Skin injuries occasioned by robotic procedure versus open

ABSTRACT | Objective: to identify factors associated with skin lesions resulting from robotic versus conventional urological surgery in adults / elderly. Method: integrative review, stages: Construction of the research protocol; Formulation of the question - evidence-based practice, using the acronym PICO; Definition of search strategy descriptors in each of the selected databases, which should be varied; Determination, selection and review of inclusion and exclusion criteria; Critical evaluation of studies; Data collection using instruments that analyzed in pairs; and Summary of results / data grouped by similarity. Results: the search strategy generated 207 articles. Resulting in 7 articles for final analysis. Conclusion: further clinical studies are needed, addressing the losses and benefits related to robotic and open surgical positioning, thus directing accurate nursing interventions to patients at higher risk.

Keywords: Perioperative Nursing; Robotic Surgical Procedures; Urology; Wounds and Injuries; Intraoperative Care.

INTRODUCTION

Minimally invasive surgeries, unlike conventional surgeries, are those performed with reductions in the size of the incisions, postoperative pain, bleeding and inflammatory response. There are different procedures considered to be minimally invasive, such as video-laparoscopy, in addition to robotic surgery, which has gained space in most surgical specialties. 1-2

In 2000, the use of robotics in medical treatments reached a dizzying growth, due to the development of the Da Vinci robotic system. 3 This platform has three main components: console (place where the doctor performs the procedure); patient cart (4 robotic arms, 1 for endoscopic camera
and 3 for surgical instruments); and the vision car. 2-4

Robotic surgery in the field of urology has been used in many surgical treatments, mainly in nephrectomy, cystectomy and prostatectomy. 5 In the past 20 years, there has been a considerable increase in the incidence of prostate cancer in most countries, in addition to bladder cancer, which is a malignant tumor with a high rate of invasiveness and is one of the most common types of cancer. 5-7

In the operating room, the nurse performs specific activities, being responsible for organizing and ensuring safe care for the surgical patient, using the Perioperative Nursing Care Systematization (SAEP - Sistematização da Assistência de Enfermagem Perioperatória). 8 The nursing process performed through SAEP is an essential activity for nurses to individualize care, thus promoting the promotion, maintenance and recovery of the patient’s health. 9

To start a robotic surgery program, well-trained employees are of paramount importance, and for this, the nurse has the competence of training and updating its staff. 10 The nursing professional must guarantee the best possible support, both for the team and for the patient. 11 To ensure patient safety during the intraoperative period, attention must be paid to the surgical positioning and immobilization of the patient, minimizing adverse events such as pressure injuries. 10,12

The present study seeks to identify the factors associated with skin lesions resulting from robotic surgeries when compared with conventional surgeries in urology in adults and the elderly, aiming at improving the assistance provided by nurses working in the area.

METHOD

Integrative review: 1.construct of the research protocol; 2.formulation of the question within the evidence-based practice (PBE), using the acronym PICO; 3.definition of search strategy descriptors in each of the databases selected by the researcher; 4.determination, selection and inclusion and exclusion criteria; 5.critical assessment of studies; 6.data collection using instruments of analysis in pairs; and 7.synthesis of results / data grouped by similarity.

Eligibility criteria

Study question: What are the factors associated with skin lesions resulting from robotic surgeries compared with conventional surgeries in urology in adults and the elderly?

Inclusion criteria: studies with adults over 18 years of age, comparing skin lesions resulting from robotic versus conventional / open surgery; observational, experimental or quasi-experimental design, and studies with or without randomization. Secondary source studies, time series or case control were excluded, without determining a clear methodology, theses and dissertations. As filters, studies were applied in English, Spanish or Portuguese; without temporal cut.

Information sources

The definition of controlled descriptors was referenced from the following thesaurus: Health Sciences Descriptors (DeCS), MESH (Medical Subject Headings) and the study’s keywords. The controlled descriptors mentioned below were used considering the Boolean operators "AND" and "OR" for research.

Due to the specific characteristics of each database, the search strategies were adapted according to the objectives and inclusion criteria of this study. The search for the articles took place in May 2020, and updated in June 2020, according to Chart 1.

The search was carried out in the following databases: CINAHL (Cumulative Index to Nursing and Allied Health Literature); PubMed (Search facility provided by the National Center for Biotechnology Information) and EMBASE (Elsevier publisher) via CAPES Portal. During the selection of sources of evidence, the study was divided into two moments (1st search in the databases and insertion in a spreadsheet; 2nd spreadsheet was sent to 2 independent reviewers, who evaluated the studies in pairs, blindly, applying eligibility criteria).

Data collection and synthesis of results

Selection of texts and filling in an Excel spreadsheet built on the basis of the research protocol prepared by the authors, to obtain the necessary infor-
Figure 1. Flowchart of the study selection and inclusion process according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2009). Niterói, Rio de Janeiro, 2020.

Table 2. Main outcomes and references of the included studies. Niterói, Rio de Janeiro, Brazil, 2020.

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Country</th>
<th>Objective(s)</th>
<th>Sample</th>
<th>Study type</th>
<th>Main Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haglind E, et al. 2015</td>
<td>Sweden</td>
<td>Compare the incidence of urinary incontinence and erectile dysfunction, between radical open prostatectomy vs. robotics</td>
<td>Total: 2100 Open: 700 Robotics: 1400</td>
<td>Multicenter, prospective cohort (1 year), controlled and consecutive randomization</td>
<td>There was no difference in the improvement in the rate of urinary incontinence, with a small improvement in erectile function after surgery by the robot.</td>
</tr>
<tr>
<td>Bochner BH, et al. 2015</td>
<td>USA</td>
<td>Compare the complication rates between open radical cystectomy vs. robotics.</td>
<td>Total: 118 Open: 58 Robotics: 60</td>
<td>Prospective cohort (4 years) and consecutive randomization</td>
<td>There were no differences between the two comparison groups after 90 days postoperatively.</td>
</tr>
<tr>
<td>Soria F, et al. 2018</td>
<td>Austria</td>
<td>To evaluate long-term Perioperative mortality, comparing open radical cystectomy vs. robotics.</td>
<td>Total: 1887 Open: 690 Robotics: 1197</td>
<td>Multicenter, retrospective cohort, consecutive randomization</td>
<td>The robotic technique presents less blood loss and shorter hospital stay, but with longer operative times and more readmissions.</td>
</tr>
<tr>
<td>Bochner BH, et al. 2018</td>
<td>USA</td>
<td>Compare the evolution of cancer in patients undergoing radical open cystectomy vs. robotics.</td>
<td>Total: 118 Open: 58 Robotics: 60</td>
<td>Prospective cohort (4 years) and consecutive randomization</td>
<td>No differences were found in the risk of recurrence or death from bladder cancer between the two groups.</td>
</tr>
<tr>
<td>Parekh DJ, et al. 2018</td>
<td>USA</td>
<td>Compare survival in patients with bladder cancer treated by open cystectomy vs. robotics.</td>
<td>Total: 350 Open: 174 Robotics: 176</td>
<td>Multicenter, prospective cohort (2 years) and consecutive randomization</td>
<td>There was no difference in the survival rate between patients who underwent robotic and open cystectomy at follow-up.</td>
</tr>
<tr>
<td>Moschini M, et al. 2019</td>
<td>EUA</td>
<td>To evaluate the survival of patients undergoing radical robot-assisted cystectomy vs. open.</td>
<td>Total: 9757 Open: 8990 Robotics: 767</td>
<td>Multicenter, prospective cohort (3 years), consecutive randomization</td>
<td>Patients treated with robotic and open surgery have similar survival results.</td>
</tr>
<tr>
<td>Lenfant L, et al. 2019</td>
<td>France</td>
<td>Compare the oncological results between robotic cystectomy vs. opened, by surgeons who started their experience in robotic surgery.</td>
<td>Total: 242 Open: 118 Robotics: 124</td>
<td>Multicenter, prospective cohort (2 years)</td>
<td>There was no difference between the perioperative oncological results in robotic and open cystectomy.</td>
</tr>
</tbody>
</table>

Source: Own author.
DISCUSSION

Most of the articles included showed more benefits in the robotic surgery technique compared to open surgery, demonstrating the relevance of this technique for patients with shorter hospital stay and blood loss, less intra and postoperative complications and preservation of erectile function. Three studies showed that there was no significant difference in the patients’ survival rate. While two articles highlighted the need for further studies to detect the superiority of robotic surgery.

In a prospective, controlled, non-randomized study comparing patients who underwent prostatectomy using a robot-assisted technique and an open technique at 14 centers in Sweden, 2625 men were eligible for the survey and, after 12 months, 21.3% who underwent robot surgery and 20.2% who underwent open surgery had urinary incontinence. After robotic prostatectomy 70.4% compared to 74.7% after open prostatectomy, he presented erectile dysfunction. There was a subtle improvement in erectile function after robot operation. 13

Sooriakumaran et al. demonstrated that robotic surgery favors better recognition of preservation planar nerves during radical prostatectomy, thus helping to preserve the neurovascular and erectile bundle. Also according to the study, recovery of erectile function was higher in the group that underwent robotic surgery between 12 and 24 months of follow-up, however, in patients with high-risk tumors, recovery of erectile function after 24 months was greater in the group who performed the open surgery. 14

The home education program after hospital discharge consists of an educational intervention carried out through the combination of oral, written and telephone counseling that sought to encourage patients in their development about self-care and the reduction of psychological morbidity. This study proved to be clinically effective for the proposed intervention, demonstrating the importance of the nursing professional in preparing patients for hospital discharge and postoperative care in the treatment of neoplasms through educational strategies. 15

Still with regard to the survival rate, a prospective multicenter study observed that there are disadvantages with regard to the time of the procedure (learning curve), cost and there is no significant difference regarding the cancer survival rate when comparing open surgery and robotics. 16

The robotic surgery technique was associated with less blood loss in the intraoperative period, but with an increased surgical time, facilitating the appearance of lesions on the patient’s skin. The study also showed that there were no significant differences regarding the length of hospital stay or complication rates in both surgical techniques. 17

Still with regard to the survival rate, a prospective multicenter study observed that there are disadvantages with regard to the time of the procedure (learning curve), cost and there is no significant difference regarding the cancer survival rate when comparing open surgery and robotics. 18 Comparatively, Soria et al. demonstrated that, robotic radical cystectomy showed less blood loss and shorter hospital stay, and longer operative times. 19 Moschini et al. demonstrated that robotic surgery has many short-term benefits, such as: decreased blood loss and length of stay, however, there was no significant difference in cancer survival rate when comparing open and robotic surgery, suggesting more prospective studies. 20

Robotic surgery, despite being an effective method of surgical technique, presents costly disadvantages, currently the costs for the acquisition of the Da Vinci Surgical System® range from US$ 1 million to US$ 2.5 million per unit, in addition to reforms to adapt the environment system maintenance and generating a high cost for its operation. 21
There is a knowledge gap that was detected during the search for articles, since studies that addressed a comparison between robotic and open techniques with regard to skin lesions by intraoperative positioning were not recovered. Since robotic procedures have a longer duration, they can generate more damage to patients’ skin and tissues. 22 It is therefore suggested that further studies on the potential risks to the patient’s skin constitute a limitation of the study, the failure to search for articles in other databases.

CONCLUSION

There is a greater benefit of robotic surgery compared to conventional surgery in radical prostatectomies, with preservation of erectile function, whereas in cystectomy there is less bleeding, and even shorter hospital stay. No studies were found to compare factors related to the incidence of skin lesions between patients undergoing robotic surgery and those undergoing conventional open surgery treatment. Therefore, it is concluded that new clinical studies are needed, addressing the losses and benefits related to robotic and open surgical positioning, thus directing accurate nursing interventions to patients at higher risk.

References