Staphylococcus aureus surgical site infection

- Superficial incisional surgical site infections experimentally induced by Staphylococcus aureus in mice: the effect of Bdellovibrio bacteriovorus containing dressing
- Uncovering the silent public health threat: nasal carriers of linezolid-resistant, vancomycin-intermediate and mupirocin-resistant MRSA among healthcare workers in a tertiary care hospital in Central India
- Deep Infections After Open and Closed Fractures
- Post-Surgical Abdominal Myonecrosis: The Unusual Role of Candida albicans
- Diversity and antibiotic susceptibility profiles of bacterial isolates from wound infections in patients at the surgical unit of Kisii teaching and referral hospital, Kenya
- Microbiological monitoring of the hospital environment: risk assessment and strategies in infection control systems
- Methicillin-resistant Staphylococcus aureus (MRSA) infection of the temple region of the face: Case report
- Necrotizing Fasciitis Caused by Gas-producing Methicillin-sensitive Staphylococcus aureus: A Case Report

A Staphylococcus aureus surgical site infection (SSI) is a complication type of healthcare-associated infection that occurs after surgery. Staphylococcus aureus, often referred to simply as “Staph,” is a bacterium commonly found on the skin and mucous membranes of healthy individuals. While it is usually harmless in these locations, it can cause infections if it enters the body through surgical incisions or wounds. SSIs can range from mild to severe and may lead to complications if not promptly treated.

There is a need for more detailed information on the role of S. aureus in the burden of surgical site infections and consequently how to establish multiple approach prevention programs [1)]

Key points

Causes: Staphylococcus aureus is one of the most common bacteria responsible for SSIs. It can be introduced into the surgical site during surgery, through contaminated surgical instruments, the hands of healthcare providers, or from the patient's own skin.

Risk Factors: Several factors can increase the risk of developing a Staphylococcus aureus SSI, including the type and duration of surgery, the patient's overall health, the presence of underlying medical conditions (such as diabetes or obesity), and the surgical environment's cleanliness.

Symptoms: Symptoms of a surgical site infection may include redness, swelling, warmth, pain or tenderness, pus or drainage from the incision, fever, and chills.

Diagnosis: A diagnosis is typically made based on clinical symptoms and signs, as well as laboratory tests. Cultures of the wound discharge or tissue samples may be taken to identify the specific bacteria causing the infection.

Treatment: Treatment usually involves antibiotics to target the Staphylococcus aureus bacteria. The

choice of antibiotics may depend on the type and severity of the infection and whether the bacteria are resistant to certain drugs. In some cases, surgical intervention may be necessary to drain pus and remove infected tissue.

Prevention: Preventing SSIs is a priority in healthcare settings. Measures to prevent Staphylococcus aureus SSIs include meticulous hand hygiene, proper sterilization of surgical instruments, pre-operative skin preparation, and antibiotic prophylaxis before surgery in certain cases.

Methicillin-Resistant Staphylococcus aureus (MRSA): Some Staphylococcus aureus strains have developed resistance to antibiotics, including methicillin (MRSA). MRSA infections can be more challenging to treat, and preventive measures are even more critical in healthcare settings to avoid MRSA SSIs.

It's important for healthcare providers to closely monitor surgical incisions, adhere to infection prevention protocols, and promptly treat any signs of infection to reduce the risk of complications associated with Staphylococcus aureus SSIs. Patients should also follow post-operative care instructions and promptly report any signs of infection to their healthcare provider.

Cohort Studies

Staphylococcus aureus surgical site infections (SSIs) and bloodstream infections (BSIs) are important complications of surgical procedures for which prevention remains suboptimal. Contemporary data on the incidence of and etiologic factors for these infections are needed to support the development of improved preventive strategies.

Objectives: To assess the occurrence of postoperative S aureus SSIs and BSIs and quantify its association with patient-related and contextual factors.

Design, setting, and participants: This multicenter cohort study assessed surgical patients at 33 hospitals in 10 European countries who were recruited between December 16, 2016, and September 30, 2019 (follow-up through December 30, 2019). Enrolled patients were actively followed up for up to 90 days after surgery to assess the occurrence of S aureus SSIs and BSIs. Data analysis was performed between November 20, 2020, and April 21, 2022. All patients were 18 years or older and had undergone 11 different types of surgical procedures. They were screened for S aureus colonization in the nose, throat, and perineum within 30 days before surgery (source population). Both S aureus carriers and noncarriers were subsequently enrolled in a 2:1 ratio.

Exposure: Preoperative S aureus colonization.

Main outcomes and measures: The main outcome was cumulative incidence of S aureus SSIs and BSIs estimated for the source population, using weighted incidence calculation. The independent association of candidate variables was estimated using multivariable Cox proportional hazards regression models.

Results: In total, 5004 patients (median [IQR] age, 66 [56-72] years; 2510 [50.2%] female) were enrolled in the study cohort; 3369 (67.3%) were S aureus carriers. One hundred patients developed S aureus SSIs or BSIs within 90 days after surgery. The weighted cumulative incidence of S aureus SSIs or BSIs was 2.55% (95% CI, 2.05%-3.12%) for carriers and 0.52% (95% CI, 0.22%-0.91%) for noncarriers. Preoperative S aureus colonization (adjusted hazard ratio [AHR], 4.38; 95% CI,

2.19-8.76), having nonremovable implants (AHR, 2.00; 95% CI, 1.15-3.49), undergoing mastectomy (AHR, 5.13; 95% CI, 1.87-14.08) or neurosurgery (AHR, 2.47; 95% CI, 1.09-5.61) (compared with orthopedic surgery), and body mass index (AHR, 1.05; 95% CI, 1.01-1.08 per unit increase) were independently associated with S aureus SSIs and BSIs.

In this cohort study of surgical patients, S aureus carriage was associated with an increased risk of developing S aureus SSIs and BSIs. Both modifiable and nonmodifiable etiologic factors were associated with this risk and should be addressed in those at increased S aureus SSI and BSI risk [2)].

Cross-sectional studies

A cross-sectional study was conducted from January 2014 to December 2014 in a rural tertiary care hospital of Pauri Garhwal district of Uttarakhand state, India. Samples were collected using sterile cotton swabs from 269 patients clinically diagnosed with SSIs and were processed as per standard microbiological techniques. Antimicrobial susceptibility testing was done using a modified Kirby-Bauer disc diffusion method.

Out of 1294 patients, 269 (20.8%) were found to have SSIs, and samples were collected from them. Out of a total of 269 samples, 258 (95.9%) yielded bacterial growth and 267 bacterial isolates were obtained. S. aureus (45.3%) was the commonest organism followed by Escherichia coli (13.9%), Pseudomonas aeruginosa (6.7%), and Proteus species (4.9%). The antimicrobial profile of S. aureus revealed maximum sensitivity to rifampicin, linezolid, teicoplanin, vancomycin, and amikacin whereas ampicillin, cefazolin, and gentamicin were found to be least sensitive.

S. aureus played a predominant role in the etiology of SSIs in this hospital with MRSA being a major concern as the treatment options for such resistant strains are limited. Reduction in SSI rates can lead to both better clinical outcomes for patients and cost savings for hospitals. Adherence to strict infection control measures, maintenance of proper hand hygiene, and optimal preoperative, intraoperative, and postoperative patient care can surely reduce the incidence of SSIs. A multifaceted approach involving the surgical team, microbiologist, and infection control team is required to provide quality surgical services [3)].

To determine the overall and procedure-specific incidence of surgical site infections (SSI) caused by Staphylococcus aureus (S. aureus) as well as risk factors for such across all surgical disciplines in Europe.

This is a retrospective cohort of patients with surgical procedures performed at 14 European centers in 2016, with a nested case-control analysis. S. aureus SSI was identified by a semi-automated crossmatching bacteriological and electronic health record data. Within each surgical procedure, cases and controls were matched using optimal propensity score matching.

Results: A total of 764 of 178 902 patients had S. aureus SSI (0.4%), with 86.0% of these caused by methicillin-susceptible and 14% by resistant pathogens. Mean S. aureus SSI incidence was similar for all surgical specialties while varying by procedure.

This large procedure-independent study of S. aureus SSI proves a low overall infection rate of 0.4% in this cohort. It provides proof of principle for a semi-automated approach to utilize big data in

epidemiological studies of healthcare-associated infections. Trials registration The study was registered at clinicaltrials.gov under NCT03353532 (11/2017) [4].

Test

What is Staphylococcus aureus commonly referred to as in medical terminology? a) Bacteroides b) Streptococcus c) Staph d) E. coli

How can Staphylococcus aureus enter the body to cause a surgical site infection (SSI)? a) Through the respiratory system b) Through the bloodstream c) Through surgical instruments or healthcare provider's hands d) Through ingestion of contaminated food

Which of the following is NOT a common symptom of a surgical site infection (SSI)? a) Redness and swelling b) Warmth and pain at the incision site c) Nausea and vomiting d) Pus or drainage from the incision

How is the diagnosis of a Staphylococcus aureus SSI typically confirmed? a) Blood test b) Imaging scan (X-ray or MRI) c) Clinical symptoms and laboratory tests d) Urine analysis

What is the primary treatment for a Staphylococcus aureus SSI? a) Surgery to close the incision b) Physical therapy c) Antibiotics d) Over-the-counter pain relievers

What is Methicillin-Resistant Staphylococcus aureus (MRSA)? a) A fungal infection b) A viral infection c) A strain of Staphylococcus aureus resistant to antibiotics d) A type of surgical instrument

What is the key to preventing Staphylococcus aureus SSIs in healthcare settings? a) Frequent handwashing and hand hygiene b) Regularly disinfecting the patient's room c) Performing surgery without gloves d) Avoiding antibiotics before surgery

In the study mentioned, what was the commonest organism causing SSIs in the hospital? a) Escherichia coli b) Pseudomonas aeruginosa c) Staphylococcus aureus d) Proteus species

Which antibiotic was found to be least sensitive against Staphylococcus aureus in the study? a) Rifampicin b) Linezolid c) Teicoplanin d) Ampicillin

What was the overall incidence of Staphylococcus aureus surgical site infections in the European study mentioned? a) 0.1% b) 1.0% c) 0.4% d) 4.0%

Answers:

c) Staph c) Through surgical instruments or healthcare provider's hands c) Nausea and vomiting c) Clinical symptoms and laboratory tests c) Antibiotics c) A strain of Staphylococcus aureus resistant to antibiotics a) Frequent handwashing and hand hygiene c) Staphylococcus aureus d) Ampicillin c) 0.4%

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