International Journal of Medical Science and Clinical Research Studies

ISSN(print): 2767-8326, ISSN(online): 2767-8342

Volume 04 Issue 07 July 2024

Page No: 1409-1413

DOI: https://doi.org/10.47191/ijmscrs/v4-i07-25, Impact Factor: 7.949

Optimization and Early Detection of Postsurgical Sepsis and Surgical Site Infection

Dr. Ángel Gómez Cortés[1], Dr. Abraham Romero Mendoza[2], Dra. Susana Alejandra Arzate Muñoz[3], Dr. José Hisashi García Becerril[4], Dra. Andrea Álvarez Alvarado[5], Dra. Citlaly Michel Cruz Joaquin[6], Dr. Willy Jacinto Enriquez Serrano[7], Dra. Keren Magally Aguilar Hidalgo[8]

[1]Hospital General "Dra. Columba Rivera Osorio" ISSSTE Pachuca. Universidad Autónoma del Estado de Hidalgo. ORCID 0009-0005-6543-7718

[2]Hospital General "Dra. Columba Rivera Osorio" ISSSTE Pachuca. Universidad Autónoma del Estado de Hidalgo. ORCID 0000-0003-3305-1245

[3]Hospital General "Dra. Columba Rivera Osorio" ISSSTE Pachuca. Universidad Autónoma del Estado de Hidalgo. ORCID 0009-0007-3627-4803

[4]Hospital General "Dra. Columba Rivera Osorio" ISSSTE Pachuca. Universidad Autónoma del Estado de Hidalgo. ORCID 0009-0007-9753-8083

[5]C.H. " Dr.Rafael Barba Ocampo" ISSSTE. Benemérita Universidad Autónoma de Puebla ORCID 0009-0008-8451-5437

[6]Universidad Anáhuac Puebla. ORCID 0009-0007-8181-1495

[7]Hospital General "Dra. Columba Rivera Osorio" ISSSTE Pachuca. Universidad Autónoma del Estado de Hidalgo. ORCID 0009-0002-9616- 2575

[8]Hospital General "Dra. Columba Rivera Osorio" ISSSTE Pachuca. Universidad Autónoma del Estado de Hidalgo.

ABSTRACT

Surgical site infection is a common cause of hospital-acquired infections. The Centers for Disease Control introduced the phrase "Surgical Site Infection" to specifically refer to postoperative infections, which can be further categorized as either "Wound infections" or "organ or space infections". The organization also established the criteria that delineate this particular form of illness. Identifying the disease at an early stage and promptly initiating evidence-based therapy may provide a challenge. Early detection, standardized treatment after the first protocol, immediate management of the infection site, and the implementation of additional medications can significantly enhance the outlook for these patients.

KEYWORDS: Surgical site infection, sepsis, risk factors, early detection

ARTICLE DETAILS

Published On:
27 July 2024

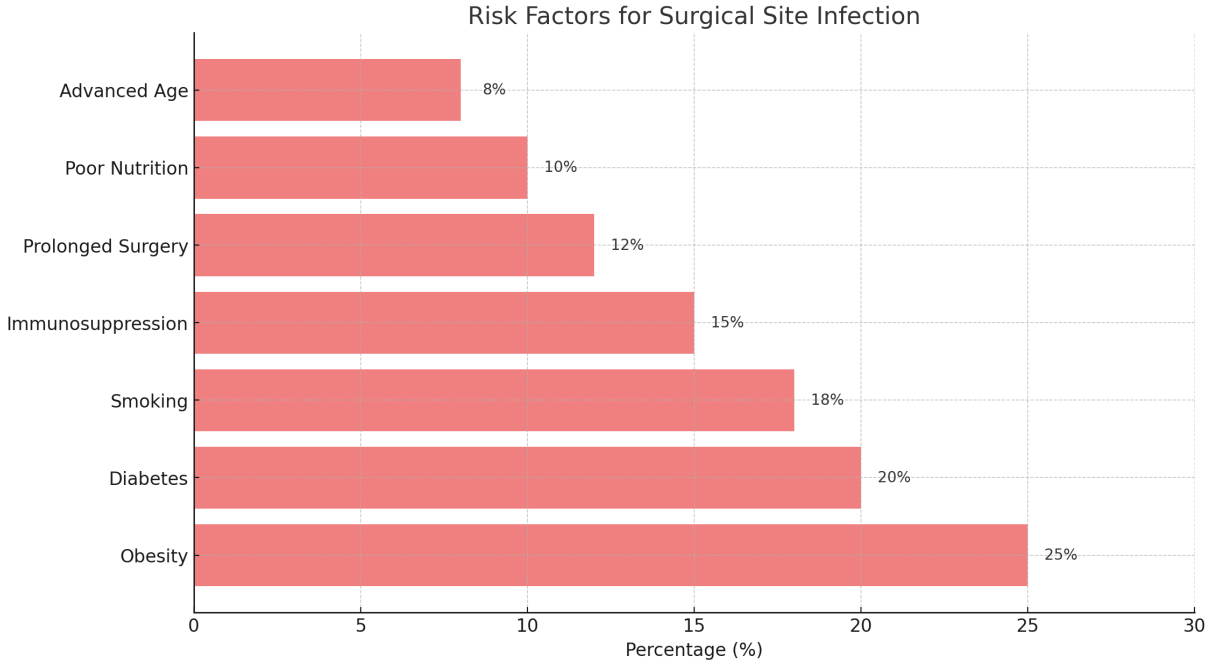
Available on:
https://ijmscr.org/

INTRODUCTION

Surgical site infection (SSI) is a common cause of hospital-acquired infections. Variables such as being over the age of 60, malnutrition or malnutrition related to obesity, immunosuppression, having concurrent pre-existing diseases, undergoing lengthier surgical procedures, the kind of operation (clean, contaminated, or unclean), extended preoperative stays, and the use of drainage are all associated with rates of surgical site infections (SSIs). Since the care provided in the operating room has little impact on the development of surgical site infections (SSI), and surgeons are responsible for the occurrence of infections in sterile wounds, the operating room plays a crucial role in successfully preventing SSI.

The Centers for Disease Control (CDC) has revised the definition of "surgical wound infection" to specifically include only infections that occur within the initial 30 days after a surgical procedure. Depending on the planes involved, an infection might manifest as either superficial or profound. Surgical site infections are responsible for 40% of nosocomial infections in patients who have had surgery, making it the most prevalent form of sepsis in these individuals. Organ-space infections, also known as deep surgical site infections, specifically target the internal organs or intraabdominal tissues that have been manipulated or

accessible during the surgical procedure. These infections do not involve the skin, fascia, or muscle layers that cover the incision site. The majority of surgical site infections (SSIs) are caused by the patient's own endogenous flora, which refers to the microorganisms naturally present on their skin, membranes, mucous membranes, or hollow viscera. While each type of surgical intervention may have unique pathogens associated with it, the primary source of infection is the patient's own flora.



Surgical site infection and postsurgical sepsis.

The Centers for Disease Control (CDC) introduced the term "Surgical Site Infection" (SSI) to specifically refer to postoperative infections. SSI is further categorized into "Wound infections" and "organ or space infections." The organization also established the criteria that delineate this particular form of illness. Various factors such as aging, malnutrition, invasive procedures, urgent and unhygienic surgeries, prolonged surgical durations, longer preoperative hospital stays, inadequate surgical expertise, and other factors have all been associated with the occurrence of Surgical Site Infections (SSI).

The categorization of surgery into four primary classifications—clean surgery, clean-contaminated surgery, contaminated surgery, and dirty surgery—arises from the vulnerability of a surgical wound to infection, which is influenced by the level of contamination during the procedure.

The unhygienic nature of the technique has long been recognized as a contributing factor to the increased risk of postoperative septic complications and the heightened difficulty of the surgical process. An additional determinant for the occurrence of Surgical Site Infections (SSIs) is the necessity for immediate surgical intervention. A longer preoperative stay is another risk factor associated with hospitalization that increases the likelihood of surgical site infections (SSIs).

Severe sepsis in the United States causes 215,000 deaths annually and has a financial burden of $16.7 billion. This is a significant problem that is increasing due to invasive surgeries, immunosuppressive drugs, organ transplants, higher infection rates, and the emergence of antibiotic resistance. Survivors of sepsis experience a diminished quality of life.

The most common forms of infections that occur after elective surgery are staphylococcal or enterobacterial infections. In the majority of cases, a local remedy is sufficient to address the problem. Unless there is periincisional cellulitis or systemic sepsis, intravenous antibiotics are typically unnecessary, and many situations can be handled without the need for hospitalization. Gram-negative infections often arise from the introduction of intestinal contents during emergency surgical procedures, which can be chaotic. These may comprise both Bacteroides fragilis and Anaerobic Streptococci. Aside from doing surgical debridement, the administration of systemic antibiotics is essential for effective therapy.

Figure 1. Superficial incisional surgical site infection

The recommendations for perioperative antibacterial prophylaxis are well-established. Preventive procedures such as asepsis, antisepsis, isolation, intestinal decontamination, hand washing, and the use of sterile clothes are essential for preventing infections. The selected antibiotic must have efficacy in preventing surgical wound infections, as evidenced by clinical trials.

Therefore, in aseptic operations Staphylococcus epidermidis is the most common bacterium present during clean surgical operations, however there are also gram-positive and gram-negative, aerobic and anaerobic bacteria, regardless of whether the procedures are contaminated, dirty, or clean.

Nosocomial infections only refer to infections that were not already present or in the incubation stage at the time of hospital admission. Surgical wound infections are categorized into two types: incisional and deep. An incisional surgical wound infection is a kind of infection that occurs within the first 30 days after surgery and affects the skin, subcutaneous tissue, or muscles underlying the surgical site. In the absence of an implant following surgery, a profound surgical wound infection would manifest during the initial 30 days thereafter. However, if an implant was indeed installed, the infection would often arise within the initial year.

The diagnosis will be based on several aspects, including the patient's medical history, the clinical presentation, laboratory and microbiological tests, and guided cabinet investigations.

Key principles for managing infections are thorough drainage of localized purulent collections, implementation of hygienic-dietary measures, and appropriate management of shock if it is detected. These tactics rely on individual germs that are separated from others and include both broad-spectrum and specific antibiotic treatment. Systemic Inflammatory Response Syndrome (SIRS): It refers to a compilation of events that occur when the immune system is triggered in a widespread manner, regardless of their source. The concept of Systemic Inflammatory Response Syndrome (SIRS) is valuable in identifying individuals exhibiting inflammatory symptoms, hence highlighting the need to identify and treat the underlying cause, which might be viral, autoimmune, ischemia-reperfusion, acute neurological lesions, and so on. It is defined by the satisfaction of two or more of the following criteria:

• Axillary temperature exceeding 38° or falling below 36°.
• Heart rate exceeding 90 beats per minute.
• A respiratory rate exceeding 20 breaths per minute or a carbon dioxide partial pressure below 32 mmHg.
• An elevated white blood cell count above 12,000, a decreased count below 4,000, or the existence of over 10% immature forms

If a systemic inflammatory response syndrome (SIRS) is caused by an infectious agent, it is believed to be indicative of sepsis. An aseptic tissue, fluid, or cavity is considered infected when it is infiltrated by pathogenic microorganisms that have the potential to cause injury. The infection may not always be conclusively confirmed, but sepsis can still be inferred and managed if there is a robust clinical suspicion. Sepsis, along with hypotension that persists even after receiving proper fluid resuscitation, is known as septic shock. It is important to consider and exclude the following reasons of low blood pressure, since they require specific medical treatment: bleeding, severe pulmonary embolism, myocardial infarction, and others.

Early identification of severe sepsis is crucial for enhancing the treatment outcomes of these people. Expeditious use of first resuscitation procedures, prompt delivery of appropriate antibiotics, and rapid containment of the epidemic seem to be crucial factors in reducing the mortality rates of these severely ill individuals.

The initial stage of care involves promptly recognizing a patient exhibiting symptoms that align with Systemic Inflammatory Response Syndrome (SIRS). Search for signs of organ failure and shock. This will facilitate the quick execution of the treatment's core principles, which should commence at the location where the patient is situated (such

as the emergency room, hospital room, critical patient unit, etc.) and then progress sequentially throughout their hospitalization. The use of a standardized approach to managing severe sepsis can greatly enhance patients' likelihood of survival. The management of severe sepsis or septic shock in the early hours has a significant impact on its progression, similar to the effect seen in trauma, acute myocardial infarction, or stroke.

Surgeons and interventional specialists might offer temporary relief to the patient's extreme condition before shifting their emphasis to managing the septic focus. Furthermore, throughout this specific timeframe, we have the capability to generate photographs that assist us in determining the precise cause of the condition. The treatment approach may involve surgical intervention or other medical interventions, depending on the careful selection of medical teams and a thorough assessment of the risks and benefits. Furthermore, there is a notable prevalence of colon and postoperative sepsis, with appendiceal and biliary pathology being especially frequent. There is a strong correlation between gastrointestinal surgery and the occurrence of postoperative sepsis.

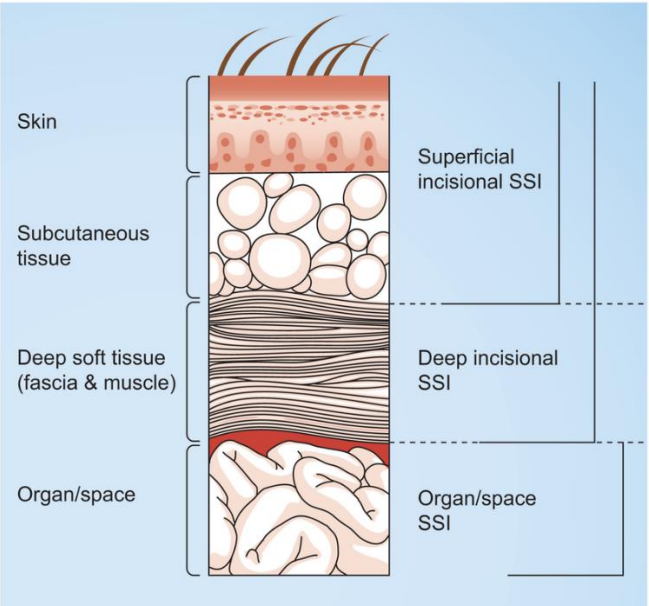


Figure 2. Classification of surgical site infections according to CDC National Nosocomial Surveillance System SSI: Surgical site infection

The crucial factor that might impact the occurrence of illness and death following this procedure is the avoidance of postoperative sepsis by proficient surgical technique and judicious decision-making by the surgeon, guided by the results. It is crucial to highlight the necessity of doing a prompt and comprehensive assessment of the patient's condition and physiological decline during surgery. If the physiological injury is deemed severe, surgical intervention should be initiated. Initially employed for trauma patients, the concept of damage control surgery has recently been extended to encompass individuals with surgical sepsis who are critically ill.

CONCLUSION

It is indisputable that surgical site infections remain a significant public health concern that need ongoing attention, since they contribute to higher rates of surgical complications and longer hospital stays. Thirty-three percent of cases of severe sepsis are attributed to surgical patients, making it the leading cause of death in non-cardiological intensive care units. Identifying the disease at an early stage and promptly initiating evidence-based therapy may pose challenges. Early detection, standardized treatment following the initial plan, immediate management of the infection site, and the implementation of additional medications can significantly enhance the outlook for these patients.

Emphasizing the importance, it is essential to note that several therapies that have shown significant impact on clinical outcomes do not require substantial financial investments or advanced technology. Instead, they rely on a deep understanding of the underlying disease processes, a proactive mindset, and the enhancement of collaboration. Expensive supplementary approaches have shown to be useless. It is imperative to emphasize that the management of these patients should start promptly upon their admission to the emergency unit and should be sustained in the critical care unit and surgical ward, rather than delaying until they reach the UCI.

REFERENCES

I. Seidelman, J. L., Mantyh, C. R., & Anderson, D. J. (2023). Surgical site infection prevention: a review. Jama, 329(3), 244-252.

II. Alkaaki, A., Al-Radi, O. O., Khoja, A., Alnawawi, A., Alnawawi, A., Maghrabi, A., ... & Aljiffry, M. (2019). Surgical site infection following abdominal

surgery: a prospective cohort study. Canadian journal of surgery, 62(2), 111.

III. Ekanem, E., Ngene, N. C., Moodley, J., & Konje, J. (2023). Prevention of surgical site infection and sepsis in pregnant obese women. Best Practice & Research Clinical Obstetrics & Gynaecology, 102406.

IV. Dixon, L. K., Biggs, S., Messenger, D., & Shabbir, J. (2022). Surgical site infection prevention bundle in elective colorectal surgery. Journal of Hospital Infection, 122, 162-167.

V. Stryja, J. (2021). Surgical site infection and local management of the wound meta-analysis. Rozhledy v chirurgii: mesicnik Ceskoslovenske chirurgicke spolecnosti, 100(7), 313-324.

VI. Mazuski, J. E., Symons, W. J., Jarman, S., Sato, B., Carroll, W., Bochicchio, G. V., ... & Schuerer, D. J. (2023). Reduction of surgical site infection after trauma laparotomy through use of a specific protocol for antibiotic prophylaxis. Surgical infections, 24(2), 141-157.

VII. Rollins, K. E., Javanmard-Emamghissi, H., Acheson, A. G., & Lobo, D. N. (2019). The role of oral antibiotic preparation in elective colorectal surgery: a meta-analysis. Annals of surgery, 270(1), 43-58.