

Characteristics of robotic urological surgeries at Hospital Eugenio Espejo (November 2021 to March 2023)

Abstract

Introduction: Minimally invasive urologic surgery employs extracorporeal, endoscopic and laparoscopic techniques. Robotic assistance has significantly modified urologic laparoscopic surgery in the last decade. This technology is available at the Hospital de Especialidades Eugenio Espejo (HEEE) in the city of Quito - Ecuador, since November 2021, being one of the few public hospitals in Latin America that provides this service to the community.

Methods: Observational, retrospective and descriptive study, with case series design. All patients undergoing robotic surgery in the Urology Department of the HEE between November 2021 and March 2023 were included.

Results: In the 28 months of the study, 98 surgical procedures were performed. Of the 91 adult patients, 67% were men. The main preoperative diagnoses were malignant prostate tumor, malignant kidney tumor, hydronephrosis, adrenal tumor, malignant bladder tumor and lithiasis. The procedures performed were radical prostatectomy, nephrectomy, ureterolysis and adrenalectomy. The mean operative time was 169.2 ± 66.3 min; with a Dokin time of 12.7 ± 5.2 min. There were 1.1% of non-fatal complications. The median hospital stay was 4 days (range 2 to 18 days). In the 7 younger patients with a mean age of 8.3 years operated on, the most common procedure was ureteral reimplantation. There were two cases of non-fatal complications. Surgical time was 255.7 ± 29.2 min and Dokin time was 9.5 ± 5.3 min.

Conclusion: In the Hospital de Especialidades Eugenio Espejo, urological robotic surgery has been used mainly for the surgical treatment of neoplasias in adults and urinary tract alterations in children, being the experience for other procedures still incipient. Surgical times have been longer in children due to the complexity of reconstructive surgeries, but with excellent results and early recovery.

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Introduction

Currently, minimally invasive surgery has played an important role in urological surgery, with the widespread and frequent application of extracorporeal, endoscopic and laparoscopic techniques. The introduction of robotic assistance has significantly modified the panorama of laparoscopic surgery in urology since the last decade and is a technology that is currently available at the Hospital de Especialidades Eugenio Espejo in the city of Quito - Ecuador since November 2020, being one of the few public hospitals in Latin America that provides this service to the community. Through an inter-institutional agreement between two institutions under the Ministry of Public Health, the Eugenio Espejo Specialties Hospital and the Baca Ortiz Children's Hospital, it has been possible to provide robotic surgical support to children with urinary tract disorders, with excellent results and almost immediate recovery. The objective of this communication is to present the casuistry of urological surgeries performed in the third level public hospital of the city of Quito and to create a database that will grow and be modified in order to present results and follow-up in the short and long term.

Methods

An observational, retrospective and descriptive study was carried out, with a case series design. All patients undergoing robotic surgery in the Urology Department of the Hospital de Especialidades Eugenio

Espejo between November 2020 and March 2023 were included. Data were obtained from 98 patients, 91 of which were adults and 7 were children. The present study does not follow up the patients; this is the subject of another research study. Demographic data, pre- and postoperative diagnoses, procedures scheduled and procedures performed, operative time, dokin time, length of hospital stay and complications were collected.

Results

Ninety-eight robot-guided laparoscopic urologic surgical procedures were performed, information was taken from the robotic surgery database of the Urology service, taking the procedures performed with the Da Vinci Si system, in 28 months, from November 5, 2020 to March 23, 2023.

The surgeries were performed by 4 doctors specialized in Urology with both laparoscopic and robotic training and certification, 3 of which belonged to the Eugenio Espejo Specialties Hospital and 1 to the Baca Ortiz Children's Hospital, based on the agreement maintained through the Ministry of Public Health through which the care of the children was managed in our health house for the surgical procedure, being admitted in the pre and post-surgical in their base hospital.

Between November and December 2020 and from January to March 2023, 7 procedures were performed in each cohort, in 2021 there were 29, in 2022 there were 55 robotic surgeries, the data were

taken until March 2023 when the supplies were finished in our health house so the robotics program had to suspend its activities.

Year	Percentage
2020	7,1
2021	29,6
2022	56,1
2023	7,1

Robotic surgeries performed at the Hospital de Especialidades Eugenio Espejo between November 2020 and March 2023.

Source: Urology Service database.

Among the factors that made it difficult to have a higher number is the damage of the floor of the central operating room, of the central sterilization equipment, of one of the robotic arms, which led to the suspension of approximately 6 months in total of the 28 months of study; however, due to the intervention of the Robotics Committee and the support of the authorities, it was possible to continue with the program in our hospital. Of the 98 patients registered 91 were adults, the average age was 49.7±17.4 years, the age range was between 18 to 76 years, 27 patients were classified as elderly because they were over 65 years old and 67% were men.

In adult patients the main preoperative diagnoses were malignant prostate tumor 43.9%, malignant kidney tumor 12.1%, hydronephrosis 10.9%, adrenal tumor 4.4%, bladder tumor 4.4% and renal and pelvic lithiasis 4.4%. The procedures performed were radical prostatectomy 46.15%, nephrectomies 21.98%, ureterolithotomy and pyelolithotomy 6.59% and suprarenalectomy 4.4%, radical cystoprostatectomy with urinary diversion, ureteral reimplantation, pyeloplasty 3.3% each, the remaining procedures represented 1.1% between fistulectomies and urethroreteroanastomosis.

The mean operative time was 169.2±66.3 min (range 20 to 420 min); with a Dokin time of 12.7±5.2 min (range 6 to 35 min). There was a 1.1% complication rate. No fatal complications or conversions were reported. The median hospital stay was 4 days (range 2 to 18 days).

In relation to the pediatric population, there were 7 patients who underwent robotic surgery, with ages ranging from 2 to 16 years, with a mean of 8.3 years; 2 boys and 5 girls underwent surgery. The pre-surgical diagnoses were characterized by congenital anomalies, among which were found Vesico-ureteral reflux 57.14% followed by giant ureteroceles, double pyelocaliceal system, bladder floor anomalies. The procedures performed were ureteral reimplantation 71.4%, ureterocelelectomy 14.29% and reconstruction of the bladder floor 14.29%.

There were two cases (28.5%) of complications, one was a hysterectomy due to a stony uterus and the other a bleeding that required support by vascular surgery due to an ectopic uterine artery. Surgical time was 255.7±29.2 min and Dokin time was 9.5±5.3 min. The success rate at discharge reached 100%. Hospital stay was managed at the Baca Ortiz Children's Hospital with a median of 3 days (range 2 to 5 days).

Discussion

Surgery has evolved gradually and has taken giant steps in recent years as it has sought to reduce invasiveness and promote early patient recovery for which minimally invasive surgical techniques have been developed, which have had their application in each of the surgical subspecialties and Urology has not been left behind, in fact minimally

invasive techniques in both the endourological and laparoscopic area had and have great acceptance.

The robotic era has demonstrated an enormous impact in the surgical field, and is part of a natural and logical evolution of minimally invasive surgery. Robotic-assisted surgery is spreading rapidly and has been shown to overcome the intrinsic limitations of laparoscopy. High definition, three-dimensional stereoscopic vision and magnification, a stable and surgeon-guided camera, improved ergonomics, superior range of motion and motion scaling are notable advantages.¹⁻³

A progressive increase has been observed in the publications of robotic surgery at Latin American level, Ecuador as well as Mexico, have shown an increase in the installation of technologies for robotic surgery in different provinces of the country, noting its progress in the territory, which of course leads to access to patients in different areas, however, this access in Mexico is carried out mostly by institutions of private order, unlike our country that until October 2023 had 3 robotic systems at national level, one in social security, one private and one public. However, in both countries in public institutions they have had a complicated history, where some remain and others are in uncertainty (Corona-Montes, 2022). The arrival of robotic support to perform surgeries that implied difficulty in both open and laparoscopic techniques for the surgeon, long and painful recovery periods for the patient totally changed the vision of radical surgeries necessary for mainly oncological diagnoses.

Robotic surgery has been in constant growth in many parts of the world, with increases in the number of equipment installed and in productivity. Also, with the establishment of treatment standards in certain pathologies.⁴ The Hospital de Especialidades Eugenio Espejo, a third level institution, provides care to patients who are not affiliated with any insurance, so it represents the referral hospital in the north and east center of Ecuador for the reception of patients who depend on public health, acquired the Da Vinci Si Si robotic system in 2020, starting surgeries in the specialties of Oncological Surgery, Urology, Gynecology and General Surgery, later expanding to Thoracic Surgery.

As indicated,⁵ the robot restores the degrees of freedom lost in conventional laparoscopy, facilitates the manipulation of very small and fine articulated instruments in the abdominal cavity, eliminates the trembling of the surgeon's hands and, consequently, surgeries are more precise as the surgeon has a three-dimensional vision through a high-resolution immersion stereo viewer.

Robotic surgery will continue to play an important role in the development and evolution of medicine,⁶ in the Hospital de Especialidades Eugenio Espejo robotic surgery has allowed treating both adults and children, allowing a quick recovery, without major complications and with the expectation that the government will value these benefits for the acquisition of the new technology by 2024. The present study presents the characteristics of the patients who underwent surgery in this public health center, the database is open, following up the patients, both adults and children, in order to develop new publications. The times of surgery, dokin and hospitalization are in accordance with similar studies, it is a study of the initial development of robotic urology so it is considered that the surgical times will decrease and the complexity of the surgeries will increase.

It is expected that the evolution towards the creation of new robots will reduce costs and lead to an increase in their use, so that in the next decade robot-assisted surgery will be more common than laparoscopic and open surgery.⁷

Conclusion

In Ecuador 3 robotic guided surgery systems have been installed until October 2023, the Hospital de Especialidades Eugenio Espejo, being the main public health hospital had the Da Vinci Si system for 28 months, where urological robotic surgery was mainly used for the surgical treatment of neoplasms in adults and alteration of the urinary tract in children, being the experience for other procedures still incipient. Surgical times have been longer in children due to the complexity of reconstructive surgeries, but with excellent results and early recovery. The investment in robotic surgery has demonstrated economic benefits known to all as a decrease in hospital stay, reduction of complications and less readmission, achieving a correct cost-benefit analysis, which will allow its definitive implementation at all levels of health.

We hope that the robotic surgery program will continue in this public hospital in order to continue offering the benefits of this type of procedure to patients who otherwise would not have access to it.

Acknowledgments

None.

Conflicts of interest

The authors declare no conflicts of interest.

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