

EFFECTIVENESS OF THE PROTOCOL FOR THE PREVENTION OF SKIN LESIONS IN ROBOTIC UROLOGICAL SURGERIES

Efetividade do protocolo prevenção de lesões de pele em cirurgias urológicas robóticas
Efectividad del protocolo prevención de lesiones de piel en cirugías urológicas robóticas

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ABSTRACT: Objectives: To verify the effectiveness of the Skin Lesion Prevention Protocol by analyzing the occurrence of lesions caused by surgical positioning in cancer patients undergoing robotic urological surgeries; to demonstrate the importance of simulations as educational strategies for training nursing teams. **Method:** This study includes a descriptive, retrospective, quantitative approach, and refers to the year of 2015. The study was performed at the surgery center of a cancer hospital that performs on average 1,000 surgeries per month. **Results:** In 2015, 359 robotic urological procedures were performed, of which 298 cases were prostatectomies. There were no skin lesions caused by positioning in the observed period. **Conclusion:** In this study, the occurrence of skin lesions associated with the surgical positioning of cancer patients undergoing robotic urological surgeries was zero. This result proves the effectiveness of the institutional protocol and demonstrates the importance of simulation as an educational improvement strategy to guarantee the success of robotic surgical positioning.

Keywords: Perioperative nursing. Pressure ulcer. Robotics. Patient positioning.

RESUMO: Objetivos: Verificar a efetividade do Protocolo Prevenção de Lesão de Pele, por meio do levantamento de ocorrências causadas pelo posicionamento cirúrgico em pacientes oncológicos submetidos às cirurgias urológicas robóticas e demonstrar a importância da simulação como estratégia educativa no treinamento da equipe de enfermagem. **Método:** Trata-se de uma pesquisa descritiva, retrospectiva, abordagem quantitativa, referente ao ano de 2015. O estudo foi feito no centro cirúrgico de um hospital oncológico que realiza em média 1.000 cirurgias/mês. **Resultados:** Em 2015, foram realizados 359 procedimentos urológicos robóticos, sendo 298 casos de prostatectomia. Não houve nenhuma lesão de pele por posicionamento no período observado. **Conclusão:** A ocorrência de lesões de pele em pacientes oncológicos submetidos a cirurgias urológicas robóticas, associada ao posicionamento cirúrgico, neste estudo, foi zero. Esse resultado comprova a efetividade do protocolo institucional demonstrando a importância da simulação como estratégia educativa de melhoria para garantir o sucesso do posicionamento cirúrgico robótico.

Palavras-chave: Enfermagem perioperatória. Úlcera por pressão. Robótica. Posicionamento do paciente.

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RESUMEN: Objetivos: Verificar la efectividad del Protocolo Prevención de Lesión de Piel, por medio del levantamiento de ocurrencias causadas por el posicionamiento quirúrgico en pacientes oncológicos sometidos a las cirugías urológicas robóticas e demostrar la importancia de la simulación como estrategia educativa en la capacitación del equipo de enfermería. **Método:** Se trata de un estudio descriptivo, retrospectivo, abordaje cuantitativo, referente al año 2015. El estudio fue hecho en el centro quirúrgico de un hospital oncológico que realiza en promedio 1.000 cirugías/mes. **Resultados:** En 2015, fueron realizados 359 procedimientos urológicos robóticos, siendo 298 casos de prostatectomía. No hubo ninguna lesión de piel por posicionamiento en el período observado. **Conclusión:** La ocurrencia de lesiones de piel en pacientes oncológicos sometidos a cirugías urológicas robóticas, asociada al posicionamiento quirúrgico, en este estudio, fue cero. Ese resultado comprueba la efectividad del protocolo institucional demostrando la importancia de la simulación como estrategia educativa de mejoría para garantizar el éxito del posicionamiento quirúrgico robótico.

Palabras clave: Enfermería perioperatoria. Úlcera por presión. Robótica. Posicionamiento del paciente.

INTRODUCTION

Recent national research estimates that for the years 2016 and 2017 there will be approximately 600,000 new cases of cancer (CA). In men, the most frequent type will be prostate cancer (28.6%)¹.

Currently, there are several surgery techniques that can be used for the treatment of prostate cancer, and the most modern and innovative one utilizes a minimally invasive and videolaparoscopic approach with the use of robots. Videosurgery emerged in the late 1980s and began to be used after the invention of the first endoscope, developed by Philipp Bozzini, a German physician, and even more so after the improvement of the laparoscope by other physicians^{2,3}.

Robot-assisted surgery is defined as “a computer-controlled manipulator with artificial sensors, which can be reprogrammed to move and position surgical instruments in order to perform surgical tasks,” according to the Robot Institute of America⁴.

In addition, the robotic system improves the visualization, exposure and dissection of important structures in a reduced space, thus decreasing the risk of complications, surgical trauma, pain and the duration of hospital stay^{5,6}.

When undergoing a surgical procedure, the patient is exposed to several situations that may compromise his or her physical and psycho-emotional integrity during the perioperative period. Among them, robotic urological surgical positioning stands out, since the surgical position should guarantee the patient's comfort and safety with respect to their anatomical and physiological limits. It is necessary that nurses be technically and scientifically able to perform these procedures, and that they be part of a multi-professional team to position the patient, which minimizes the risks of developing skin lesions (SL) resulting from surgical positioning⁷⁻⁹. Appropriate

surgical positioning ensures efficiency and safety during the procedure, as it is one of the main quality indicators in perioperative care. Appropriate surgical positioning maintains the body aligned, making the operation site evident. This reduces tension and pressure on the tissues, preserves circulatory and respiratory functions, and prevents possible harmful effects due to the surgical position maintained for prolonged periods^{10,11}.

Intraoperative surgical patients are prone to numerous risks and to the development of various complications due to chemical agents, electrical burns and lesions caused by pressure, which are most commonly found. Pressure lesions can be defined as a SL and/or in the underlying tissue or structure, and are most evident in bone prominences, caused by pressure alone or in combination with friction and / or shearing while transferring the patients to the bed, and may be associated with significant patient comorbidities⁸.

Recent studies have emphasized several risk factors associated with SL in surgical patients, and these factors are divided into two groups: intrinsic, such as age, body weight, nutritional status and chronic diseases, like diabetes mellitus, vasculopathies, neuropathies, hypertension and anemia; and extrinsic, for example, type and time of surgery, anesthesia, surgical positions and positioning. The intensity of these factors and the duration of the anesthetic-surgical procedure demonstrate the major or minor risk of developing SL, which can be observed after the end of the procedure and can increase rapidly. The most common sites for SL development from surgical positioning are: the sacral region, the calcaneus, the mandibular region, and the trochanters^{8,11}.

Thus, the basis for ensuring patient safety during intraoperative robotic surgeries is the early assessment of surgical risks, so as to implement improvement strategies and to minimize adverse events, such as SL from surgical positioning, through support and prevention mechanisms^{8,12}. Improvement

strategies can be developed using educational actions in professional improvement training, such as simulations.

According to the guidelines from the Association of Perioperative Registered Nurses (AORN, 2017), the surgical positioning of the patient allows for the assessment of the quality of care provided¹³. With quality indicators, it is possible to monitor the occurrence of adverse events during the intraoperative period, since these events may be associated with the learning level of the nursing professionals. Such learning, in turn, meets the educational actions implemented to ensure the safety of the patient and the reduction of SL risks due to surgical positioning.

In this situation, the nursing professional can develop skills and abilities focused on the surgical patients and their needs. As such, robotic simulations provide opportunities for better interaction within the interdisciplinary team, ensuring the success of surgical positioning¹⁴.

OBJECTIVES

To verify the effectiveness of the SL Prevention Protocol through the review of the occurrences of lesions caused by the surgical positioning in cancer patients undergoing robotic urological surgeries; to demonstrate the importance of simulations as educational strategies for training nursing teams.

METHOD

The study has a documental and retrospective design, and contains quantitative data analysis.

The study was developed at a national cancer hospital with 361 beds. The Surgery Center (SC) has 14 operating rooms, and the surgical volume is around 1,000 procedures per month (outpatient, inpatient, urgency and emergency). Of these 1,000 procedures, about 40 surgeries are performed with robotic technology, and 85% of those are urological surgeries.

The protocol analyzes the variables: age, gender, presence or absence of SL from surgical positioning, SL site, type of surgical positioning, duration of surgery, time during which the patient was positioned, time during which the patient remained under anesthesia, type of surgical procedure, time during which the surgeon remained in the console and laterality.

The inclusion criteria were: adult patients (both genders) undergoing elective robotic urological surgeries, in which the SL Prevention Protocol was applied.

Exclusion criteria: patients undergoing emergency surgeries, and who had SL from other causes and those undergoing other types of robotic surgery.

Data was collected from all patients undergoing robotic urological surgeries in the year of 2015, which accounted for 359 surgeries. This study was approved by the Ethics Committee of the institution hosting the study, according to report n. 2.278 / 16.

The data was collected through the creation of an instrument called the Systematization of Robotic Perioperative Nursing Assistance (SAEP Robotics), stored in the MV2000 database. The instrument highlights the variables as provided in the protocol. Based on its analysis, it is possible to create a graphic representation.

In the “intercurrent” field, nurses reported the presence or absence of SL from surgical positioning according to the SL Prevention Protocol, which refers to all types of surgical positions, including robotic surgeries.

Based on this data, figures were constructed to represent the profile of cancer patients undergoing robotic urological surgeries and their association with SL.

Training of the Surgery Center Nursing Team

The training of the nursing team is carried out using the realistic simulation model. Simulation scenarios bring the nursing professional closer to reality. They take advantage of the opportunity to predict errors, which can then be prevented in similar situations in the future, increasing the safety of the nursing professional and the cancer patient, thus avoiding damage to the patient on the date of surgery.

In this type of training, it is possible to practice technical skills and develop critical reasoning to evaluate the best actions to be taken, according to the particularities and specificities of the surgical procedures and of each patient.

The simulation of surgical positioning is performed prior to the procedure, and nurses, nursing technicians, surgeons and anesthesiologists are invited to participate in the training. In the simulation, one of the medical professionals is selected to be a living model, and then the SL Prevention Protocol is applied with the involvement of the interdisciplinary and multi-professional team, according to the surgical proposal and the clinical case of the surgical patient.

Thus, the absence of SL from surgical positioning reflects the integrated performance of the interdisciplinary and multi-professional team, which enhances their skills and competences through evidence-based practice, ensuring patient safety during the intraoperative period.

SL Prevention Protocol: Surgery Center

Upon arriving at the SC, the patient is admitted by the nurse using the document called “peri-admission.” This is one of the steps in the Systematization of Perioperative Nursing Care (SAEP). In this document, there is a specific field for describing the intraoperative surgical risks, which highlights the risk of perioperative positioning lesions.

After going over the risk factors, the nurse confirms the intraoperative care to be provided based on the flowchart from Figure 1.

In this flowchart, the SL Prevention Protocol is applied according to the institutional scale of the surgery risk, which evaluates the time during which the patient underwent the surgical procedure. The institutional risk scale is

composed of four classifications: low risk, moderate risk, high risk and special high risk.

In the low risk classification, the following are available for surgical positioning: positioners (head, back, arms, whole body and calcaneus), viscoelastic mattress, pyramidal mattress and pillows. In the classifications of moderate risk, high risk and special high risk, the following are available for surgical positioning: positioners (head, back, arms, whole body and calcaneus), viscoelastic mattress, pyramidal mattress, pillows and 15 × 20 cm protective films and specific special objects, in accordance with the nurse’s assessment in the “peri-admission”.

As such, risk assessment will guide what types of materials and aids will be required for surgical positioning, minimizing potential lesion risks. Therefore, according to the type of risk exposure in the proposed surgical procedure, positioners, pyramidal mattresses and specific 15 × 20 cm protective films are available.

The protective films are impermeable, that is, humidity and bacteria proof. It is possible to replace them several times without altering their ability to adhere to the patient’s skin.

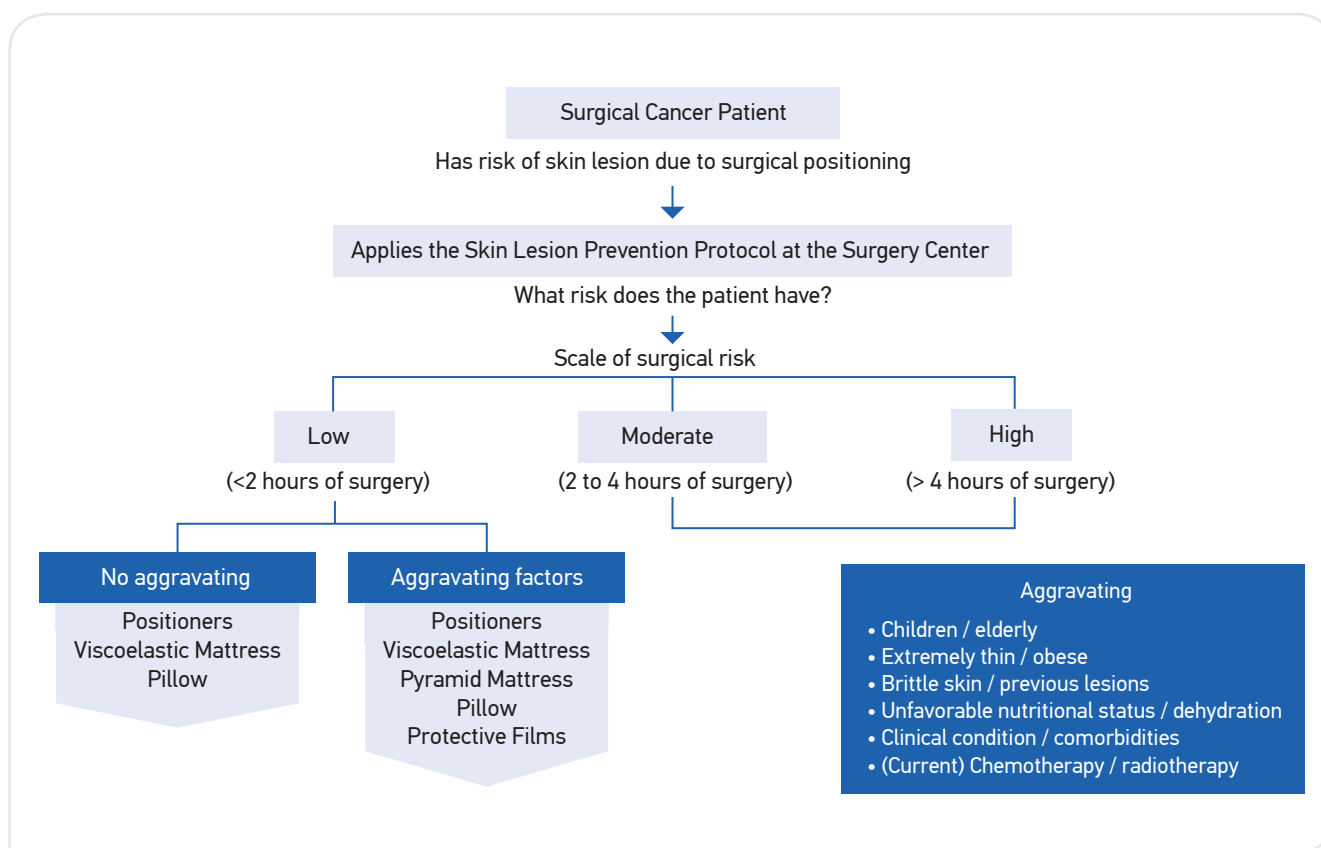


Figure 1. Skin Lesion Prevention in the Surgical Center Flowchart prepared by the A.C. Camargo Cancer Center.

In addition, in the absence of 15 × 20 cm protective film size, 15 × 15 cm sized film may be applied, according to the evaluation of the nurse at the “peri-admission”. As such, the sites where the films are to be placed are highlighted in the nursing staff’s pocket manual (Figure 2).

In the next section, the sites for placement of these protective films, according to the type of surgical positioning, can be observed by means of a pocket manual made available to all SC staff.

Surgical Positions

- Dorsal decubitus or supine position: natural position of the body in which the patient’s back and spine are resting on the operating table mattress. The following stand out as potential areas of pressure: occipital, scapular, sacrococcygeal regions, elbows and calcaneum. Mainly observed in: head and neck surgeries, thoracic surgeries, pelvic-abdominal surgeries, breast surgeries, reparative surgeries, interventional radiology surgeries, endoscopic surgeries, urological surgeries, orthopedic surgeries, cardiovascular and vascular surgeries, surgeries for pain control, cutaneous oncology surgeries, dental surgeries, liver transplants and neurosurgery;
- Ventricular decubitus or prone: in this position, the patient’s stomach or abdomen comes in contact

with the operating table mattress. The following stands out as potential areas of pressure: periauricular, parietal, mandibular, thoracic and patellar regions, genitalia and dorsum of the feet. Mainly observed in: neurosurgeries, orthopedic surgeries and pelvic surgeries;

- Lateral decubitus: in this position, the patient is anesthetized in the supine position and, later, moved to the lateral thoracic position, or lateral renal position. The following stand out as potential areas of pressure: trochanteric, calcaneal, parietal, malleolar, thoracolateral, periauricular and condylopatellar regions. Observed mainly in: thoracic surgeries, orthopedic surgeries and urological surgeries.
- Lithotomic or gynecological position: position in which the patient is anesthetized in the supine position and moved to the lower fold of the operative table, so that the gluteal region is aligned with the “table break”, for posterior placement of the leg rests. The following stand out as potential areas of pressure: occipital, scapular and sacrococcygeal regions, calves, calcaneus and soles of the feet. Mainly observed in: gynecological surgeries, pelvic surgeries and colorectal surgeries;
- Modified Fowler’s position: commonly known as the “beach chair” position. It allows the patient to remain seated at angles 30 to 90 ° above the horizontal plane.



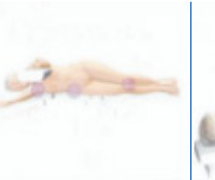

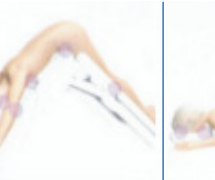
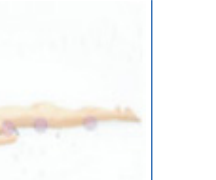
Objectives: to protect from friction and shearing, and control the microclimate						
Positions						
Table	Dorsal or supine decubitus / Reverse Inclined Trendelenburg		Lateral or Sims / Lying on side	Lithotomy	Knife (Kraske)/ ventral or prone decubitus	
Areas at risk	Occipital Arms and elbows Sacrum and coccyx	Scapula Column Calcaneus	Shoulder Hip Ankle Side of face and ear Overlapping areas (skin on skin) Armpit Knee Feet	Occipital Shoulder Blade Calcaneus Sacrum and coccyx Lateral side of the legs Shoulders Hips	Forehead, eyes and ears Lower shoulders Iliac crests Knees and legs Toes Chin Chest Male genitalia Back of feet	

Figure 2. Handbook made by the A.C. Camargo Cancer Center.

The following stand out as potential areas of pressure: scapular, gluteal, sacrococcygeal and popliteal regions, calcaneus and soles. Mainly observed in: orthopedic surgeries and neurosurgeries;

- Trendelenburg position: this position is a variation of the dorsal decubitus, in which the upper back is lowered and the feet are raised. The following stand out as potential areas of pressure: occipital, scapular, sacrococcygeal, elbow and calcaneal regions. Mainly observed in: vascular surgeries and lower abdominal surgeries;
- Reverse or inclined Trendelenburg position: in this position, the patient is placed in the back position so that the head is at a higher level in relation to the feet. The following stand out as potential areas of pressure: occipital, scapular, sacrococcygeal and calcaneal regions. Mainly observed in: upper abdominal surgeries and head and neck surgeries;
- Knife or Kraske position: modified position of the ventral decubitus. The following stand out as potential areas of pressure: parietal, periauricular, thoracic, genitalia, patellar and lower ankle regions. Mainly observed in: orthopedic surgeries and pelvic / colorectal surgeries;
- Robotic position: in this decubitus, the patient remains positioned in accentuated Trendelenburg in conjunction with the lithotomic position. The following stand out as potential areas of pressure: occipital, scapular, sacrococcygeal, calf, calcaneum and plantar regions. Observed mainly in: robotic urological surgeries. In this position, a profiled mattress will be made into an x on the thorax so that it is not directly in contact with the patient's skin. That is, it is in direct contact with the protective films adhered to the anterior thoracic region, and the mattress is fixed with adhesive tape. And, also, a profiled footrest is placed in the patient's hands, to guarantee their protection and safety.

RESULTS

The data collected were represented by three figures, which show the following items: age, number of patients undergoing urological procedures, presence or absence of SL from surgical positioning, SL location, duration of surgery and type of surgical procedure.

Figure 3 shows the total number of patients undergoing robotic urological surgical procedures (359 cases) in 2015, and demonstrates the percentage of each type of surgery performed. The 1% (four cases) of the category called "Others" refers to types of surgeries that had only one case in 2015. These include: adrenalectomy, kidney biopsy, ureteral implant and the resection of periprosthetic sarcoma.

Figure 4 shows the age group of patients undergoing urological surgeries according to the type of surgical procedure performed. The most prevalent age group is between 50 and 79 years old, both for prostatectomy surgeries (283 patients) and nephrectomy (30 patients).

Figure 5 shows the total surgery time for each type of surgical procedure. The surgery category with the highest percentage in the shortest period — that is, between 1 and 2 hours in duration — was prostatectomy (89.11%).

In the 359 robotic urological surgeries that strictly followed the SL Prevention Protocol, there was no occurrence of SL. No SL was detected in the more frequent surgery (prostatectomy: 89.11%) or in longer surgeries (cystectomy: 3%), which lasted more than 6 hours.

DISCUSSION

Nursing interventions are necessary to prevent risks and guarantee the integrity of the surgical patient with safety and the

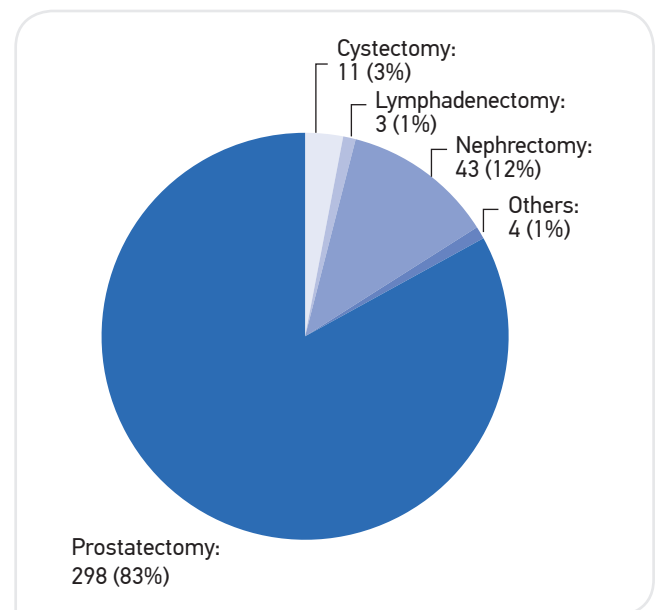


Figure 3. Number of patients per robotic urological procedure.

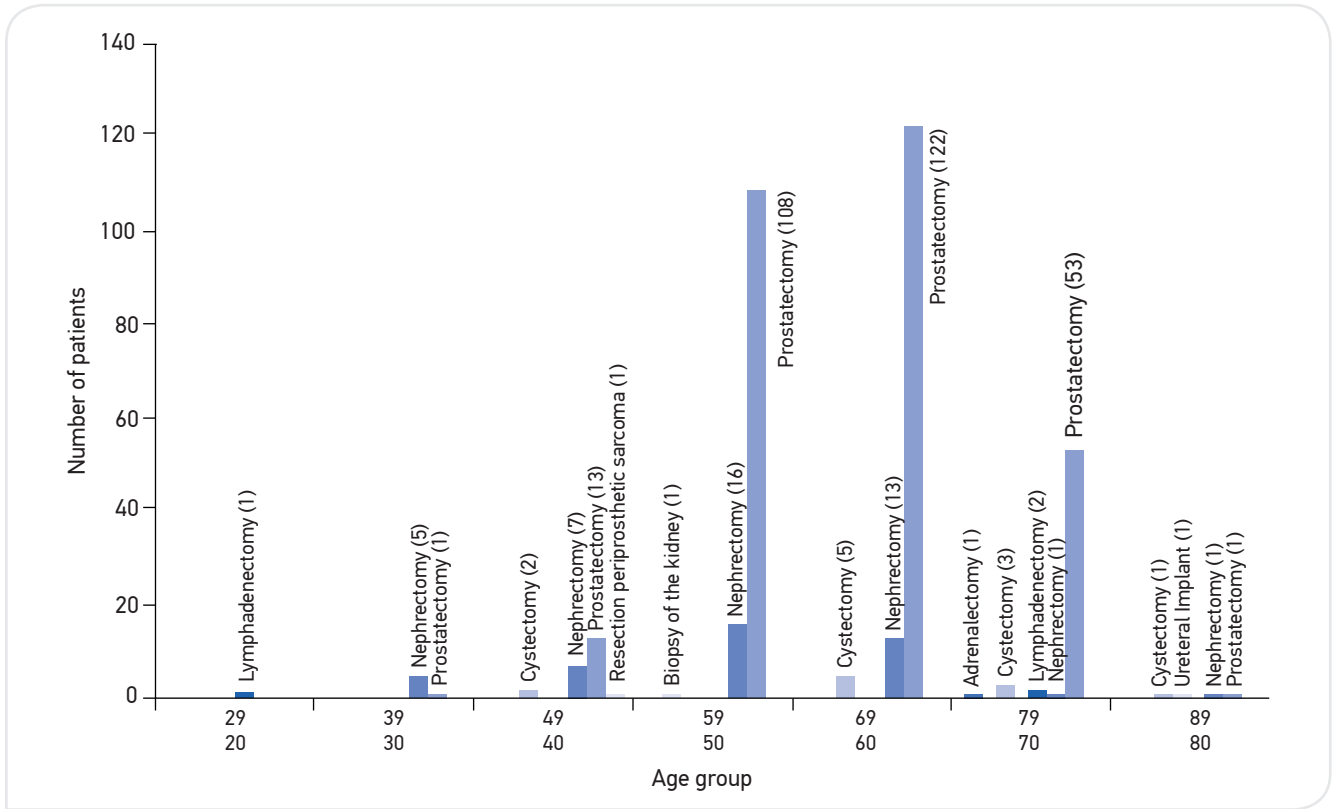


Figure 4. Number of surgical procedures × age range of patients.

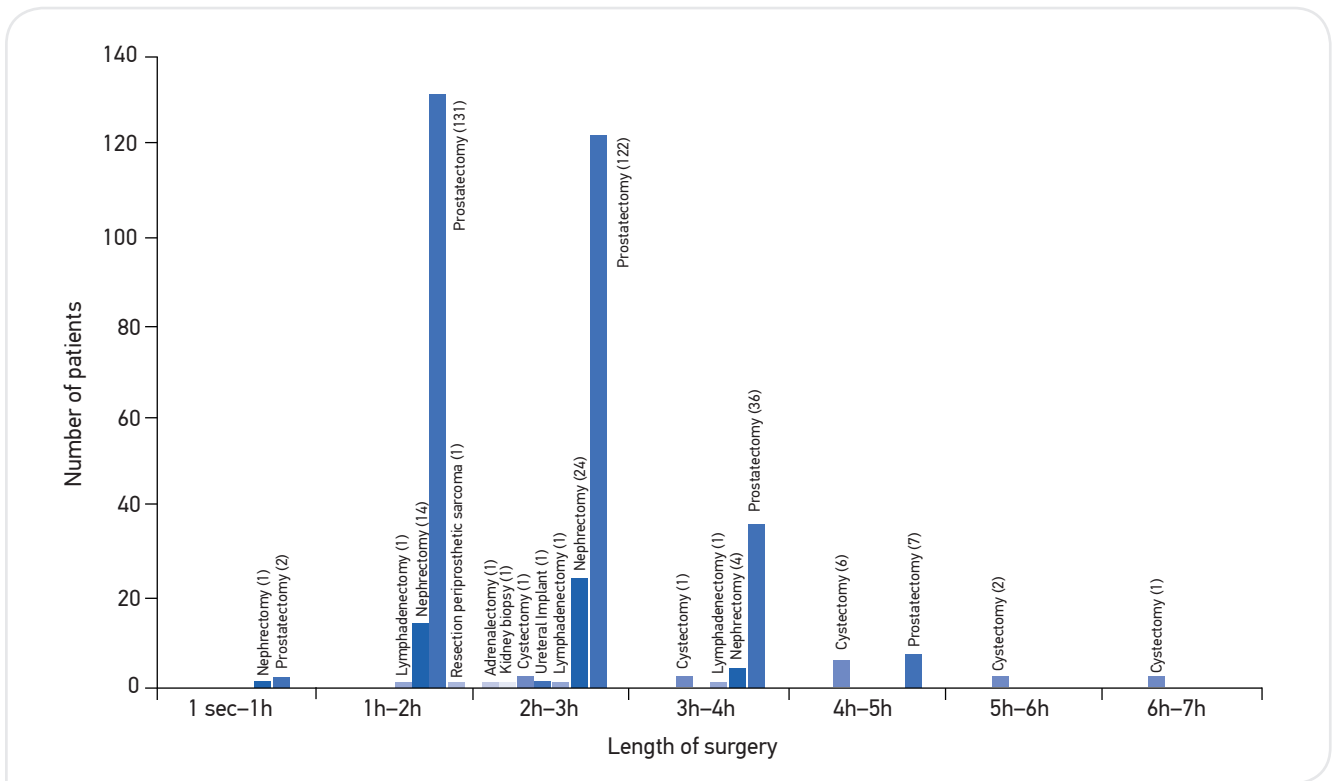


Figure 5. Range of surgery time × type of procedure.

effective management of their actions¹⁰. Therefore, the application and effectiveness of the SL Prevention Protocol in the SC guide the perioperative care behaviors defined by the nurse according to the needs of the cancer patient.

The occurrence of SL may be associated with the duration of the surgery, the time during which the patient is anesthetized, the period of time the surgeon stays on the console (the equipment used by the surgeon to manipulate the robot), and the type of the patient's surgical positioning^{8,15}. In this regard, our data did not demonstrate any SL cases from positioning in robotic urologic surgical procedures. This result reflects the implementation of the best care practices as preventive barriers, such as, simulation, strengthening ethical attitudes and a responsible multi-professional team involved¹⁴.

In robotic urological surgeries, the following surgical positions can be observed: accentuated Trendelenburg (15 to 20°), associated with the lithotomic position; and right or left lateral decubitus. In the accentuated Trendelenburg position associated with the lithotomic position, the following stands out as potential areas of pressure: occipital, bilateral scapular and sacrococcygeal regions, calves, calcaneus and soles of the feet. In the right or left lateral decubitus, the following are potential areas of pressure: trochanteric, calcaneal, parietal, malleolar, lateral thoracic, periauricular and condylopatellar regions^{16,17}. This type of positioning implies hemodynamic changes, which may

result in increased blood pressure, increased intraocular pressure, increased intracranial pressure, ventilatory difficulty and SL^{17,18}.

Thus, the quality and safety of the robotic devices used to position the patient need to be considered, since the success of this surgical modality is owed to SL prevention protocols¹⁶⁻¹⁸.

Therefore, the present article allowed us to verify the effectiveness of the SL Prevention Protocol, in light of studies reported in the literature, since the occurrence of SL in cancer patients undergoing robotic urological surgeries associated with the surgical positioning was zero in this study.

CONCLUSION

In this study, the occurrence of LP associated with the surgical positioning in cancer patients undergoing robotic urological surgeries was zero.

This research proves the great effectiveness of the SL Prevention Protocol of the SC, as it shows the integrated actions of various medical professionals in implementing prevention strategies and protocols for robotic urological oncology surgeries. This demonstrates that simulation training for the interdisciplinary and multi-professional team is essential to ensure the effectiveness of robotic surgical positioning.

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