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RESEARCH ARTICLE

APPLICATION OF PREVENTIVE MEASURES FOR SURGICAL PATIENT SAFETY AT THE NAVY MEDICAL CENTER, MEXICO

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ABSTRACT

Background: The safety of surgery is a widely recognized problem throughout the world. Comprehensive patient safety in the surgical area is a key component of the quality of nursing care. The development of information tools such as the *WHO Surgical Safety Checklist* can promote the early identification of the most frequent problems in nursing care. Nevertheless, previous studies indicate that, despite the many benefits of the systematic implementation and use of checklists in operating rooms, achieving full adherence to it by the medical and nursing professionals is not an easy task, as their performance is not usually as constant or consistent as it should be. **Objective:** To determine the level of application of preventive measures for the safety of the surgical patient in the Navy Medical Center in the period between August and December 2019. **Methods:** An observational, exploratory and retrospective study was carried out using a sample of 307 cases obtained based on a selective-intentional, non-probabilistic, incidental sampling by consecutive cases and by quotas. The data collection instrument consisted of a checklist that grouped for each clinical record the evaluable data on the parameters established in the clinical practice guide *Preventive interventions for safety in surgical patients*, as well as the corresponding to the *WHO Surgical Safety Checklist*, the nursing sheet, the anesthesia sheet, informed consent for surgery, and pre-anesthetic assessment. The working hypothesis was that the level of application of preventive interventions for the safety of the surgical patient would be less than 80%.Descriptive statistical analysis was performed using SPSS v.20.0 software. **Results:** The percentage of fulfillment of certain preventive security measures was very variable. The data obtained reveals that there is still a long way to go in order to achieve 100% compliance with the safety measures in surgery. Only in the cases of taking informed consent and confirming the risk of bleeding, full compliance was observed. Meanwhile, in the rest of the measures contained in the safety checklist, percentage of non-compliance ranges between 3% and 8%. **Conclusions:** Compliance with most of the preventive interventions for the safety of the surgical patient occurred in more than 80% of the cases. Only presurgical soap bath obtained less than 80% of the compliance frequency, which may be due to a bias in the records.

INTRODUCTION

For more than a century, surgery has been an essential aspect of healthcare. It is estimated that 234 million major surgeries are performed each year, which is equivalent to one operation for every 25 people worldwide. Furthermore, given the increasing incidence of injuries, cancers and cardiovascular diseases, the weight of surgery services in public health systems will grow heavier. It has been estimated that, each year, 63 million people undergo surgery for traumatic injuries, another 10 million for pregnancy-related complications, and 31 million more for cancer problems.(1) Despite the cost-effectiveness of surgery today in terms of lives saved and disabilities avoided, lack of access to quality surgical care remains a serious problem over the world. The lack of safety in surgical care can cause considerable harm to patients, with significant repercussions for public health.

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At least 7 million patients are affected by surgical complications each year, of which about 1 million die during or immediately after the operation. In industrialized countries, major complications have been reported in between 3% and 16% of surgical procedures that require admission, with permanent death or disability rates of approximately 0.4% to 0.8%. Meanwhile, in developing countries, the mortality rate associated with major surgery is much higher: between 5% and 10%. Furthermore, it should be noted that surgical services are unevenly distributed, as 75% of major surgery operations are concentrated in 30% of the world's population. (1) The safety of surgery is a widely recognized problem throughout the world. While studies carried out in developed countries confirm the magnitude and omnipresence of the problem, in the developing world these difficulties are exacerbated by problems such as poor medical infrastructure and equipment, irregular supply and quality of drugs, deficiencies in organizational management and in the fight against infections, poor capacity and training of staff and severe shortage of financial resources. It is in this sense that the efforts to “raise the bar” to make surgical care safer around the world are explained.

Such is the case of the initiative *Safe Surgery Saves Lives*, carried out by the World Alliance for Patient Safety, under the auspices of the World Health Organization (WHO).(2)The objective is to improve the safety of surgery worldwide by defining a basic set of safety standards that can be applied in all WHO Member States. The results of the work meetings held by the initiatives' members led to the identification of four areas in which it is urgent to make progress in terms of safety during surgical care: prevention of surgical wound infections, safety of anesthesia, safety of patients, surgical equipment and measurement of surgical services.(3) Specifically, comprehensive patient safety in the surgical area is a key component of the quality of nursing care. This, considering, above all, that errors or carelessness in care can be associated with the morbidity and mortality of patients.(4)The processes and decisions of the nurses include knowledge for the care and management of the patient, and where they carry out actions related to surgical safety for the prediction and reduction of complications, the early detection of aggravations and the warning of adverse events in the preoperative periods, operative and postoperative. To be successful, decisions regarding nursing care must be made according to planning and evaluation, based on an appropriate information system. The development of information tools such as checklists can promote the early identification of the most frequent problems in planning nursing care during the hospital stay, the development of the discharge plan and guidance on care at home.

The initial milestone that demonstrated the benefits of using a surgical patient safety checklist was a study conducted by WHO experts on 7688 patients in eight countries to test the validity and usefulness of the *Surgical Safety Checklist*. The results showed a reduction of 36% in surgical complications, 47% in mortality, 50% in infection rates and 25% in the need for a new surgical intervention. Thus, it was concluded that the use of this checklist practically doubled the possibility of using safe standards of care during the surgical treatment of patients. (2)After this finding, numerous empirical studies and systematic reviews of the literature have concluded that surgical safety checklists are useful instruments to significantly improve patient safety in surgery, prevent morbidity and mortality, prevent surgical site infection, improve communication among the members of the medical-surgical team, reduce errors, ensure the consistency and completeness of the tasks, minimize the occurrence of rare events, adhere to processes, reduce the negative impact of hierarchies among the personnel, coordinate assistance, promote union equipment andreduce postoperative complications.(5)(6)(7)

Today, it is universally accepted that the *WHOSurgical Safety Checklist* is a known, validated, effective and efficient tool to promote patient safety. Thanks to its implementation, it has been possible to improve the safety of the surgical act for both patients and professionals in matters such as the correct identification of patients, the safety of the anesthetic act, the avoidance of surgery in an informed wrong place, antibiotic and antithrombotic prophylaxis, the loss of anatomical pieces, the avoidance of forgetting foreign bodies, and obtaining complete information and informed consent from the patients. (8)Likewise, it is recognized that filling out checklists is a practice that allows professionals to avoid dependence on memory and intuition, and reduce errors, placing them in the possibility of carrying out a better practice within high-risk contexts.

As a measure to stimulate the culture of safety in surgery, the WHO has recommended the development of checklists adapted to the needs and particular situations of hospital services. This is a practice that has begun to be adopted in hospitals around the world, where nursing teams have been given the task of designing and validating specific checklists for the pre- and postoperative periods. (9)Along the same lines, the Naval Medical Center of Mexico has implemented a checklist based on that of the WHO, contained in the clinical practice guide *Preventive interventions for safety in surgical patients*, published by the Ministry of Health. The observance of this guide is mandatory for all nursing personnel working in surgery services in the country. In this hospital, an average of 3,000 surgeries are carried out per year, a figure that, due to its size, leads us to think that there is a greater workload for the nursing staff than can usually exist in smaller health care centers. That is why the probability of failures or omissions in the punctual compliance of safety procedures in surgery is also higher, since each nurse must be aware of several patients at the same time. Likewise, between 2018 and 2019, a 2.5% increase in cases of surgical wound infection, occurrence of adverse events after surgery, and operation cancellations was documented.

Derived from the above, the present study aimed to determine the level of application of preventive measures for the safety of the surgical patient in the Navy Medical Center in the period between August and December 2019. This, based on the observation made by previous studies that indicate that, despite the many benefits of the systematic implementation and use of checklists in operating rooms for both the health of patients and the work performance of professionals, achieving full adherence of professionals is not an easy task, as theirperformance is not usually as constant or consistent as it should be.(5)As particular objectives, it was sought to calculate the percentage of compliance with preventive interventions for the safety of the surgical patient and to identify the points of greatest deficiency in their application.

MATERIALS AND METHODS

An observational, exploratory and retrospective study was carried out using a sample of 307 cases obtained based on a selective-intentional, non-probabilistic, incidental sampling by consecutive cases and by quotas. All the clinical records of elective and scheduled surgeries of different specialties performed at the Navy Medical Center between August and December 2019 were included, as long as they had the complete data in the nursing assessment sheets and safe surgery checklists. Cases of surgical procedures performed outside the operating room, clinical records that were under medico-legal investigation, and deaths in the operative period were excluded. Incomplete or written medical records in languages other than Spanish were eliminated.

The data collection instrument consisted of a checklist that grouped for each clinical record the evaluable data on the parameters established in the clinical practice guide *Preventive interventions for safety in surgical patients* (Ministry of Health), as well as the corresponding to the *Surgical Safety Checklist* (WHO), the nursing sheet, the anesthesia sheet, informed consent for surgery, and pre-anesthetic assessment. A total of 14 variables were measured, of which 13 were nominal level and one ordinal level. The information processing and analysis was carried out using descriptive statistics with simple

frequencies and percentages. The working hypothesis was that, based on the background of the literature and the observations made in the performance of the hospital nursing staff, the level of application of preventive interventions for the safety of the surgical patient would be less than 80%.Descriptive statistical analysis was performed using SPSS v.20.0 software. It is important to note that, due to several gaps in the data contained in the documents used to compile the analysis material, certain information could not be specified or was not entirely consistent and was therefore omitted from the analysis. For example, it was not possible to specify the substance used for antisepsis in surgeries (such as povidone iodine and chlorhexidine), the method for maintaining normothermia (such as convection heat or thermal sheets), or the schedule of patient bath. These gaps could be important since they contain factors that can affect the effectiveness of the security measures applied to surgery.

RESULTS

The percentage of fulfillment of certain functions was very variable.As part of the preoperative preparation of the patient, the preoperative soap bath was performed in 24.03% of the patients who underwent surgery, against 75.65% of times when it was not performed. Antiseptic preparation was performed in 96.74% of the cases and was omitted in 3.26%. The administration of antibiotic prophylaxis was carried out in 66.45% of the cases and it was not carried out in 33.55%. Among the cases in which it was done, in 48% of themitprophylaxis was administered 60 minutes before surgery; in 23%,during the surgical act; in 14%, after surgery, and in 15%, no antibiotic was administered. Confirmation of the risk of bleeding during the patient's surgery was carried out in 100% of the cases. Confirmation of transfusion blood products available atthe blood banks was carried out in 95.44% of the cases, while it was missed in 4.56%. Mechanical antithrombotic measures were taken in 96.42% of the cases and missed in 3.58% of them. Among the measures applied, in 91.20%of the cases an elastic bandage was used, and in 5.21%graduated compression stockings were applied. Meanwhile, measures to maintain normothermia in the patient during the intraoperative period were taken in 92.18% of the cases, and not carried out in 7.82% In 96.09%of the cases, the anesthesiology team performed the pre-anesthetic assessment of patients undergoing surgery before the patient entered the operating room, while in 3.91% of the time it was carried out in the operating room. In 45.28% of the cases, ondasetron was ministered; in 24.76% of the cases, ondasetron plus dexamethasone; in 16.29% only dexamethasone; in 8.4%other drugs; and 5.54% of the time nothing was ministered. Informed consent prior to surgery was taken from 100% (n = 307) of the patients.

DISCUSSION

The results obtained reveal that there is still a long way to go in order to achieve 100% compliance with the safety measures in surgery. Only in the cases of taking informed consent and confirming the risk of bleeding, full compliance was observed. Meanwhile, in the rest of the variables referring to the application of measures contained in the safety checklist, there is always a percentage of non-compliance that ranges between 3% and 8%. Some of the measures whose partial non-compliance is more worrisome are the actions to maintain normothermia, the verification of the patient's blood products available at the blood bank, and the performance of antithrombotic mechanical measures (7.82%, 4.56%, 3.58% of non-compliance in the checklist, respectively). Regarding the 3.26% of the cases in which antiseptic preparation of the patient was not performed and 33.55% in which antibiotic prophylaxis was not administered, it should be noted that all of these corresponded to endoscopic surgeries. This type of surgery is performed orally or anally and only lubrication of the endoscope is required, while antibiotic prophylaxis is not necessary unless the patient has some type of previous pathology. Therefore, it can be established that the antiseptic preparation and antibiotic prophylaxis were fully complied with. In fact, it is almost impossible for these measures not to be carried out, since their omission would constitute a terrible medical negligence.

On the other hand, it should be taken into account that, being this a retrospective study, these results are subject to human error bias, since it is possible that compliance was higher in some variables but the respective annotation was not made. Likewise, another bias to consider is the incompatibility of the measurements between the different documents that were the source for the completion of the final checklist; for example, in the nursing care sheet used in the hospital, the performance of the preoperative bath is a measure included under the heading "surgical preparation", where it appears together with others as channeling of patients based on medical indications, bandaging lower limbs, administration of drugs and bowel preparation. In this way, some annotations on the preoperative bath could have been skipped in the safety checklist of the surgery because this measure is contained in the general indications of the nursing sheet, thus making it obvious. This would explain the high percentage of non-compliance obtained in the measure (75.65%). In any case, this observation makes it possible to realize the existing need to standardize the internal documentation filling processes and regularize the medical records. Results obtained are compatible with those of antecedent studies that indicate that, even in industrialized countries, full compliance with the checklists by medical and nursing staff in the operating room does not usually occur either.(5)In this sense, it is necessary to redouble efforts in training, control and creation of a culture of safety in surgery to ensure that the verification checklists are followed and filled out completely and correctly by the personnel.

Conclusion

The level of application of preventive measures for the safety of the surgical patient in the Navy Medical Center was variablein the period between August and December 2019. According to the reference value established in the working hypothesis, it is observed that compliance with the antiseptic preparation measures, antibiotic prophylaxis, confirmation of the risk of bleeding, confirmation of the patient's blood products in the blood bank, anthitrombotic and normothermia measures and pre-anestesthetic assessment occurred in more than 80% of the cases. Presurgical soap bath was the only measure that obtained less than 80% of the compliance frequency, which may be due to a bias in the records made by the nursing staff. The points of greatest deficiency in the application of preventive surgical measures were the actions to maintain normothermia, the verification of the patient's blood products in the blood bank and the mechanical antithrombotic measures. In contrast, the confirmation of the risk of bleeding and the application of informed consent were measures

complied with in 100% of the cases, while the antisepsis of the surgical area and the antibiotic prophylaxis were carried out in all the cases in which said measures they were necessary. In order to improve the application of preventive safety measures for surgery in the hospital, it is recommended to work on the training of personnel and the creation of a culture of safe surgery in the hospital, as well as on the standardization of the processes of filling in internal documentation and correspondence of the registration fields between the various documents and checklists that the nurses must fill out.

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Conflict of interest statement

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