RISK FACTORS OF SURGICAL SITE INFECTIONS AND THEIR EPIDEMIOLOGY

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Introduction

Surgical site infections (SSI), resulting in chronic wounds, pose a significant clinical, social and economic challenge in surgical care. These wounds do not progress through the normal, orderly and timely sequence of resolution, resulting in increased cost of care and morbidity. Resolution depends on intraoperative and perioperative (local and systemic) risk factors. Intraoperative risk factors have previously been described in the literature at depth. The understanding of the major perioperative risk factors involved in poor wound healing is key to improving outcomes.

Effective management of wound healing should encompass a standardised approach to ensure a baseline level of care - an approach that is not yet enforced in the Czech Republic, where standard of care for SSI and chronic wounds are largely dependent on the individual clinic or physician.

This study aimed to identify whether certain anamnestic, anthropometric or clinical factors exceeded others in their role as negative prognostic factors for wound healing in SSIs and chronic wounds.

Materials and Methods

This ambispective study, used 14 retrospective and 135 prospective cases from patients undergoing treatment of non-healing wounds at the Military hospital surgical outpatient clinic in Olomouc, from August 2021 to September 2023. Inclusion criteria involved completion of treatment and availability of personal medical history.

Exclusion criteria included non-compliance with treatment, termination of treatment and multiple wounds. For each patient, a medical history, anthropometric data, mobility assessment, and American Society of Anaesthesiologists (ASA) score of physical status were obtained. Lesion were assessed for location, size, depth, state of base, secretion and surrounding area. Wound treatment was standardised for all patients and Patients were followed up in 3-day intervals. Patients with signs of infection were swabbed and analysed for the presence of microbes. Statistical analysis was performed to assess treatment outcome and association of risk factors.

Results

149 cases met inclusion criteria for our study (57 females, 92 males – mean age 64.6 years). **Figure 1** illustrates the distribution of wound types – Diabetic, pressure and vascular ulcers, SSI and traumatic wounds. From these cases, 110 wounds presented with signs of infection, revealing 103 positive tests contaminated by over 200 bacterial species identified **(Figure 2).**

Figure 1 – Distribution of wound type

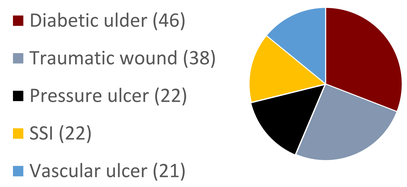
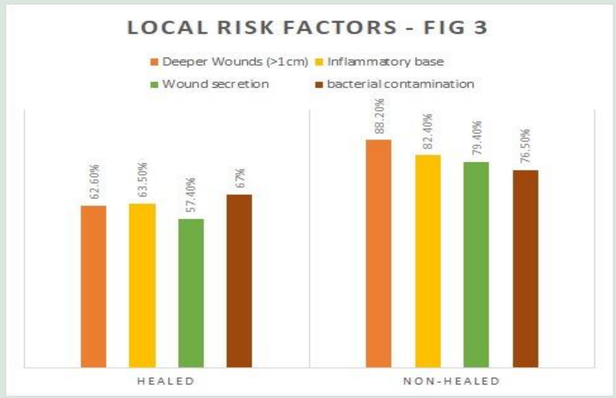


Figure 3 shows the difference in wound resolution for local risk factors (Wound depth, inflammatory base, diameter, secretions, bacterial contamination)

Bacterial species	Positive swabs
Staphylococcus	55
Proteus	28
Streptococcus	26
Anaerobes	24
Escherichia	20
Enterobacter	18
Pseudomonas	12

Figure 4 shows difference in healing rates for systemic risk factors (Age, ischaemic heart disease, Diabetes, systemic antibiotic therapy, hospital admission, lower ASA score, mobility, long term medications, major surgical procedures, hypercholesterolemia, arterial hypertension)



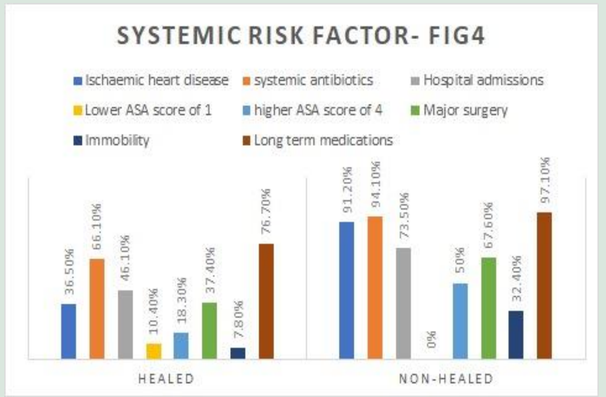


Figure 2 – Frequency of different etiological agents from positive wound swabs.

Discussion

Amongst local risk factors, infection resulted in the greatest prolongation of healing duration, when compared to wound secretion, presence of an inflammatory base, diameter or wound depth. Moreover, the bacterial species (especially *Proteus* and *Pseudomonas*) and the number of colonising species influenced the duration of healing greater than other local factors.
The most significant systemic factors influencing the healing outcomes of SSI and other chronic wounds was ischaemic heart disease and other atherosclerotic diseases, arterial hypertension, hypercholesterolemia and diabetes mellitus.

Chronic wound care can be improved by the implementation of local and systemic risk factor screening when treatment for chronic wounds begins, to identify possible metabolic and cardiovascular factors which may impede healing. Furthermore, early identification of infection aetiology can provide an earlier window of opportunity to use targeted therapy or local antibiotic therapy.

Conclusions

Early identification of local and systemic risk factors is crucial for reducing healing time, thereby promoting better outcomes for patients, reducing long-term disability and making more efficient and cost-effective use of healthcare resources.