

Patient Safety in the Operating Room

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Abstract

Surgery, no matter how minor, causes stress and poses risk for complications. Many variables, such as procedure performed, age of the patient and coexisting medical conditions determine the safety practices a patient needs before, during and after surgery. Nevertheless, administering anesthesia and disrupting the normal physiological process (ex. Through creation of the surgical wound and the surgical manipulation) subject all patients undergoing surgery to a common set of problems that requires standardized and individualized assessment and safe nursing intervention. Nursing goal when caring for surgical patient are to minimize the patient's anxiety, prepare them for surgery and assist in achieving safe and uncomplicated procedure and recovery. In addition, the health care environment is laden with hazards for the caregiver and the patient. Failure to use equipment and devices in a safe manner places both the caregiver and the patient at risk for injury. Legally, safety refers to conditions that will not cause injury or harm for both the patient and caregiver. Safety in surgery requires a reliable execution of multiple necessary steps in care, not just by the surgeon but by the team of health care professionals working together for the benefit of the patient. Patient's safety has received increased attention in recent years, but mostly with the focus on the epidemiology of errors and adverse events rather than on practice that reduce such events. The National Forum for Quality Measurement and Reporting (the National Quality Forum) define a patient safety practice as a type of process or structure whose application reduce the probability of adverse events resulting from exposure to the health care system a cross the range of disease or procedure.

INTRODUCTION

Surgery is an invasive special medical procedure performed on all parts of the human body to diagnose or treat illness, correct deformities and defects, repair injuries and cure certain diseases. General surgery is the basis for all surgical specialties that emerged as a result of understanding the etiology of various disease processes and using treatment for various parts of the body. Each specialty involves surgical procedures performed on a specific body system or anatomic region. General surgery includes abdominal surgeries such as cholecystectomy, appendectomy, hernioraphy, mastectomy and thyroidectomy (Henderson et al., 2000; Saad., 2007)

As the incidence of traumatic injuries, cancer and cardiovascular disease continues to rise, the impact of surgical intervention on public health system will grow. An estimated 234 million major surgeries are performed around the world each year, corresponding to one operation for every 25 people alive (World Alliance for Patient Safety., 2008)

While surgical procedures are intended to save patient's life, unsafe surgical care can cause substantial harm, errors and adverse events that may be preventable or unpreventable. Negative outcome of surgery can be divided into three types which include: First; a sequela which is defined as an expected negative result of surgery as a consequence inherent to the procedure itself such as mastectomy (surgical removal of the breast) as a result of breast cancer, second; failure to cure which indicates that the operation was performed with some degree of unsuccessfulness in achieving its purposes for example: inability to remove the entire cancer cells without compromising vital structure and finally surgical complications which are defined as any deviation from the normal conduct or consequence of operation as accidental injury to nerve or blood vessel as a result of poor safety management (Henderson et al., 2000; World Alliance for Patient Safety., 2008).

John and Direkx (2010) reported that Human errors play an important role in the occurrence of surgical complications that interfere with patient's safety. These errors may occur as a result of improper practice for identifying the patient, inadequate preoperative evaluation, ignorance of important clinical history as drug allergies, failure to confirm that all required instruments, devices and blood products are on hands, negligence to display essential images and administer the prophylactic antibiotics, improper disinfection and sterilization of equipment and instrument, inappropriate labeling of specimen, omission of sponges ,needles and instrument in the body cavities. In addition to these recurring errors of omission, human factors that contribute to poor surgical outcomes and lacking of surgical patient's safety include inexperience, poor judgment and miscommunication.

Caring and maintaining patient safety in the operating room is a collaborative responsibility between the overall OR health workers. Patient's care is founded on critical thinking and caring in a holistic framework. evidence-based concepts should be applied to care for patient problems in a particular setting. While the operating room is a special environment for diagnosis and treatment, hazards for the surgical patients and personnel are found. The most apparent condition that includes a great risk for the surgical patient is general anesthesia which refers to the drug that induces a state of analgesia, muscle relaxation and loss of consciousness, and it represents a critical experience to the surgical patient that need extensive and complex perioperative nursing care concentrating in the intraoperative phase of surgery (SURPASS., 2015; Quelletee., 1996).

Many studies done on anesthesia reported critical errors, such as wrong drug administration (24%), misuse of anesthetic machine (22%), problems with airway management (16%), problem with breathing system (11%), fluid therapy mismanagement (5%), intravenous infusion disconnection (6%), failure of monitoring (4%), and others (12%). These studies recommended that the first way to decrease those errors is improving intraoperative nursing care (Saad., 2001).

Because the majority of surgical adverse events are preventable various organizations, associations and agencies are interested to set a standard and rules to be followed by the operating room nurses toward the perioperative surgical patient based on the studies showing that the majority of surgical procedures performed a round the world are not evidence based (Safe surgery objectives., 2015).

Patient safety is a new healthcare discipline that emphasizes the reporting, analysis, and prevention of medical errors that often lead to adverse healthcare events. patient safety has emerged as a distinct healthcare discipline supported by an immature yet developing scientific framework (Alex et al., 2009). According to Morz, (1998) patient safety is defined as the avoidance and prevention of patient injuries or adverse events resulting from the processes of health care delivery.

The intraoperative phase starts when the patient arrives in the preoperative holding area and ends when the patient is admitted into the recovery room. Although safety is important in all phases of the surgical experience, the following areas are particularly important in the intraoperative phase: equipment safety, electrical safety, chemical safety, radiational safety, patient transport and positioning, and continuous asepsis (Strasser et al., 2001; Patient safety., 2018)

Safe and effective intraoperative care requires team effort. Each member of the surgical team brings unique skills that must be coordinated to achieve the desired patient's outcomes. Each member of the surgical team must be familiar with specific surgical procedures, adhere to policies and procedures and be able to adhere quickly to alterations in the patient's condition and surgical procedure (Potter & Perry., 2005).

Patient safety has received increased attention in recent years but mostly with a focus on the epidemiology of errors and adverse events, rather than on practices that reduce such events, so this study will be overview the practices toward safety of intraoperative surgical patient that will have a great impact on the quality of care (Making health care safer., 2015; Strasser et al., 2001).

Discussion

Surgery, no matter how minor, causes stress and poses risks for complications. Many variables, such as procedure performed, age of the patient and coexisting medical conditions determine the care a patient needs before, during and after surgery. Nevertheless, administering anesthesia and disrupting the normal physiological processes (ex. Through creation of the surgical wound and the surgical manipulation) subjects all patients undergoing surgery to a common set of problems that requires standardized and individualized assessment and nursing intervention (World Alliance for Patient Safety., 2008).

In order to define risk management it is first appropriate to define risk; Risk is the chance of an adverse event.....risk is the combination of the probability or frequency of occurrence of a defined hazard and the magnitude of the consequence of that occurrence.

According to Fischer et al., 2007, management of risk is best, if it is systematic. The advantages include: clarification of objectives, better understanding of uncertainty, a better response to the unexpected, and more effective communication, improvement in decision making, creation and reinforcement of confidence by all staff involved in the process. With these definitions in mind, it is possible to describe the circumstances in which risk management may be undertaken. Regardless the environment in which the person works, there will be some objects and situations that can potentially cause hazards in some description. An example of these is a building site or work place (OR). Containing in such an environment are heavy plant and equipment, chemical substances, noxious and poisonous gases, blood and blood related products, drugs and other complex liquids that put the surgical patient and operating room personnel in a continuous hazard (Keene et al., 2001; Alfredsdottir et al., 2008).

Operating room hazards:

The health care environment is laden with hazards for the caregiver and the patient. Failure to use equipment and devices in a safe manner places both the caregiver and the patient at risk for injury. Legally, safety refers to conditions that will not cause injury or harm for both the patient and caregiver. Safety in surgery requires a reliable execution of multiple necessary steps in care, not just by the surgeon but by the team of health care professionals working together for the benefit of the patient (Neeleman et al., 2003; Encyclopedia of Occupational Health and Safety., 2000). Operating room hazards classified according to occupation as follows:

Occupational hazards:

Accidental hazards include injuries to legs and toes caused by falling objects, e.g., medical instruments, slips, trips, and falls on wet floors, especially during emergency situations, stabs and cuts from sharp objects, especially needle-pricks and cuts by blades. **Physical hazards** include exposure to radiation from x-ray and radioisotope sources. **Chemical hazards** results from exposure to various anesthetic drugs (e.g. N₂O, halothane, ethyl bromide, ethyl chloride, ether, methoxyfluorane, etc.). Skin irritation and dermatoses are due to frequent use of soaps, detergents, disinfectants, Latex allergy caused by exposure to natural latex gloves and other latex-containing medical devices. **Biological hazards** as infections due to the exposure to blood, body fluids or tissue specimens possibly leading to blood-borne diseases such as HIV, Hepatitis B and Hepatitis C. **Ergonomic, psychosocial and organizational** factors include fatigue and lower back pain due to the handling of heavy patients and to long periods of work in a standing posture. Psychological stress is caused by a feeling of heavy responsibility towards patients, stress, strained family relations, and burnout due to shift and night work, overtime work (Johnson et al., 2008; Fransworth et al., 2007).

Surgical patient safety:

many studies showed that the annual volume of major surgeries was estimated to be 187-281 million operations or approximately one operation annually for every one 25 human being alive. While the rate of major complications has been documented to occur in 3-22% of inpatient surgical procedures, and the death rate ranged from 0.4-0.8%. Nearly half of these

adverse events are preventable. So surgical patient safety especially under general anesthesia has therefore emerged as a significant global health concern (Linda et al., 2009; Lawson et al., 2008).

In order to improve patient safety, firstly, it must be recognized as a significant health concern. Second, assessing the actual situation and the level of care given to be as a data base for the program and further development, in addition to assess the most important and frequent or recurrent adverse events and complications such as the surgical site infection and anesthesia complications (Delaune & Lander., 2002).

Patient safety has received increased attention in recent years, but mostly with the focus on the epidemiology of errors and adverse events rather than on practice that reduce such events. The National Forum for Quality and Measurement and Reporting (the National Quality Forum) defines a patient safety practice as a type of process or structure whose application reduce the probability of adverse events resulting from exposure to the health care system across the range of disease or procedure. So, it is necessary to determine the most common risks and hazards that the surgical patient faces during surgical experience including the administration of general anesthesia which includes: risk for injury, risk for injury from electrical, chemical and physical hazards, risk for operating the wrong site or wrong patient, risk for anesthesia complications, Risk of high blood loss, Risk for allergy or adverse drug reaction, risk for post-operative surgical site infection, risk for retention of instruments and sponges in the surgical wound, risk for insecure and incorrectly identifying all surgical specimens, and risk for ineffectively communicate and exchange critical information (Agency of Healthcare Research and quality., 2001; Harrison ET AL., 2000).

Strategy of intraoperative safety practices:

Emotional support:

Providing emotional support for the surgical patient in the operating room can be vital to the success of the procedure. Providing appropriate information and explanations for each phase of the procedure helps preventing unexpected, stressful events for the patient and promotes more relaxed and cooperative environment (Chen., 2010; Payne., 2007).

Equipment safety:

The operating room staff must routinely check and maintain equipment used during surgical procedures through inspection and testing of equipment such as connectors and grounded pad before each use. In addition, immediate reporting of equipment malfunctioning is necessary (AORN., 2004).

Electrical safety:

A ground pad is provided for ensuring patient safety. Proper grounding technique is essential for the safe and effective use of the generator. The circulating nurse and operating room staff ensures that the selected ground site is free of skin folds, scar tissue, erythema, skin lesions. The site should be as close as possible to the operative area. Throughout the surgery, inspects the ground pad site for any unusual skin discoloration, burns, or skin reaction. Lasers provide another method for cutting and coagulating tissue during the surgical procedure (Sandra & Jacqueline., 2006; Smith & Johnson., 2006).

Chemical safety:

To ensure patient chemical safety it is important to the operating room personnel to be aware of chemical hazards, follow warning labels and safety precautions and assess the patient for potential risk factors as allergy (El Azzazi., 2005; Dever., 2000).

Positioning:

Proper positioning ensures patient comfort and safety, preserves vascular supply, and prevents neuromuscular damage to tissue. At the same time, positioning also provides access to the surgical site, airway, intravenous lines, and all monitoring devices (Dever., 2000).

So all sharp surfaces in contact with the patient's skin should be padded to prevent injury from positioning. Bony prominences (e.g., sacrum and heels) are padded to avoid excessive pressure on these points. Appropriate devices are made available to support extremities to prevent compression of vital structures, such as the ulnar nerve or Achilles tendons. Restraints are available to secure the patient to the operating bed; sufficient soft padding is used to maintain anatomical alignment of the head and neck with the spine (Hilton., 2004).

Prevention of injury includes careful movement during positioning, use of appropriate positioning methods, and use of protective devices such as side rails and safety strips. Safe transfers of the patient to or from the operating room bed with all tubes are visible (Sue & Patricia., 2002).

Maintain body temperature:

Body temperature is maintained by applying warming mattresses or warmed blankets, warming and humidifying inhaled gases, warming irrigating and intravenous solutions, and increasing room temperature when the patient is exposed for skin preparation and positioning (NICE., 2008).

Safe anesthesia:

The provision of safe anesthesia depends on careful preparation, which is facilitated by a systematic approach to reviewing the patient, machine, equipment and medications. This is ideally based on a formal check of the anesthesia system. In addition to the personnel involved in delivering anesthetic, the anesthesia system includes: any machine or apparatus that supplies gases, vapors', local anesthesia or intravenous anesthetic agents to induce and maintain anesthesia; any equipment necessary for securing the airway; in addition to any monitoring devices necessary for maintaining continuous evaluation of the patient and the patient him or herself, correctly identified, consensual and evaluated preoperatively (Dever., 2000).

In preparing for anesthesia, the anesthesia system should be checked before each anesthetic, before the start of each operating day and after any repair or maintenance to equipment or the introduction of new equipment. The first and most important component of peri-anaesthetic care is the continuous presence of a vigilant, professionally trained anesthesia provider. Supplemental oxygen should be supplied for all patients undergoing general anesthesia. Tissue oxygenation and perfusion should be monitored continuously

using a pulse oximeter with a variable-pitch pulse tone loud enough to be heard throughout the operating room (Brunner& Suddarth's., 1996).

Surgical asepsis:

Protecting the patient from infection is the major goal of intraoperative intervention. The goal of care is to control the number and types of microorganisms present during surgery. Many of the activities that are directed toward achieve this goal are related to monitoring and controlling the environment (WHO, 2009). The most important measure in preventing post operative wound infection is adherence to meticulous aseptic technique principles and to transmission based precautions, in addition to elevating the patient defense and minimizing the patient related risk factors through the following:

Complete assessment of all surgical patients preoperatively; reduced preoperative hospitalization; evaluation and treatment of remote infections; weight reduction (for obese patients); cessation of tobacco use. Furthermore, control of hyperglycemia, restoration of host defenses; decreased endogenous bacterial contamination; appropriate methods of hair removal, administration of appropriate and timely antimicrobial prophylaxis and confirmation of proper asepsis and antisepsis of skin and instruments, maintenance of meticulous surgical technique and minimization of tissue trauma; maintenance of normothermia during surgery, shortened operating time, effective wound surveillance are essential (WHO, 2009).

Surgical specimens:

The team should confirm that all surgical specimens are correctly labeled with the identity of the patient, the specimen name and location (site and side) from which the specimen was obtained, by having one team member read the specimen label aloud and another verbally confirming agreement(Abo Jash., 2008).

Prevention of foreign body retention:

Counting should be performed by two persons, such as the scrub and circulating nurses, or with an automated device, when available. If a count is interrupted, it should be started again from the beginning. Ideally, items should be viewed and audibly counted concurrently. All items should be separated completely during a count. Counts should be performed in a consistent sequence, for example, sponges, sharps; instruments should be counted before the start of the procedure and before wound closure. Instruments should be inspected for completeness. All parts of a broken or disassembled instrument should be accounted for. If an instrument falls to the floor or is passed off the sterile field, it should be kept within the operating room until the final count is completed. No instrument should be removed from the operating room until the end of the procedure (Henrikson et al., 2008).

Operating the correct patient, site and side:

The Universal Protocol confirms a three-step process in which each step is complementary and adds redundancy to the practice of confirming the correct patient, site and procedure. The first step is **verification** that consists of verifying the correct patient, site and procedure at every stage from the time a decision is made to operate to the time the

patient undergoes the operation. Secondly is **marking** the site or sites to be operated on must be marked. This is particularly important in case of laterality, multiple structures (e.g. fingers, toes, ribs) and multiple levels (e.g. vertebral column). Finally, **time out or surgical pause** is a brief pause before the incision to confirm the patient, the procedure and the site of operation. It is also an opportunity to ensure that the patient is correctly positioned and that any necessary implants or special equipment are available (Khatab., 2005).

Team communication:

A central component of team communication is the ability of team members to raise safety concerns. The ability of teams to communicate effectively and avoid unnecessary mishaps requires each member to act on concerns about the safety of the patient and the operating room personnel. An essential starting-point for effective team communication is an interdisciplinary discussion to ensure adequate planning and preparation for each surgical case. Constructive team culture creates an environment that permits and fosters such discussions (Abdo., 2011)

From what has been displayed, and for the best to quality of patient care as a whole, it would be better to overview and explain the practices toward safety of intraoperative surgical patient.

Conclusion:

Operating room environment is considered as a risk for the personnel and patients. Patient safety is a new aspect in the health care system delivered from increased rate of patient's hazards and elevated morbidity and mortality rates. Human factors are considered as a main cause that affects the patient safety. Patient safety should be a top strategic priority for health care organizations and its leaders. Developing a patient safety culture was one of the recommendations made by the **WHO** to assist hospitals in improving patient safety. Assessing the organization's existing safety culture and practices is the first stage of developing a safety culture and the way to access the quality and accreditation.

References:

1. A world alliance for safer health care. Human factors in patient safety: Review of topics and tool. WHO, 2009; 15-37
2. Abdo H. Verbal abuse and coping behaviors directing to operating room nursing staff at university hospitals. Published Theses. Faculty of Nursing: Alexandria University, Egypt. Available at <http://www.americanscience.org> . 2011; 7(5), 466-75
3. Abo Jash Y. Nurses' practices regarding the implementation of safety measures in the critical care unites. Unpublished Master Theses. Alexandria University, Faculty of nursing. 2008
4. Alex B, Thomas G, William R. Surgical Safety to reduce Morbidity and Mortality in a Global Population. The New England Journal of Medicine 2009; 360(5):490-99.
5. Alfredsdottir H, Bjornsdottir K. Nursing and patient safety in the operating room. Journal of Advanced Nursing, 2008; 61(1), 29-37. Retrieved on 3 Dec 2010.
6. Brunner. Suddarth's. Medical surgical nursing: Intraoperative nursing and anesthesia. 8th ed. Philadelphia: Lippincott Raven publishers, 1996; 423-9.

7. Chen H. Illustrative handbook of general surgery. Springer: 2010; 6-12
8. Delaune S, Lander P. Fundamentals of nursing standers and practices. 2nd ed. USA: Delmar, 2002; 31-181 Making health care safer: A critical Analysis of Patient Safety Practices. Agency of Healthcare Research and quality. July 2001.
9. Development and Validation of the SURgical PATient Safety System (SURPASS) 2015. Available at <http://qshc.bmj.com/cgi/content/full>
10. Dever A. Recommended practices for skin preparation of patients: Standards recommended and guidelines, AORN, 2000; 329-33.
11. Egyptian Group for Surgical Science and Research. Safe surgery objectives. 2015. Available at www.mri.edu.eg
12. El Azzazi MH. Spotlights on anesthesia. 1st vol. Cairo, Egypt: 2005; 15-20.
13. Fischer J, Bland K. Mastery of surgery. 5th ed. Philadelphia: Lippincott Williams and Wilkins, 2007; 93-9.
14. Fransworth B, Ferguson E, Cox T. Managing health and safety in hospitals. British Journal of Nursing. 2007; 5(22): 921-7
15. Harrison B, Gibberd R, et al. Epidemiology of medical errors. British Medical Journal. 2000;18 (320): 774-7 .
16. Henderson L, Eoyang T, Schrfer S. Fundamentals of nursing: Caring and clinical Judgment. Philadelphia: WB Saunders Company, 2000; 1504
17. Henrikson K, Battles J, et al. Advances in Patient Safety: New Directions and Alternative Approach. Vol 3. Agency for Healthcare Research and quality. 2008. 246-56.
18. Hilton P. Fundamental nursing skills. 1st ed. Philadelphia: Whurr publisher, 2004; 77-83.
19. International hazard datasheets on occupation: Nurse, Operating room. Encyclopedia of Occupational Health and Safety. 3rd ed, Geneva. 2000; vol 2: 1528-32.
20. John H, Direkx M.D. WHO Cares about Safety in the Operating Room. 2010. Available at www.hpisum.com
21. Johnson Y, Brunner and Suddarth's Textbook of Medical Surgical Nursing.11th ed. Philadelphia: Lippincott Williams and Wilkins, 2008; 206-16.
22. Keene A, Hawks J, Black J. Medical Surgical Nursing: Clinical management for positive outcomes. 6th ed. Philadelphia: W.B. Saunders Company, 2001; 440.
23. Khatab M. Development of a manual for safety measures in general critical care unites at Alexandria Main University Hospital, Doctoral degree of Nursing Administration, Faculty of Nursing, Alexandria University. 2005.
24. Lawson P, lankshear A, et al. Making patients safer: Nurses' responses to patient safety alerts. Journal of Advanced Nursing, 2008; 63(6), 567-75
25. Linda C, Chang Y, et al. Quality and strength of patient safety climate in medical surgical units. Journal of Health Care Management. 2009; 34(1): 19-28
26. Making health care safer: A critical Analysis of Patient safety Practices.2015 Available at www.ahrq.gov
27. Morz j, Dubuque L. Safety in Everyday Living.3rd ed. New York: Brown Group, 1998; 11.

28. National Institute of Health and Clinical Excellence (NICE). Clinical practice guidelines. The management of inadvertant perioperative hypothermia in adults. 2008. London:200-18
29. Neeleman J, Buerhaus P. Nursing staffing and patient safety: Current knowledge and implication for action. International Journal for Quality in Health Care, 2003; 15(4):275-77
30. Patient safety. 2018. Available at http://en.wikipedia.org/wiki/Patient_safety#cite_note-0#cite_note-0
31. Payne N. Professionalism in medical student education: Mapping the clinical curriculum, Virginia: School of medicine, University of Virginia, 2007; 1-4.
32. Potter P, Perry A. Fundamentals of Nursing.6th ed. Elsevier: Mosby, 2005; 960.
33. Quellettee SM. Clinical aspects CRNA practice, General anesthesia. Nursing Clinics of North America. 1996; 31(3):633-42.
34. Saad A. Nurse anesthetist role in the management of patients undergoing general anesthesia, Unpublished Master Thesis, Faculty of Nursing, Alexandria University, 2001.
35. Saad A.Devoloping standard of intraoperative nursing interventions for general surgery. Unpublished Doctor Dissertation: Faculty of Nursing, Alexandria University, 2007.
36. Sandra M, Jacqueline E. Manual nursing practice. 8th ed. USA: Lippincott Williams and Wilkins, 2006; 505-10.
37. Smith J, Johnson J. Nurses' guide to clinical procedures. 5th ed. USA: Lippincott Williams and Wilkins, 2006; 696-75.
38. Strasser M, Aaron J, John R. Fundamentals of Safety Education. 3rd ed. New York: Macmillan Publishing Company, 2001; 23-5.
39. Strasser M, Aaron J, John R. Fundamentals of Safety Education. 3rd ed. New York: Macmillan Publishing Company, 2001; 23-5
40. Sue C, Patricia K. Fundamentals of nursing: Standards and practice. 2nd ed. USA: Delmar Co, 2002; 760-70
41. World Alliance for Patient Safety. The second global patient safety challenge: Safe surgery save lives, Geneva, WHO, 2008.
42. World Alliance for Patient Safety: Guidelines for Safe Surgery. 1st ed. WHO, Geneva; 2008.
43. www.aorn.Org/ journal/ May hpi. Htm. The critical nurse in the circulating nurse role. AORN journal, 2004; 2(5): 1-7.