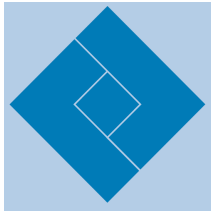




WOUND CARE



Surgical Wound Infections in the Intensive Care Unit

The Nurse's Role

Sevim Çelik

Surgical wound infections are increasing in frequency. They have a negative effect on length of stay among intensive care unit (ICU) patients and patients on other wards. The reported incidence of surgical wound infections ranges from 15% to 38%; commonly associated microorganisms include *Staphylococcus aureus*, coagulase-negative *Staphylococcus*, *Enterococcus*, and *Escherichia coli*. Risk factors for the development of a surgical wound infection include type of procedure and reason for surgical intervention, presence of comorbidities, and operating room environment. Interventions for the prevention of surgical wound infections begin in the preoperative process, and they continue throughout the perioperative and postoperative period, and even after the patient is discharged home. Prevention and management of surgical wound infections requires evidence-based care in both the ICU and on the surgical wards. This article reviews knowledge of the causes of surgical wound infections, and implications for prevention and management.

Epidemiology

The reported incidence of surgical wound infections varies between 15% to 38%, and they rate second or third in incidence when compared to urinary tract infections (UTI).¹⁻¹³ Custovic and colleagues¹⁴ investigated the types and incidence of nosocomial infections in a hospital ICU in Bosnia, and reported that the most common nosocomial infection was UTI, followed by surgical wound infection (22.5%). Jovanovic and colleagues¹⁵ reported that surgical wound infections accounted for 16.9% of all nosocomial infections, and was third in frequency behind UTI and septicemia. Kim and coworkers¹⁶ reported a 15.5% surgical wound infection rate, making it the third most common type of nosocomial infection at their institution. Erol and colleagues¹⁷ measured the incidence rate of nosocomial infection in a resuscitation unit, and found that surgical wound infections occurred in 24.5% of patients, making it the second most common infection behind UTI.

In contrast to these findings, Erbay and colleagues^{3,18} found a much lower incidence of surgical infection (5.3%), which dropped their ranking to fourth among nosocomial

infections. This study was carried out in the Anesthesiology Intensive Care Unit at Pamukkale University Hospital in Turkey and included 434 patients. A study conducted by Palabiyıkoğlu and colleagues¹⁹ at Ankara University Medical Faculty İbn-i Sina Hospital Anaesthesiology and Reanimation Unit monitored the types of infections in 70 patients for more than 2 days and reported similar results, with a 6% infection rate.

Surgical wound infections increase a patient's length of stay in hospital by an average length of 7 to 10 days, and they are the cause of 60% to 93% of deaths.¹⁰ In one study, Çelik¹³ estimated that surgical wound infections increased the length of stay in hospitals in Europe an average of 9.8 days and raised the average daily cost by €325 (\$444). In Turkey, Aydın¹² reported that patients remained an extra 20 days in the hospital because of infection, and this caused a \$1582 increase in cost per patient.

Surgical wound infections are also common among ICU patients. The risk of surgical wound infections among ICU patients is 2.63 times higher than patients managed in other hospital units. They contribute to bacteremia, sepsis, and multi-organ failure.^{1-13,20,21,22} In recent years the trend has been to decrease the hospital length of stay after surgery; one goal of early discharge is to reduce the incidence of surgical wound infections.^{5,9} Other preoperative and postoperative nursing measures include wound care interventions designed to maximize healing and prevent colonization and infection of the wound, pain management, nutritional support, and overall physiological and psychological care.²³⁻²⁵ This article reviews the etiology of surgical wound infections and types of pathogens that lead to their development, as well as diagnostic tools and strategies for preventing and managing these important nosocomial events.

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■ ACKNOWLEDGMENTS

The author has no significant ties, financial or otherwise, to any company that might have an interest in the publication of this educational activity.

■ References

- Goltrup F, Melling A, Hollander DA. An overview of surgical site infections: aetiology, incidence and risk factors. *EWMA Journal*. 2005;5:11-15.
- Stafford RE, Weigelt JA. Surgical infections in the critically ill. *Curr Opin Crit Care*. 2002;8:449-452.
- Erbay H, Yalçın NA, Serin S, et al. Nosocomial infections in intensive care unit in a Turkish university hospital: a 2-year survey. *Intensive Care Med*. 2003;29:1482-1488.
- Jenney AW, Harrington GA, Russo PL, et al. Cost of surgical site infections following coronary artery bypass surgery. *ANZ J Surg*. 2001;71:662-664.
- Scott G. Prevention and control of infections in intensive care. *Intensive Care Med*. 2000;26:S22-S25.
- Sykes PK, Brodribb RK, McLaws ML, et al. When continuous surgical site infection surveillance is interrupted: the royal hobart hospital experience. *AJIC*. 2005;33:422-427.
- Nichols RL. Preventing surgical site infections: a surgeon's perspective. *Emerg Infect Dis*. 2001;7(2):220-224.
- French G, Friedman C, eds. Post-operative wound infections. In: *Infection Control: Basic Concepts and Training*, 2nd ed. International Federation of Infection Control; 2003. <http://www.theific.org/oldsite/Manual/toc.htm>. Accessed June 13, 2006.
- Medeiros AC, Aires-Neto T, Azevedo GD, et al. Surgical site infection in a university hospital in northeast Brazil. *Braz J Infect Dis*. 2005;9(4):310-314.
- Anaya DA, Dellinger EP. Surgical infections and choice of antibiotics. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL, eds. *Sabuton Textbook of Surgery*. 17th ed. Philadelphia: Elsevier Saunders; 2004:257-282.
- Martorell C, Engelman R, Corl A, et al. Surgical site infections in cardiac surgery: an 11-year perspective. *Am J Infect*. 2004;32:63-68.
- Aydın A. Perfore apandisitlerde primer kapama ve geciktirilmiş primer kapamanın yara enfeksiyonuna etkileri. *Uzmanlık Tezi*, İstanbul, 2005.
- Çelik S. Uzamışyoğun bakım sürecinde multidisipliner bakım: nozokomiyal enfeksiyonlara yönelik yaklaşımlar. *Yoğun Bakım Hemşireliği Dergisi*. 2004;8:97-104.
- Custovic A, Babovi M, Tihi N, et al. Nosocomial infections in the surgical intensive care unit at a university clinical center Tuzla. Paper presented at: Sixth Congress of the International Federation of Infection Control; October 13-16, 2005; İstanbul, Turkey.
- Jovanovic B, Mazic N, Mijoljevic V, et al. Nosocomial infections in the intensive care units. *Vojnosanit Pregl*. 2006;63:132-136.
- Kim JM, Park ES, Jeong JS, et al. Multicenter surveillance study for nosocomial infections in major hospitals in Korea. Nosocomial Infection Surveillance Committee of the Korean Society for Nosocomial Infection Control. *Am J Infect Control*. 2000;28:454-458.
- Erol S, Kürş at H, Özyurt Z, et al. Reanimasyon ünitemizdeki hastane enfeksiyonları. *Hastane Enfeksiyonları Dergisi*. 2000;4:97-100.
- Erbay H. Yoğun bakım ünitesinde nozokomiyal enfeksiyonlar: korunma ve kontrol. *XII. Ulusal Yoğun Bakım Kongresi Özet Kitabı*. 2004: 55-65.
- Palabıykoğlu, Tulunay M, Oral M, et al. Bir reanimasyon ünitesinde gözlenen hastane enfeksiyonları: risk faktörleri, etkenler ve antibiyotik direnci. *Hastane Enfeksiyonları Dergisi*. 2000;4:150-155.
- Smeltzer SC, Bare BG, eds. Postoperative nursing management. In: *Medical-Surgical Nursing*. 9th ed. Philadelphia: Lippincott Williams & Wilkins; 2000:347-370.
- Johnston SC, Wilson J. Infected wound management: advanced technologies, moisture-retentive dressing, and die-hard methods. *Crit Care Nurs Q*. 2001;24:64-77.
- Cantrell S. Surgical site infection: the operation was a success, but the patient died. *Healthcare Purchasing News*. 2004.
- Murray JA, Belzberg H. *Current Yoğun Bakım Tam ve Tedavi*. 2nd ed. Ankara: Güneş Kitabevi; 2004:435-437.
- Elaldı N. Cerrahi antimikrobiyal profilaksi. *Cumhuriyet Üniversitesi Tıp Fakültesi Dergisi*. 2002;24:36-44.
- Ruth-Sahd L, Gonzales M. Multiple dimensions of caring for a patient with acute necrotizing fasciitis. *Dimens Crit Care Nurs*. 2006;25:15-21.
- Collier M. Recognition and management of wound infections. *World Wide Wounds*. <http://www.worldwidewounds.com>. Published January 2004. Accessed May 28, 2006.
- Manduz Ş, Katrancıoğlu N, Doğan K. Kardiyovasküler cerrahisinde profilaktik antibiyotik kullanımı. *Cumhuriyet Üniversitesi Tıp Fakültesi Dergisi*. 2002;24:225-229.
- Malazgirt Z. Cerrahi yara enfeksiyonları. In: Günaydın M, Esen Ş, Saniç A, Leblebicioğlu H, eds. *Sterilizasyon Dezenfeksiyon ve Hastane Enfeksiyonları*. Samsun; 2002.
- Geehan DM, Pemberton LB. Management of wounds and wound infections in the intensive care unit. *Crit Care Nurs Q*. 1997;20:69-78.
- Spelman DW, Russo P, Harrington G, et al. Risk factors for surgical wound infection and bacteremia following coronary artery bypass surgery. *Aust N Z J Surg*. 2000;70:47-51.
- Holloway NM, ed. Perioperative care. In: *Medical-Surgical Nursing Care Planning*. 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2004:146-158.
- Garcia HJ, Rodriguez-Medina X, Franco-Gutierrez M, et al. Risk factors for surgical site infections in newborns in a neonatal intensive care unit. *Rev Invest Clin*. 2005;57:425-433.
- Baskan S. Cerrahi alan enfeksiyonlarında risk faktörleri. *Hastane Enfeksiyonları Dergisi*. 2000;4:233-239.
- Seltzer J, McGrow K, Horsman A, et al. Awareness of surgical site infections for advanced practice nurses. *AACN Clinical Issues*. 2002;13:398-409.
- Stotts N. Wound and skin care. In: Baird MS, Keen JH, Swearingen PC, eds. *Manual of Critical Care Nursing: Nursing Interventions and Collaborative Management*. 5th ed. St. Louis: Mosby; 2005:44-51.
- Aksoy G. Yara ve bakımı. In: Askoy, G, ed. *Cerrahi Hastalıkları Hemşireliği El Kitabı*. İstanbul: Birlik Ofset Ltd.Şti; 1998:19-31.
- Harvey C. Wound healing. *Orthop Nurs*. 2005;24:143-157.
- Thomas S. A structured approach to approach to the selection of dressing. *World Wide Wounds*. <http://www.worldwidewounds.com>. Published July 1997. Accessed May 28, 2006.
- Lewis SM, Ayello EA. Inflammation, infection and healing. In: Lewis MS, Heitkemper MM, Dirksen RS, eds. *Medical Surgical Nursing, Assessment and Management of Clinical Problems*. 6th ed. St Louis: Mosby; 2004.
- Tallon RW. Wound care dressings. *Nurs Manage*. 1996;27(10):68-70.
- Susman C. Pain doesn't have to be a part of wound care. *Ostomy Wound Manage*. 2003;49:10-12.
- Akyolcu N. Yara iyileş mesi ve bakımında temel ilkeler. Paper presented at: Yara Bakım ve Tedavi Kursu, 23-24 Mayıs, 2000. İstanbul.