



SEPSIS AND SURGICAL INFECTIONS MANAGEMENT: MODERN CLINICAL APPROACHES

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ABSTRACT

Sepsis and surgical infections remain among the most serious problems in modern medicine because they can rapidly lead to organ dysfunction, septic shock, disability, prolonged hospitalization, and death. Surgical infections include postoperative wound infections, intra-abdominal infections, soft tissue infections, implant-associated infections, diabetic foot infections, and purulent-septic complications after trauma or surgery. The modern management of sepsis is based on early recognition, rapid assessment, timely antimicrobial therapy, source control, hemodynamic stabilization, microbiological diagnosis, infection prevention, and multidisciplinary care. According to the Surviving Sepsis Campaign 2021 guidelines, antimicrobials should be administered immediately, ideally within 1 hour, in patients with septic shock or high likelihood of sepsis. In the United States, the Centers for Disease Control and Prevention reports that at least 350,000 adults and more than 1,800 children who develop sepsis die during hospitalization or are discharged to hospice. For Uzbekistan, the problem is also relevant due to postoperative purulent-septic complications, trauma, diabetes-related infections, antimicrobial resistance, and the need to strengthen microbiological diagnostics in regional hospitals. The Ministry of Health of Uzbekistan maintains official clinical guideline resources, which are important for standardizing diagnosis and treatment.

Keywords: sepsis, septic shock, surgical infection, source control, antimicrobial therapy, postoperative infection, intensive care, antimicrobial resistance, Uzbekistan.

INTRODUCTION

Sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection. In surgical practice, sepsis often develops from uncontrolled infection sources such as infected wounds, intra-abdominal abscesses, perforated hollow organs, postoperative complications, necrotizing soft tissue infections, diabetic foot infections, and infected implants. The danger of sepsis lies in its rapid progression: a local infection may quickly lead to systemic inflammation, hypotension, tissue hypoperfusion, multiple organ failure, and death.

Surgical infections are not only a clinical problem but also an economic and social burden. They prolong hospital stay, increase the need for repeated operations, raise antibiotic consumption, and increase the risk of disability. The Centers for Disease Control and Prevention emphasizes that sepsis contributes to more than one-third of all hospital deaths in the United States and is a major cause of hospital mortality and disability after discharge.

For Uzbekistan, this topic is important because emergency surgery, abdominal infections, traumatic injuries, diabetic foot complications, postoperative wound infections, and antimicrobial resistance remain relevant clinical challenges. A publication related to hospital-acquired and postoperative infections in Uzbekistan reported nosocomial infection concerns and noted that purulent-septic infections are important among surgical departments. This indicates the need to



improve infection control, microbiological testing, early diagnosis, and standard clinical algorithms in surgical hospitals.

Aim

The aim of this article is to analyze modern clinical approaches to the management of sepsis and surgical infections, identify key problems in clinical practice, and propose practical solutions adapted to the healthcare system of Uzbekistan.

MATERIALS AND METHODS

This article was prepared as an analytical review based on modern clinical guidelines, scientific publications, and official healthcare resources related to sepsis and surgical infections. The main focus was placed on practical issues that are important for surgical departments, emergency care units, intensive care units, and medical education in Uzbekistan.

The following sources and materials were analyzed:

- international recommendations on sepsis and septic shock management;
- clinical approaches to postoperative wound infections, intra-abdominal infections, necrotizing soft tissue infections, diabetic foot infections, and implant-associated infections;
- data from the Surviving Sepsis Campaign and the Centers for Disease Control and Prevention;
- official materials and clinical guideline resources of the Ministry of Health of the Republic of Uzbekistan;
- Uzbek and Russian surgical literature related to purulent-septic diseases;
- publications on hospital-acquired infections, antimicrobial resistance, and source control in surgery.

The analysis was carried out in several directions: early recognition of sepsis, microbiological diagnosis, rational antibiotic therapy, surgical source control, intensive care support, infection prevention, and antimicrobial stewardship. Special attention was given to the conditions of Uzbekistan, including regional hospital practice, availability of microbiological laboratories, postoperative infection prevention, irrational antibiotic use, and the need to improve practical training in medical universities.

The article does not present results of a separate clinical trial. It summarizes available evidence and practical experience in order to identify key problems and propose clinically applicable solutions for improving sepsis and surgical infection management.

DISCUSSION

Sepsis and surgical infections remain difficult clinical problems because they progress quickly and require immediate coordinated action. In surgery, infection often begins locally: in a postoperative wound, abdominal cavity, soft tissue, diabetic foot ulcer, implant area, or traumatic injury. However, if the source is not controlled in time, local infection may become systemic and lead to sepsis, septic shock, multiple organ dysfunction, and death.

The first important point is early recognition. In real clinical practice, sepsis may not always begin with obvious symptoms. A patient may initially have weakness, fever, chills, rapid pulse, rapid breathing, low blood pressure, confusion, reduced urine output, or worsening pain after surgery. These signs can sometimes be mistaken for a normal postoperative reaction. Therefore, surgeons, nurses, emergency physicians, and intensive care specialists must always consider sepsis in patients with infection signs and worsening general condition.

The second key issue is antibiotic therapy. In septic shock or highly suspected sepsis, antibiotics should be started as early as possible. Delay may increase the risk of organ failure and death. However, this does not mean that antibiotics should be used without control in every mild case.



Unnecessary or prolonged antibiotic use increases antimicrobial resistance. Therefore, blood cultures and samples from the infection source should be taken before antibiotics whenever this does not delay urgent treatment. After microbiological results are available, therapy should be narrowed according to the identified pathogen and its sensitivity.

The third and most important surgical principle is source control. Antibiotics alone cannot cure sepsis if pus, necrotic tissue, perforation, abscess, infected implant, or gangrenous tissue remains in the body. In such cases, drainage, debridement, removal of necrotic tissues, revision of the wound, treatment of perforation, or removal of infected foreign material may be required. For example, intra-abdominal abscess, necrotizing fasciitis, infected diabetic foot, and postoperative deep wound infection require active surgical management, not only medication.

In the conditions of Uzbekistan, several practical problems remain relevant. One of them is late referral. Some patients come to the hospital only after the wound has become purulent, fever has developed, or general condition has worsened. Another problem is irrational antibiotic use before hospital admission. Self-treatment or incomplete antibiotic courses may change the clinical picture and make microbiological diagnosis more difficult. In addition, not all regional hospitals have equal access to rapid microbiological testing, which can lead to empirical and prolonged antibiotic therapy.

Postoperative infection prevention is also a major issue. Surgical site infections can be reduced by strict hand hygiene, proper sterilization, rational perioperative antibiotic prophylaxis, good operating room discipline, careful wound care, and control of patient-related risk factors such as diabetes, anemia, obesity, smoking, and malnutrition. Prevention is always cheaper and safer than treating established sepsis.

Modern sepsis care also requires a multidisciplinary approach. A surgeon alone cannot manage severe sepsis effectively. The treatment team should include an anesthesiologist-resuscitator, infectious disease specialist, microbiologist, radiologist, nurses, and, when necessary, endocrinologist or vascular surgeon. Such teamwork is especially important in diabetic foot infection, intra-abdominal sepsis, necrotizing soft tissue infection, and implant-associated infection.

Another important direction is medical education. In medical universities, sepsis and surgical infection should not be taught only as theoretical topics. Students and residents must learn how to recognize early warning signs, interpret laboratory markers, take microbiological samples correctly, choose empirical antibiotics responsibly, understand source control, and work in emergency clinical scenarios. Simulation-based training, case discussions, and clinical algorithms can improve practical readiness.

For Uzbekistan, the most effective improvement strategy is to standardize sepsis care in all levels of hospitals. Each surgical department should have a simple sepsis screening checklist, a clear algorithm for taking cultures, early antibiotic administration rules, criteria for urgent surgical source control, and transfer criteria to intensive care. Electronic registries of sepsis and postoperative infections would help monitor outcomes, antibiotic resistance patterns, complications, and mortality.

In summary, the management of sepsis and surgical infections should be based on a clear clinical chain: early recognition, microbiological confirmation, timely antibiotics, surgical source control, intensive monitoring, prevention, and follow-up. Strengthening this chain in Uzbekistan can reduce complications, shorten hospitalization, decrease irrational antibiotic use, and improve surgical outcomes.

CONCLUSION

Sepsis and surgical infections are urgent clinical problems requiring early diagnosis, rapid antimicrobial therapy, microbiological confirmation, surgical source control, and intensive care support. In modern practice, successful treatment depends not only on antibiotics but also on timely



drainage, debridement, infection control, hemodynamic stabilization, and multidisciplinary teamwork.

For Uzbekistan, the priority tasks are to strengthen regional microbiological diagnostics, improve postoperative infection prevention, introduce sepsis screening protocols, reduce irrational antibiotic use, develop antimicrobial stewardship, and improve practical training in medical universities. The most effective model is: early recognition + microbiological confirmation + rapid antimicrobial therapy + source control + intensive monitoring + prevention + electronic registry.

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