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INFECTION OF THE SURGICAL SITE IN NEUROSURGERIES

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Abstract: Goal: To identify risk factors for surgical site infection in neurosurgeries. **Methods:** It is an integrative review with a search in the databases of Pubmed, Lilacs, Scielo and Acervo + Index Base with the descriptors "Infection of the surgical site", "Neurosurgery" and "Risk factors", using the Boolean operator AND. The articles included were selected and critically evaluated on their scientific evidence on surgical site infection in order to identify risk factors in neurosurgeries. **Results:** 21 foram articles considered eligible for this review. Forams found as risk factors the presence of comorbidities, compromised nutritional status, immunodepression, extremes of ity, the presence of infection at the time of surgery, or time of hospitalization prior to surgery and prior use of antibiotic therapy. There are also factors related to the surgical center, the environment, protective measures and the presence of microorganisms. **Final considerations:** There is no consensus or way in which the factors can interfere with the outcomes, whether associated or isolated, and, as well, there must be more scientific research involving passive control measures to interfere with the positive outcome of the post-surgical process in neurosurgeries.
Keywords: Neurosurgery, Infections, Risk factors.

INTRODUCTION

One of the great concerns related to hospital infection and surgical site infection (SSI) due to its high incidence and serious consequences. Occurrence of ISC is of great relevance and, second to the literature, it occupies the third place among the most commonly found infections in the hospital environment, losing only to urinary tract infections, followed by respiratory infections. In Brazil, it is ranked third among the set of health care-related infections (IRAS) (JENKS, et al, 2014; BERTI, et al, 2017; ANVISA, 2017).

Surgical site infections (SSI) represent the most common complication among patients undergoing surgical procedures, standing out among the main HAIs (ARAUJO & OLIVEIRA, 2015). The post-surgical infectious discharge is determined by various risk factors that can occur not pre-operatively, during, or post-operatively. It is also possible to identify that the organization and the hospital team can present risks to the patient, in which a multiprofessional team with specific training and training for non-post-surgical adversities (SILVA & BARBOSA, 2015; BRAZ, et al, 2018).

The occurrence of these infections represents an important public health problem, configuring patients undergoing invasive interventions as the primary cause of iatrogenic occurrence (LALOTO, et al, 2017). A recent study shows that there is a scarcity of literature on the predictor symptoms of infection represented by the respective risk factors of two patients, where it is expected that research in this possam area will contribute and serve as a basis to guide the actions of the Hospital Infection Control Commission (SILVA, et al, 2021).

In 2009, the World Health Organization (W.H.O.), through the World Alliance for Patient Safety, aimed as essential for safe surgery as a team that must systematically use known methods to minimize the risk of surgical site infection (OLIVEIRA & RANGE, 2018). However, the literature shows, in an isolated manner, the occurrence of these infections, where the risk factors may be related to the patient himself, to the execution of the surgical technique and to the environment where the surgical procedure will be performed (ERCOLE, et al, 2011; FUSCO, et al, 2016).

Before the exposto, or present study, the objective was to identify, through an

integrative review, the risk factors for surgical site infection in neurosurgeries.

METHODS

It is an integrative review with the aim of identifying, selecting and critically evaluating the scientific evidence on surgical site infection in order to identify risk factors in neurosurgeries.

The search was carried out in the Pubmed, Latin American and Caribbean Literature in Health Sciences (LILACS) and Scientific Electronic Library Online (ScIELO) databases, in the period from 2016 to 2021. The describers "Surgical site infection", "Neurosurgery" and "Risk factors", using the Boolean AND operator. For the eligibility of two studies, the original studies indexed in the selected databases, written in the Portuguese and English languages within the last 10 years, with abstracts available and with full access online, published in scientific journals, are considered inclusion criteria. involving patients with ISC in clean neurosurgery, who present absence of local infectious or inflammatory process. As exclusion criteria, systematic reviews, duplicated articles, pilot studies, dissertations and theses, chapters or those that have a different approach to the proposed topic, those that do not present sufficient necessary information, are eliminated.

The articles are evaluated and selected independently, obeying the eligibility criteria. Apart from the withdrawal of the duplicates, the titles/abstracts were verified to exclude two studies that are not related to the guiding question. Foram found 31 articles, and, after reading two abstracts, foram considered 21 articles for a complete reading. Based on an integrative review, the results were analyzed in a descriptive manner.

RESULTS

Forums found, in total, 54 articles, in which 21 forums are chosen for reading. Below or fluxogram (figure 1).

Foram selected 21 articles in which the results demonstrate as risk factors for ISC in clean neurosurgery in the presence of comorbidities, compromised nutritional status, immunosuppression, extremes of ity, in the presence of infection at the time of surgery, or time of pre-operative hospitalization and use prior antibiotic therapy, and based on the surgical risk classification of the American Society of Anesthesiologists (ASA) presented a criterion greater than or equal to two. There were also risk factors related to the surgical center, sterilization of two materials, type of surgery, location of surgery, duration of surgery longer than four hours, use of prophylatic antimicrobials, trichotomy technique, urgent and emergency surgeries (DOS SANTOS, et al. al, 2018).

The risk factors related to the surgical procedure will include the environment and contamination of the surgical wound, and the protective measures will include the management of ventilation in the surgical rooms, adequate cleaning after each surgical procedure and the end of the day, reduction of the circulation of professionals within the operating room at the time of the performance of surgery, sterilization of two instruments and attention to personal hygiene rules and the surgical field. How many risk factors related to the microorganisms analyzed are the presence of a bacterial capsule, the ability to produce specific enzymes and factors of adaptation to tissues, which make microorganisms more capable of developing infectious conditions (DOBLE, et al, 2017).

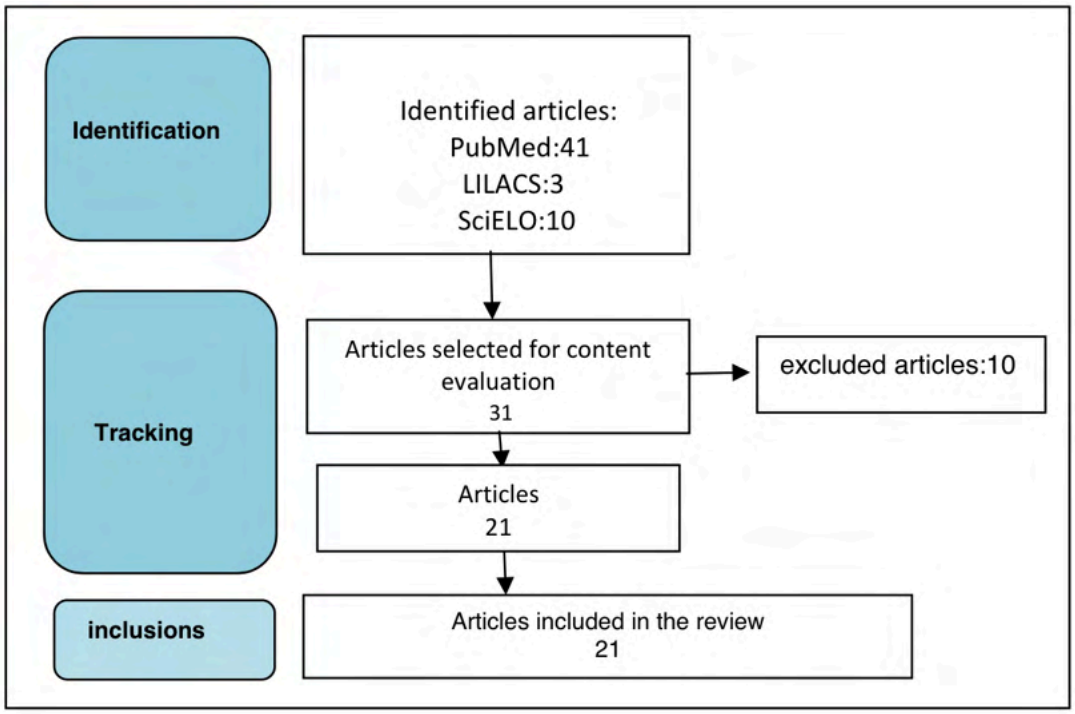

Figure 1. Flowchart not model PRISMA two applications included in the review. Adapted from Page et al., 2020.

DISCUSSION

The National Health Surveillance Agency (ANVISA, 2017) considers a superficial incisional surgical site infection to be one that occurs within 30 days after surgery, involving only the skin and subcutaneous tissue of the incision. A deep incisional ISC is defined as an infection that occurs within 30 days after the procedure, when no implant has been placed, and up to a year when implants have been placed and the infection appears to be related to the surgical procedure, involving deep tissues such as fascia and musculature.

ISC is considered high cost and is present in 14 to 16% of two hospitalized patients. An infection that manifested after discharge, but is related to hospitalization or to procedures performed in a hospital unit, can also be considered as SSI. Also, those presented after seventy and two hours of hospitalization, are related to procedures that involve diagnosis and/or therapies performed after the same (LATHAM, et al, 2001). To understand ISC it is necessary to understand its types: ISC-superficial incisional; ISC- deep incisional; ISC- organ/cavity.

There are many risk factors for SSI related to the patient and, among them, we can note the nutritional status, since the obese individual is more susceptible to developing SSI compared to non-obese patients (ANDRADE, et al, 2019). Obesity can be defined as a body mass index greater than or equal to thirty. Obese patients used to have a prolonged surgical time, apart from a major extension of trauma. There is also a homeostatic imbalance and a reduction in the delivery of oxygen to the subcutaneous tissue (LATHAM, et al, 2001; DOBLE, et al, 2017).

Superficial and deep incisional infection can be of two types, being the primary one identified in the primary incision in a patient with more than one incision, and the

secondary superficial incisional infection that is identified in the secondary incision in a patient with more than one incision. Organ/Cavity ISC is one that occurs within 1 year after implant placement, appears to be related to the surgical procedure, and involves any part of the body excluding the skin of the incision and fascia and musculature when it is opened during surgical manipulation. The types of ISC of the organ/cavity are: bone, joint or bursa and disc space. Among the various types of SSI, as they occur in neurosurgery, they are very relevant to the level of clinical gravity, to the possibility of modifying the prognosis, of increasing the level of lethality and the number of sequelae caused by infection (SILVA, et al, 2021).

An observed factor is that the assistance of a multiprofessional team is essential and there is no plan of care for the surgical patient, because this requires specific individual attention, attending to the needs not felt to prevent physical and emotional damage, perform a data collection, complete history, followed by clear guidance regarding the procedure to be performed, following the rules and routines of the health institution, passing on the patient's support and trust (RODRIGUES & SIMÕES, 2013; UZUKA, et al, 2017)

The presence of comorbidities can also negatively affect the surgical condition, as can be seen in patients with diabetes mellitus, but this can be considered a modifiable risk factor that can be controlled in the pre-operative period, controlling the glycemic indices (DOUBLE, et al, 2017; MOTA, et al, 2020). A ity may be related to the patient's immunological status, directly influencing the surgical response. Patients younger than one year of age or older than fifty years of age present higher rates of SSI because their advanced age, in addition to having a reduction in immunity, can also be associated with established comorbidities (LATHAM, et al, 2001).

The ASA score is of great importance, once high scores are considered independent predictive factors for ISC. Another risk factor related to ISC is the use of immunosuppressive drugs or the presence of pathologies that trigger non-patient immunosuppression, such as the case of individuals with AIDS, undergoing chemotherapy or using corticosteroids. Pre-existing infection or chronic infection, just as in places other than surgery, the risk of ISC will increase (TRENTIN & POMPERMAIER, 2020).

FINAL CONSIDERATIONS

This study highlighted the presence of comorbidities and compromised nutritional status as the risk factors most commonly related to surgical site infection, in which it is complex to distinguish and limit the actual isolated interference of each um. There is no consensus on how the risk factors can interfere with the outcomes, whether associated or isolated, highlighting that more scientific research must be focused on passive control measures capable of interfering with the positive outcome of the post-surgical process.

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