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ETIOLOGY AND NOSOLOGICAL FORMS OF NOSOCOMIAL INFECTIONS IN SURGICAL DEPARTMENTS OF HOSPITALS IN FERGANA REGION

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Abstract: In different regions of the Republic of Uzbekistan, indicators of surgical field infections (SSI) are unevenly distributed. The main part of the etiological factors in the origin of SSIs is *Staphylococcus aureus, , Eschericha coli, Enterobacter spp., Klepsiella spp., Proteus spp., Pseudomonas spp.,* and *Candida, Polymicrobials*. As a result of research conducted in Fergana region, as of 2023-2024, Staphylococcus aureus, coronavirus infection, and viral hepatitis B and C were the main factors in the origin of SSIs in surgical departments of regional hospitals. 95.65% of SSIs are abscesses and 4.35% are nosological forms of suture rupture.
Keywords: Nosocomial infection, surgical field infection, etiology, nosological forms, antibiotic-resistant infections, Staphylococcus aureus.

INTRODUCTION

The human skin is a natural barrier against infection. Although there are many precautions and measures to prevent infections, any operation that disrupts the integrity of the skin can lead to infection. Doctors call these infections Surgical Site Infections (SSIs) because they occur in the part of the body where the surgery was performed. If you undergo surgery, the likelihood of developing an SSI is approximately between 1% and 3% (Surgical Site Infections, Johns Hopkins Medicine).

According to international data, among adult patients, surgical site infections account for 15-25% of registered infections, while in the pediatric population, this figure ranges from 2.5% to 20%.

Staphylococci are the main bacteria responsible for surgical site infections (SSIs) after surgery. Cases caused by *S. aureus* account for 40-60%. Coagulase-negative staphylococci are responsible in 20-30% of cases. Other etiological agents include *Escherichia coli*, *Enterobacter* spp., *Klebsiella* spp., *Proteus* spp., *Pseudomonas* spp., *Candida*, and polymicrobial infections (10-40%). In the etiological structure of SSIs, *S. aureus* predominates (46.5%), followed by *E. coli* (22.2%) and *S. epidermidis* (16.7%), occupying the second and third places, respectively. Perioperative antibiotic prophylaxis is considered an effective method for preventing SSIs in pediatric surgery.

Nosocomial infections are a major problem in hospitals worldwide. Understanding the bacterial etiology and antibiotic susceptibility is a crucial factor in combating nosocomial infections. According to research conducted by Indonesian scientists, pathogens responsible for infections in children with nosocomial infections, both antibiotic-sensitive and multidrug-resistant, were identified. In pediatric wards, nosocomial infections were isolated as follows: *Pseudomonas aeruginosa* (55%), *Klebsiella* spp. (6%), *Enterobacteriaceae* (4%), *Acinetobacter baumannii* (1%), and *Escherichia coli* (<1%).

The antibiotic susceptibility of nosocomial pathogens to imipenem, amikacin, ciprofloxacin, and ceftazidime was 86%, 84%, 84%, and 75%, respectively. Significant mortality was observed among children infected with antibiotic-resistant pathogens.

According to epidemiological studies in Mexico, among children admitted to the neonatal intensive care unit, the infection rate was the highest, while it was lowest among school-age children and those admitted to the infectious diseases ward. The most commonly isolated organisms were *Klebsiella pneumoniae*, *Candida* species, and coagulase-negative staphylococci.

The mortality rate was higher in children with Gram-negative bacterial infections (45.2%) and lower in those with Gram-positive bacterial infections (19.2%).
Complications of surgical wound infections can be local or systemic. Local complications include delayed and untreated wounds, cellulitis, abscess formation, osteomyelitis, and subsequent wound breakdown. Systemic complications include prolonged hematogenous spread and bacteremia with the potential for sepsis.

METHODS

Reports and Statistical Data of the Sanitary-Epidemiological Welfare and Public Health Service of the Republic of Uzbekistan and Fergana Region (2023-2024). Epidemiological and Statistical Methods.

RESULTS

According to data from the Fergana Region, in 2023, out of 11 cases of surgical site infections (SSIs), 8 were confirmed clinically and 3 by laboratory tests. For the year 2023 overall, out of 41 cases of infections, 26 were clinically confirmed and 15 were confirmed by laboratory testing. The etiological indicators of laboratory-confirmed nosocomial infections for 2023–2024 are presented below.
In 2023, the highest number of cases were caused by *Staphylococcus aureus* (3 cases). In 2024, among 15 laboratory-confirmed cases, 8 were caused by *Staphylococcus aureus*, 5 by coronavirus infection, and 1 case each by viral hepatitis B and C.
This indicates that *Staphylococcus aureus* is the leading etiological agent of nosocomial infections. It has been confirmed that *S. aureus* is the most common causative agent of nosocomial infections not only in Fergana region but worldwide. The presence of hospital strains of *S. aureus* resistant to disinfectants and antibiotics is one of the global challenges faced by healthcare systems.
In Fergana region in 2023, the causative factors of nosocomial infections were as follows: *S. aureus* accounted for 53.3%, coronavirus infection for 33.3%, and viral hepatitis B and C infections accounted for 0.067% each.
Absolute numbers of nosological forms of surgical infections in Fergana region for 2023: 23 postoperative infections were recorded, mainly local forms. The most common was abscess with 22 cases, followed by 1 case of wound dehiscence.
According to official statistics, in 2023 in Fergana region, abscesses accounted for 95.65% of postoperative nosocomial infections, while wound dehiscence accounted for 4.35%. No other forms were reported.
In recent years, cases of abscess have become more frequent. Improving preventive measures against surgical site infections (SSIs) in hospitals remains the key solution to this problem.
The complexity of combating hospital infections is determined by their severity, structure, and dynamics, which result from the influence and interaction of many factors. This necessitates a comprehensive approach to prevention. Experience accumulated both in our country and abroad shows that the success of hospital infection prevention largely depends on the effectiveness of organizational efforts.

DISCUSSION

Surgical site infections cause significant resource damage and lead to morbidity and mortality. Therefore, numerous general rules and guidelines exist primarily to prevent them. These include

preoperative skin preparation, maintaining surgical sterility, postoperative and perioperative prophylactic antibiotics, and wound dressing. Additionally, enhancing the patient's natural defense mechanisms, such as early mobilization and improving nutritional status, is important.

For prophylaxis, a safe, narrow-spectrum antibiotic targeting the expected microorganisms should be used and administered for the shortest effective duration. Antibiotics should be given 30–60 minutes before surgery to ensure therapeutic tissue concentration during the operation. For clean procedures, antibiotics should cover staphylococci, typically 2 g of cefazolin (adjusted by weight) or vancomycin 15 mg/kg plus metronidazole, cefoxitin, or ertapenem. Prophylaxis is generally not recommended for contaminated and dirty procedures, as therapeutic antibiotic management is required.

Considering the multifactorial nature of hospital-acquired infections, especially surgical site infections (SSIs), a continuous monitoring system must be established that accounts for all causes contributing to the intensification of epidemic processes. Such monitoring ensures an epidemiological surveillance system, which encompasses the dynamics of the epidemic process in nosocomial infections (incidence, mortality, structure of hospital infections, etc.), disease etiology, and influencing factors. The spread of nosocomial infections and the results of epidemiological surveillance form the basis for developing rational control and preventive measures.

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