Launching the Assisted-Robotic Surgery Programme at Bistrița County Emergency Clinical Hospital: Pioneering a New Era in Modern Medicine

R Couți[1,2], N Marica[1], H Logigan[1], E Popovici[1], I Vîrvaș[1], MB Borz[3], RA Coman[4], J Dodane[5], R Russu[5], P Bîndeanu[5], RC Elisei[6], C Șofron[6], I Souca[6], S Moldovan[6]

[1] Compartiment Urologie, Spitalul Clinic Județean de Urgență Bistrița, Bistrița, România
[2] Departament Urologie, Universitatea de Medicină, Farmacie, Științe și Tehnologie „George Emil Palade", Târgu Mureș, România
[3] Departament Anatomie, Universitatea de Medicină, Farmacie, Științe și Tehnologie „George Emil Palade", Târgu Mureș, România
[4] Compartiment Urologie, Spitalul Medlife Humanitas, Cluj-Napoca, România
[5] Secția Anestezie și Terapie Intensivă, Spitalul Clinic Județean de Urgență Bistrița, Bistrița, România
[6] Secția Chirurgie Generală, Spitalul Clinic Județean de Urgență Bistrița, Bistrița, România

ABSTRACT

Introduction and Objectives: Minimally Invasive Surgery (MIS) has revolutionized modern medicine over the past four decades, offering significant advantages in reducing surgical trauma and recovery time. The implementation of robotic-assisted surgery at Bistrița County Emergency Clinical Hospital (SCJUB) aims to advance precision, efficiency, and training opportunities in urological and other surgical disciplines, utilizing the cutting-edge da Vinci Xi system.

Materials and Methods: The da Vinci Xi robotic system was acquired through public investment with support from local administration, the Ministry of Health, and the hospital. Comprehensive training programs were implemented for surgeons in specialized international centres involving accreditation (e.g., IRCAD, Strasbourg), and in-house proctored sessions to ensure operational proficiency for the anaesthesiologists, nurses, and support staff,

Results: Between November 20th, 2024, and the present, 15 robotic-assisted surgeries were successfully conducted for urological pathologies, highlighting the system's efficacy. Data analysis of patient outcomes, such as reduced hospital stays, minimized postoperative complications, and enhanced surgical precision, underscores the advantages of the robotic system.

Conclusions: The introduction of robotic-assisted surgery at SCJUB marks a transformative step in the region's healthcare system, bridging modern technology with patient-centred care. Despite challenges such as high costs and the need for specialized training, the program demonstrates significant potential in improving surgical outcomes, fostering medical education, and positioning the hospital as a leader in advanced medical technologies within the national public healthcare system.

Key words: da Vinci Xi, implementation, Minimally Invasive Surgery, Spitalul Clinic Județean de Urgență Bistrița

Correspondence to:
Dr. Răzvan Couți M.D.
Compartiment Urologie, Spitalul Clinic Județean de Urgență Bistrița, Bistrița, România;
Departament Urologie, Universitatea de Medicină, Farmacie, Științe și Tehnologie „George Emil Palade", Târgu Mureș, România
Address of the hospital: Bld, General Grigore Balan 43, Bistrița 420016, România
Tel / Fax: +40 728 060 953
e-mail: razvan.couti@gmail.com

INTRODUCTION AND OBJECTIVES

Being widely utilised for treating various benign and malignant pathologies, Minimally Invasive Surgery (MIS) has captured attention from both patients and surgeons since its introduction approximately four decades ago [1].

Minimally invasive approaches, including laparoscopic and robotic techniques, have been employed to perform major urological procedures such as radical prostatectomy, radical cystectomy, nephrectomy, nephroureterectomy, and pyeloplasty [2].

Robotic surgery offers comparable short- and long-term oncological and functional outcomes to open surgery while reducing perioperative complications and shortening hospital stays [3].

Compared to traditional laparoscopy and open surgeries, robotic technology provides several benefits, such as a magnified 3D view of the operative field [5], the absence of a fulcrum effect, enhanced wristed instrument motion with motion scaling, a greater range of motion of the surgical arms, elimination of tremor, improved ergonomics, better accessibility to complex anatomical regions, and ongoing advancements in platforms and instruments [4]. Robotic surgery is operational in specialties such as General Surgery, Cardiology, Gynaecology, and Urology.

However, robotic surgery has certain limitations, including high acquisition and maintenance costs and the extensive training required for medical personnel to achieve proficiency with the technology [6].

Another notable advantage of robotic surgery is the reduced postoperative pain, which results in a decreased need for analgesics and shorter hospital stays compared to traditional laparoscopy. This could be attributed to the fact that the abdominal wall is not used as a counter-bearing, minimizing irritation and promoting tissue preservation [7, 8].

The system (da Vinci Xi) includes components such as a Surgeon's Console, Patient-Side Cart, 3D Vision System, Skills Simulator, da Vinci Xi Integrated Table Motion, Firefly Fluorescence Imaging, and the Standard da Vinci System [9].

In Europe, da Vinci Xi robotic systems demonstrate notable advantages, particularly in surgeries involving complex anatomical regions. Their enhanced dexterity and range of motion are especially beneficial for procedures addressing oral cancers, prostatic diseases, colorectal disorders, and various abdominal surgical requirements [10, 11].

In Romania, robotic-assisted surgeries are performed on a smaller scale to manage benign and malignant conditions in urological, gynaecological, cardiological, and thoracic specialties.

This editorial article aims to present real-world evidence on the implementation of robotic-assisted urological surgeries in a public hospital located in the Nord-West region of Romania. Additionally, it provides valuable insights into the operational system behind this innovation and its success.

MATERIALS AND METHODS

The da Vinci Xi robotic surgical system (Intuitive Surgical, Inc.) was acquired through public investment facilitated by the local administration in collaboration with the Ministry of Health and the hospital. Comprehensive training and accreditation programs were implemented for surgeons in IRCAD in Strasbourg, France.

Moreover, anaesthesiologists, nurses, and other personnel were in-house trained (proctored) to ensure proficiency in operating and supporting robotic-assisted surgical procedures (Figure 1, 2, 3, 4).

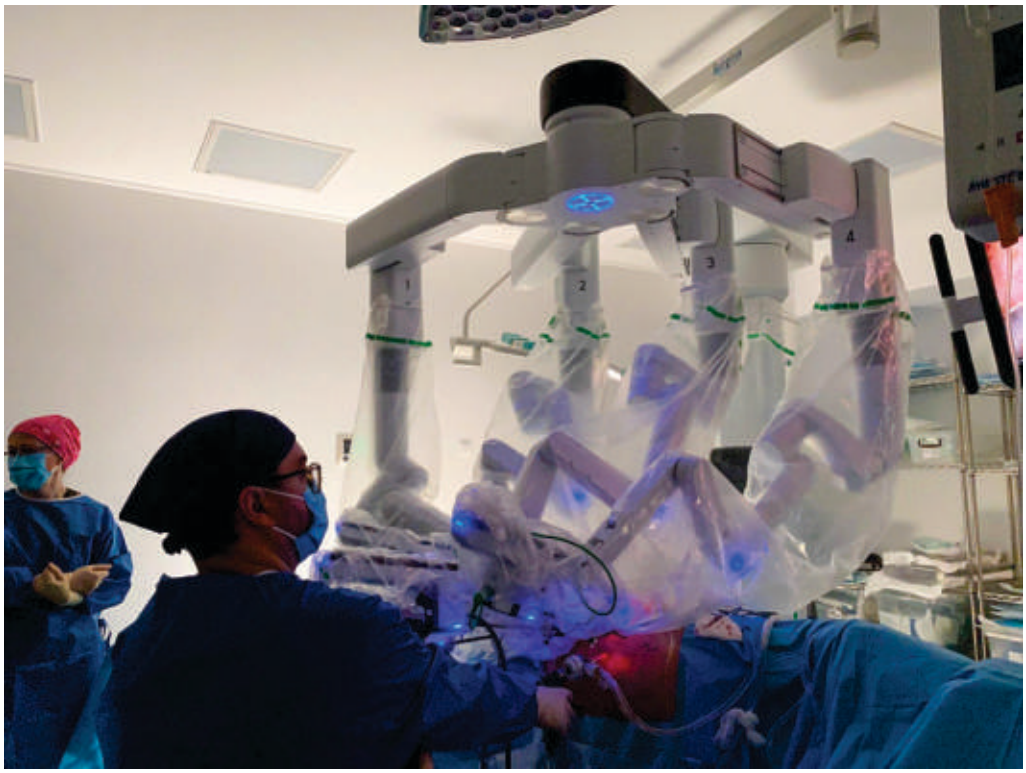


Figure 1.



Figure 2.

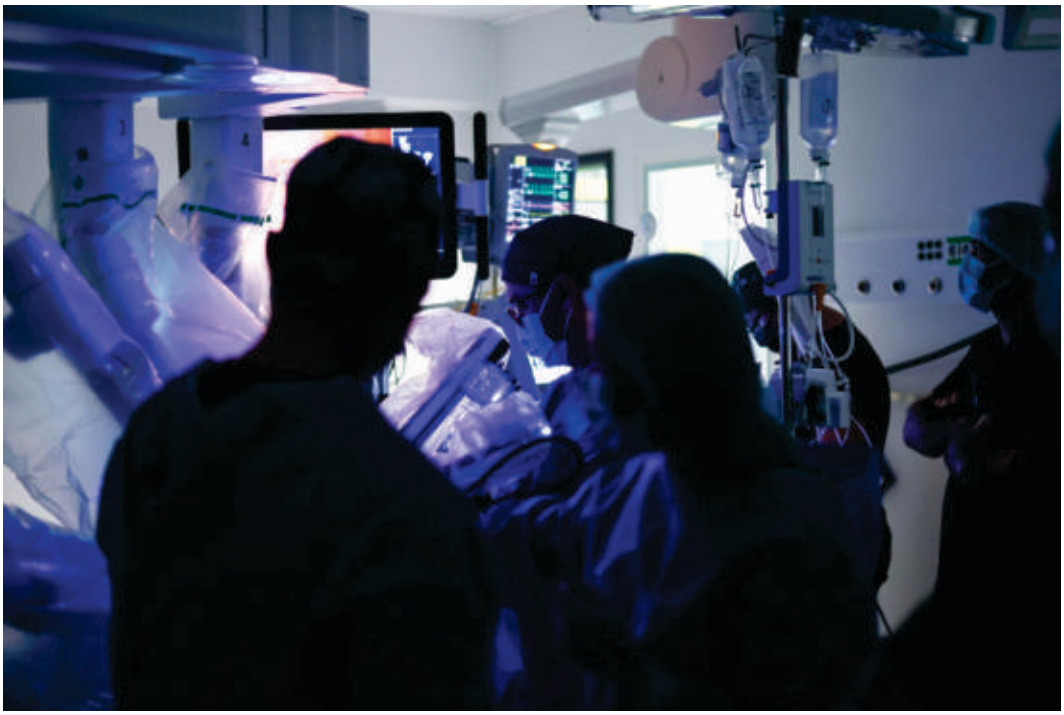


Figure 3.



Figure 4.

RESULTS

Starting from November 20th, 2024, to the present, a total of 15 robot-assisted surgeries (partialnephrectomy, prostatectomyy, pyeloplasty, and one adrenalectomy with umbilical hernia) have been successfully on patients with urological pathologies by the hospital's multidisciplinary trained surgeons.

The mean operative time was 150 minutes, with an average blood loss of 300 mL. The post-operative hospital stays averaged 3 days. The docking time, initially 40 minutes, progressively decreased to 25 minutes over time.

DISCUSSIONS

The implementation of robotic surgery system (Da Vinci Xi) at SCJUB aims to continue achieving several key objectives. One primary goal is to enhance surgical precision. By utilizing surgical robots, highly precise manipulation of instruments and tissues is possible, even during complex procedures, significantly reducing the risks associated with human error. Another important objective is to reduce hospitalisation and postoperative recovery time. Minimally invasive and robot-assisted surgery minimizes the size of incisions, thereby reducing trauma to healthy tissues. This leads to shorter recovery periods and reduced lengths of postoperative hospital stays. Additionally, the program aims to increase efficiency and reduce operative times. Robotic systems improve coordination between the surgical team and instruments, streamlining procedures and enhancing overall efficiency. For experienced teams, this can result in significantly shorter operative durations. Lastly, the institution is committed to providing a continuous training environment for future surgeons. By training professionals across multiple specialties, including urology, general surgery, gynaecology, and thoracic surgery, the program aims to take on a pivotal educational role in advancing medical expertise.

Despite its many benefits, the implementation of the robotic surgery program presents notable challenges. One significant factor is the high initial investment required for purchasing equipment and trained staff. However, as technology becomes more advanced and standardized, these costs are expected to decline, making the benefits of robotic surgery more accessible. Another challenge is the need for ongoing staff training. Implementing and operating the system requires surgeons, anaesthesiologists, nurses, and other support staff to acquire new technical skills and adapt to the technology, necessitating a continuous learning process. Ensuring the long-term functionality of the robotic surgery program is also critical. After acquiring the system and training the surgical teams, collaboration with local and national authorities is essential to secure sustainable funding. This step is crucial to prevent the loss of the investment in both the technology and the skilled personnel.

CONCLUSIONS

The implementation of robotic surgery at the SCJUB marks a significant step in transforming the medical infrastructure and healthcare services in Bistrița-Năsăud County. While the initial challenges are considerable, the benefits brought by this modern technology are undeniable. Our institution not only enhances its medical services but also becomes a key centre within the public healthcare system for cutting-edge treatments, providing patients with a safer, more efficient, and more comfortable medical experience. Currently, robotic surgery plays an increasingly important role in our institution, further solidifying its future status within the national public healthcare system.

REFERENCES

1. Lanfranco AR, Castellanos AE, Desai JP et al.: Robotic surgery: a current perspective. Ann Surg 2004; 239:14-21.
2. Lee N: Robotic surgery: where are we now? Lancet 2014; 384:1417.
3. Yu HY, Friedlander DF, Patel S et al.: The current status of robotic oncologic surgery. CA Cancer J Clin 2013; 63:45-56.
4. Yates DR, Rouprêt M, Bitker MO et al.: To infinity and beyond: the robotic toy story. Eur Urol 2011; 60:263-265.

5. Tokas T, Gözen AS, Avgeris M et al.: Combining of ETHOS operating ergonomic platform, three-dimensional laparoscopic camera, and radius surgical system manipulators improves ergonomy in urologic laparoscopy: comparison with conventional laparoscopy and da Vinci in a pelvi trainer. Eur Urol Focus 2017; 3:413-420.
6. Alkatout I, Mettler L, Maass N et al.: Robotic surgery in gynecology. Journal of the Turkish German Gynecological Association 2016; 17:224.
7. Soliman PT, Langley G, Munsell MF et al.: Analgesic and antiemetic requirements after minimally invasive surgery for early cervical cancer: a comparison between laparoscopy and robotic surgery. Ann Surg Oncol. 2013; 20:1355–9.
8. Sinno AK, Fader AN. Robotic-assisted surgery in gynecologic oncology. Fertil Steril. 2014; 102:922–32.
9. Tolu G, Ghiculescu D, Zapciu M. The nonconventional surgical system da Vinci. Revista de Tehnologii Neconventionale 2020; 24:39-43.
10. Costantino A, Sampieri C, Meliante PG et al.: Transoral robotic surgery in oropharyngeal squamous cell carcinoma: A comparative study between da Vinci Single-Port and da Vinci Xi systems. Oral Oncology 2024; 148:106629.
11. Erozkan K, Gorgun E. Robotic colorectal surgery and future directions. The American Journal of Surgery 2024; 230:91-98.