ensuring ratcheted instruments remain open and then placing them on a stringer;
- Disassembling instruments with multiple parts in accordance with the manufacturers' written IFU;
- Applying an approved enzyme/surfactant to instruments;
- Placing instruments in the appropriate instrument container inside a case cart to prevent cross contamination during transport to the SP decontamination room;
- Ensuring instruments that were not used during procedure are placed in their respective instrument tray to prevent instrument damage;
- Separating disposable items by waste categories and disposing of them in accordance with local, state and federal regulations. All disposable items should be placed in the impervious red waste bag identified by the biohazard symbol;
- Ensuring suction canisters and tubing are discarded according to facility policy and local regulations;
- Removing PPE and discarding it in a biohazardous waste bag;
- Removing biohazardous waste from the OR and placing it in the designated area for removal by Environmental Services personnel;



- Performing a medical handwash by the CST or scrub technician; and
- Ensuring that contaminated items are contained during transport from the OR to SP decontamination room.

Anesthesia technician duties include:

- Performing “end case” on the monitor;
- Cleaning the anesthesia machine;
- Wiping down all anesthesia-related equipment;
- Replacing the suction, circuits, electrocardiogram (ECG/EKG) patches and pulse oximeter;
- Filling vaporizers and hot lines, as needed;
- Checking and replacing carbon dioxide (CO₂), as needed;
- Removing excess moisture from the water trap;
- Cleaning and removing all extra equipment;
- Verifying blood pressure cuffs are available in all sizes;
- Stocking the cart and removing all extra supplies;
- Confirming an emergency back-up oxygen tank and Ambu bag are present at the time of turnover; and
- Ensuring the anesthesia cart is locked.

Equipment technician duties include:

- Checking with the OR nurse and returning blood products and/or coolers to the blood bank;
- Inspecting the OR table for cleanliness;
- Checking for correct bed and room setup, according to the preference card; and
- Setting up as supine if there is no case to follow for the next day.

Biotechnician duties include:

- Cleaning all equipment not needed for the next case before removing it from the OR; and

- Retrieving all case-appropriate equipment for the next case.

OR cleaning staff duties include:

- Collecting and removing all trash, biohazardous waste, and linens;
- Checking the sharps container (close, seal and replace at 2/3 full);
- Wiping down the overhead light with a hospital-approved disinfectant (HAD);
- Washing horizontal surfaces of furniture and equipment with a HAD;
- Removing the surgical waste management system and initiating the cleaning procedure;
- Inspecting walls and cleaning debris, as necessary;
- Cleaning the floor of debris using a wet microfiber mop with an approved cleaning/disinfecting chemical, and placing the “wet floor” sign;
- Restocking gloves, disinfecting wipes and the hand sanitizer dispenser; and
- Visually inspecting the room to ensure cleanliness and spot cleaning, as required.

The preoperative case management routine should be repeated in preparation for the next procedure (this includes repositioning the OR furniture).

Conclusion

Instrument availability and reliability are essential for a safe, well-run, cost-effective OR environment. Effective teamwork among the surgical team and SP professionals can identify deficiencies in the system and decrease the number of minor problems, which can lead to a smoother, safer and shorter surgery. Before, during and after a surgical case, every individual involved, every piece of equipment and every decision must result in a seamless, synergistic outcome. Today’s complex systems and instrumentation in the surgical field demand strong teamwork to

successfully achieve a case-ready OR where workflow sequence, timing and dependencies align. **C**

RESOURCES

Association of Surgical Technologists. *Guidelines for Best Practices for Breaking Down the Sterile Field*. June 1, 2018.

Association of Surgical Technologists. *Guidelines for Best Practices for Establishing the Sterile Field in the Operating Room*. October 20, 2018.

British Columbia Institute of Technology. *CSPS Surgical Team Member Role*. Council on Surgical & Perioperative Safety. July 10, 2019.

Occupational Safety and Health Administration. 29CR 1910.1030 Bloodborne pathogens. *Surgical Asepsis and the Principles of Sterile Technique*. 2010.

International Association of Healthcare Central Service Materiel Management. *Central Service Technical Manual*. 8th Ed. 2016.

Association for the Advancement of Medical Instrumentation. ANSI/AAMI ST79: 2017, *Comprehensive guide to steam sterilization and sterility assurance in health care facilities*.

Centers for Disease Control and Prevention. *Stop Sticks Campaign*. 2020.