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Clinical Connect

Fostering a culture of innovation and excellence

Robotic Surgery Special

Precision with Passion

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Leadership Messages

Dr Bishnu Panigrahi
Group Head - Medical Strategy and Operations
Fortis Healthcare

In the ever-evolving landscape of medicine, patient safety is paramount, transcending borders and specialties. It represents the essence of healthcare excellence, focusing on preventing harm, errors, and complications during medical treatment. Neglecting patient safety can lead to compromised recovery, unnecessary fatalities, and escalating medical expenditures. According to the World Health Organization (WHO), up to 4 in 10 patients globally suffer harm during outpatient and primary healthcare, with 80% of these outcomes being preventable. Diagnostic errors, healthcare-acquired infections, falls, medication mishaps, and readmissions pose significant challenges to patient safety. As healthcare leaders, we must envision patient safety as a cornerstone, not just for shielding patients from harm but also for fostering an environment where superior care can flourish. The adoption of advanced technologies can further improve healthcare delivery, prioritizing safety from diagnostics to surgery. Achieving this requires a collective commitment to continuous improvement, rigorous standards, and a culture of safety within healthcare systems. Continuing the focus on patient safety, imagine a patient on the operating table, surrounded by a highly trained surgical team. As the surgeon prepares to make the first incision, there's a sense of anticipation. This time, the surgeon isn't working alone. They have a trusted ally by their side - robotic-assisted surgery, a ground- breaking approach with immense potential for enhancing patient safety.

Robotic-assisted surgery isn't just a buzzword; it's a fundamental shift in how we approach surgical procedures. This innovative technique leverages robotics for surgery through smaller incisions, reducing pain and scarring. What sets it apart is precision - robotic arms as extensions of the surgeon's hands, guided by the surgeon and supported by intricate technology. These arms execute precise movements, minimizing the risk of collateral damage. As technology evolves, it can potentially be programmed to follow predetermined paths, ensuring accurate and safe procedures. This is a leap forward in-patient safety. As the Group Head of Medical Strategy and Operations, I've witnessed how robotic-assisted surgery's precision can make all the difference in ensuring safety and potentially reducing complications. Its advanced 3D camera provides surgeons with a magnified view of the surgical site, enhancing accuracy and reducing risks. The era of prolonged hospital stays linked to surgical complications may become history, given the capabilities offered by the technology.

Robotic-assisted surgery incorporates haptic feedback, allowing surgeons to feel textures and resistances as they operate using robotic arms. This tactile sensation enhances precision to a new level. It's like having the sense of touch, magnified and refined, guiding every movement. One significant advantage is its ability to reduce the risk of infection. The robotic system provides a sterilizable and sealed environment within the surgical system, minimizing the risk of pathogens entering the surgical site. This controlled environment significantly lowers the chances of post-operative infections.

Where robotic-assisted surgery truly shines is in complex procedures where small errors can have life-changing consequences. Here, it becomes the vital toolset for surgeons facing the challenges of complexity. Robotic-assisted surgery has ushered in a new era of precision and safety in the operating room. Trained surgeons are empowered by this technology, enhancing their expertise to unprecedented levels. The ergonomic design of robotic surgical systems offers comfort and precision, reducing surgeon fatigue during lengthy procedures. Tremor control technology refines the surgeon's dexterity, ensuring steady and precise movements. These advancements contribute to a substantial improvement in patient safety by minimizing the risk of human error, reducing complications, and enhancing the overall quality of surgical outcomes.

Responsible technology use is paramount. It ensures patient data confidentiality, prevents errors in diagnoses or treatment recommendations, and promotes transparency, accountability, and equitable access to healthcare resources and services. As technology continues its relentless march forward, the future of patient safety in surgery looks brighter than ever. The convergence of artificial intelligence, machine learning, and robotics holds the promise of systems that can predict and prevent potential complications before they arise. As technology evolves, patient safety will remain at the forefront, continually redefining what's possible in surgical care.

Dr Rama Joshi
Principal Director and Head - Gynaecologic Oncology
Fortis Memorial Research Institute
Chairperson, Fortis Robotic Speciality Council

It is an honour and privilege to write on behalf of Fortis Robotic Speciality Council. The continued innovations in surgical techniques have led to better outcomes of patients and transformed the field of surgery. Today Robotic surgery has emerged as the most advanced surgical technique offering unparallel precision and control and offering better outcomes for the patients. Robotic surgery was introduced at Fortis health care in the Year 2016. Speciality of Gynaecologic Oncology, Urology and Uro-oncology took the lead in establishing it, later it was adopted by various specialities including Gynaecology, Thoracic, GI Surgery, Head and Neck Surgery, Thyroid and Breast Surgeries. This innovative robotic surgical approach has significantly improved patient outcomes and has extended the quality of life to our patients undergoing robotic surgery and is the preferred choice of surgery today!

The Fortis Robotic Speciality Council was formed to connect the Robotic surgeons in the system and use their collective efforts to improve the working of this technology and patient outcomes. The council has regular meetings for improving the functioning of robotic surgery across the network and has managed to build the Fortis Robotic Institute where all the robotic surgical specialities are seen and relevant information is provided.

Robotic surgeons at Fortis have worked hard to deliver high quality of care to our patients . Efficient robotic centres demand a united, team-based approach, offering the aspiring surgeons an opportunity to be trained in this transformative technology. Many of robotic centres at Fortis have been recognised for training for the various surgeries. The future of oncology holds promise with continued technological advancements, improving outcomes and quality of life for patients. Robotic-assisted surgery not only enhances quality of life but also contributes to superior survival rates in specific malignancies.

In conclusion, we stand at the forefront of a medical revolution where human expertise and cutting-edge technology redefine healthcare. Our unwavering commitment to excellence will continue to pioneer the age of Robotic-Assisted Surgeries.

Through clinical connect we hope to share many of our experiences and surgical outcomes of this innovative technology as an organisation. I hope you will find the articles interesting and a good read.

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Please send your comments, feedback and suggestions to clinical.connect@fortishealthcare.com

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Robotic Gynaecologic Surgery

Robot Assisted Surgery for Large Complex Ovarian Mass in Pregnancy in the Department of Gyne Oncology, FMRI: First Case Report from India

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The routine uses of obstetrical ultrasound in the first and second trimester for fetal anomalies, has led to an increase in diagnosis of adnexal masses in 2 to 8% of all pregnancies. Around 1-5% of adnexal masses in pregnancy are malignant. Laparotomy has been the favoured surgical approach for removal of adnexal masses during pregnancy, but there is recent evidence favouring minimally invasive surgery via laparoscopy, with reportedly fewer intraoperative complications, less blood loss, and shorter length of hospital stay, with no apparent difference in observed obstetric outcomes. Since FDA approval of the da Vinci Surgical System (Intuitive Surgical, Inc., Sunnyvale, CA) for gynaecologic use in April 2005, robotic surgery has been demonstrated to be safe and feasible in both benign and malignant gynaecologic surgery, offering a minimally invasive approach with the benefit of three-dimensional vision and improved dexterity and precision. In the obstetric literature, however, robotic-assisted minimally invasive surgery has been limited. A total of 38 patients who underwent Robot Assisted surgery during pregnancy have been reported in literature with exclusion of robotic-assisted obstetrical cases, specifically cerclage placement and resection of ectopic pregnancies.

This is the first case reported from India where a large complex ovarian mass in pregnancy was removed by minimally invasive Robot assisted surgery. Twenty-nine years old primigravida presented with pain lower abdomen and an ultrasound report showing a large suspicious complex right ovarian mass. It measured 10x7.8cm with internal echoes and incomplete septae. Tumour markers were as follows: CA125- 306 u/ml, CEA- 1.85ng/ml, CA 19.9-416.8U/ml, AFP- 3.39ng/ml, LDH- 184units/l, β HCG-128IU/L. MRI revealed a single live intra-uterine fetus with a large cystic lesion of size ~12x10x6.7cm with multiple thin septation in right adnexal region, extending antero-superior to uterus with haemorrhagic content. She was average built with a normal general physical examination. Abdominal examination revealed a mass arising from the pelvis reaching upto the umbilicus. On rectal examination, rectal mucosa was free, uterus - 14 weeks size, mass felt arising from the pelvis reaching upto the umbilicus and no POD nodules. Clinical diagnosis of suspicious complex ovarian mass with 14 weeks of pregnancy was made and the decision for surgery was taken after explaining the risks to pregnancy. Preoperative obstetrical ultrasound showed single live intra-uterine fetus with low-lying placenta at 14 weeks gestation.

Pneumoperitoneum was created using Veress needle through Palmer's point. Diagnostic laparoscopy was done using 5mm scope and robotic ports were placed at a higher position as compared to routine under

direct visualization. Laparoscopic evaluation showed normal upper abdomen, Omentum and peritoneal surfaces. Uterus was 14 weeks size. Right ovarian cystic, multiloculated mass with intact capsule which was adherent to right pelvic peritoneum, posterior uterine surface and right ureter. Right fallopian tube was grossly normal and stretched over the mass. Left ovary and fallopian tube were grossly normal. Based on these findings, decision for robot assisted surgery was taken and proceeded with excision of right ovarian mass along with fallopian tube after sharply dissecting from pelvic peritoneum, right ureter and posterior uterine surface. Controlled aspiration of the mass was done within the endobag and the specimen was retrieved through the assistant port avoiding any spillage. Frozen section reported that there was no evidence of malignancy in the ovarian mass. Estimated blood loss was around 5mL. Total console time for the procedure was 2 hours and 30 minutes. She received postoperative tocolytics. Patient recovered well and was discharged the very next day after getting an obstetrical ultrasound with advice of weekly progesterone injections.

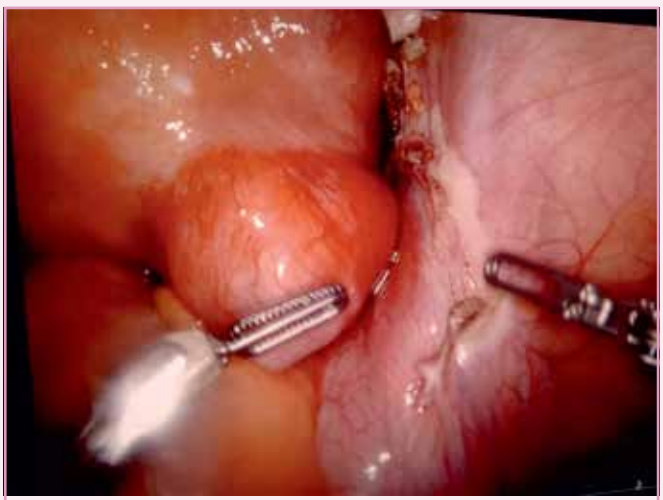

Figure 1: Ovarian mass with gravid uterus.

Figure 2: Ovarian mass retrieved within endobag.

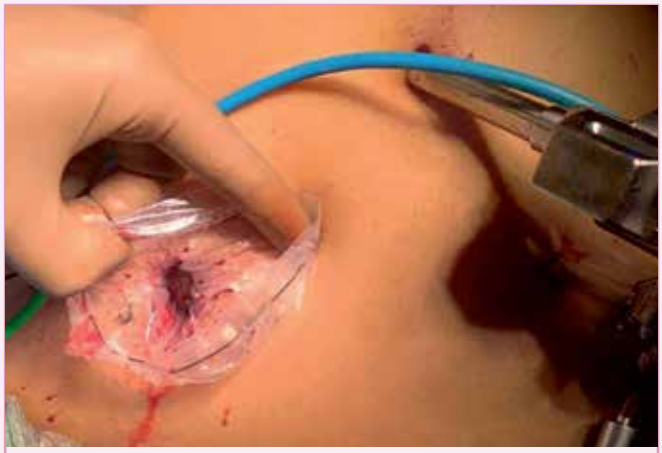

Figure 3: Mass retrieved in endo-bag through assistant port.

Final histopathology showed right ovarian endometriotic cyst. Her pregnancy was uneventful and she had a vaginal delivery of a healthy full-term baby at 39 weeks weighing 3.2 Kg with Apgar score of 9 at 5 minutes.

Surgical management is recommended for patients who have ovarian torsion or are hemodynamically unstable secondary to cyst rupture, or complex masses suspicious of malignancy or large adnexal masses predisposing to the mentioned complications. Nonurgent surgeries that cannot be delayed until after delivery should be performed in the second trimester, when possible, thereby avoiding the increased risk of miscarriage in the first trimester and the risk of preterm contractions and labour in the third.

The robotic system allows 14-fold magnification, a bioptic scope providing 3-dimensional imaging, and instruments with more than 500 degrees of motion. This translates into less if any manipulation of the gravid uterus, superior visualization, more precise dissection, and fewer conversions to laparotomy. The cost of this modality has prohibited its mainstream acceptance and therefore available in limited centres. Large studies are needed to truly compare cost-effectiveness, operating room times, blood loss, and outcomes between Robotic assisted surgery, traditional laparoscopy, and laparotomy.

A retrospective study comparing 19 pregnant women undergoing robotic resection of adnexal tumors with 50 laparoscopic controls found that robotic surgery reduced hospitalstay and blood loss without affecting pregnancy outcomes. Despite the increasing use of robotic surgery in gynecology, its utility in obstetrics is limited. However, in centres where the technology and trained surgeons are available, Robot assistedsurgery may provide a safe and feasible alternate approach to the obstetric patient with an ovarian mass.

A Case Report of Ovarian Actinomycosis-MISDIAGNOSED as Ovarian Cancer (Krukenberg's Tumour)

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Abstract

Background: Actinomycosis is an actinomycete infection, a rare zoonotic disease characterized by chronic suppurative inflammation and granulomatous inflammation. Often caused when injury occurs to the mucosa where parasites are present, actinomycetes can invade the mucosa. Use of intrauterine devices (IUDs) has increased the incidence rate of pelvic actinomycosis among women Pelvic actinomycosis is uncommon and often presents as a complication of an intrauterine device (IUD). A diagnosis of actinomycosis can be made from the finding of sulphur granules within inflammatory exudate on histologic examination after surgery. Ovarian actinomycosis is rare, often pretends to be malignant and therefore it is difficult to diagnose preoperatively.

Case

A 48-year-old woman was having pain in left renal angle, loss of appetite and recurrent UTI since last 6 months, he had a 12-year history of Intrauterine device implantation, the IUD was removed 6months back. The pelvic magnetic resonance imaging (MRI) scan on s/o bilateral adnexal lesion with enhancement left distal ureter and proximal ureteric dilation? Carcinoma ovary? metastasis. PET CT done shows hypermetabolic lesion in bilateral ovaries (left>right) S/O MALIGNANT PATHOLOGY, with left ureter and proximal ureteric dilation and increase radioactive uptake at gastro-oesophageal junction noted. Both imaging and clinical features suggestive of malignant pathology (D/D was krukenberg's tumour). Upper GI endoscopy was done which was found to be normal. Surgery was scheduled EXPLORATIVE LAPROTOMY WITH total abdominal hysterectomy with bilateral salphino-ophorectomy with frozen section with ureterolysis WITH LEFT (L-G) LEICH-GREGOIR URETRIC REIMPLANT WITH PSOAS HITCH DONE.

Frozen Section Report

Benign with inflammatory changes so further omentectomy and lymphadenectomy was not done. Postoperative pathologic examination showed purulent inflammation and sulphur granules, consistent with ovarian actinomycosis it turned out to be a case of ovarian actinomycosis. The clinical manifestations and imaging features of this disease are not specific; therefore, preoperative diagnosis is difficult.

Conclusion

Pelvic actinomycosis is an uncommon cause of a pelvic mass. Ovarian actinomycosis is a rare infectious disease of the woman reproductive system. Because of nonspecific clinical and imaging findings, ovarian actinomycosis is easily misdiagnosed as ovarian cancer. In view of the high correlation between ovarian actinomycosis and the history of IUD use, the possibility of ovarian actinomycosis should be routinely ruled out when a patient with a history of IUD use develops an ovarian space - occupying and infiltrating solid pelvic mass. Surgery combined with antibiotic treatment is effective for ovarian actinomycosis, resulting in a good prognosis.

Keywords

Pelvic mass, Ovarian actinomycosis, intrauterine devices (IUDs).

Sentinel Lymph Node Biopsy for Predicting Nodal Metastasis in Endometrial Cancer: A Prospective Study at Department of Gynaecologic Oncology, Fortis Memorial Research Institute, Gurugram

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Endometrial cancer (EC) is the 6th most common cancer affecting women globally. The incidence of the disease continues to increase steadily, by approximately 1–2% per year. GLOBOCAN 2020 India showed annual incidence of 16,413, annual death of 6385 and a 5-year prevalence of 43,484 per 100,000.

The main prognostic factors for endometrial cancer are the patient's age, histological subtype, grade, depth of myometrial invasion and the stage of the tumor. The overall 5-year survival rate is approximately 80%; however, it varies among the different histological types, stages, and grades of endometrial cancer. The 5-year survival rate in high grade types of histology is 46% compared to 93% in low grade endometrioid carcinomas. The incidence of pelvic lymph node metastases in patients with corpus-confined endometrial cancer who undergo lymphadenectomy varies between 5% and 18%. Lymph nodal status in surgical staging of uterus confined disease correlates with prognosis as well as directs adjuvant treatment based on stage of disease.

Available evidence of systematic lymphadenectomy has not shown survival advantage in patients with uterus confined endometrial carcinoma. Phase III studies have compared the oncologic outcome of sentinel lymph node mapping (SLNM) - only Vs. lymphadenectomy (LAD) suggesting SLNM does not compromise survival outcome1. It is feasible and provides the accuracy of systematic lymphadenectomy in identifying patients with lymph node metastasis while decreasing surgical morbidity and operative times, thus improving the quality of life. However, its efficacy in early-stage EC is still variable. Therefore, the present study was conducted to determine the detection rate of SLNM and its accuracy in terms of sensitivity, specificity, and positive and negative predictive values.

Experience at Department of Gynaecologic Oncology, Fortis Memorial Research Insitiitute

The present prospective study was conducted at Fortis Memorial Research Institute, Gurugram, in the Department of Gynaecologic Oncology, after obtaining approval from the Institutional Ethics Committee from September 2019 to September 2023.

PET-CT and MRI were included as a part of the pre-operative workup. ICG tracer was injected into the cervix after anaesthesia induction at 3 and 9 o'clock of the ectocervix at a 2-3mm and 1 cm depth achieving a total dose of 1mg.

A total of 110 patients with clinically uterus confined carcinoma endometrium were included for robot-assisted surgery (da Vinci Xi) with ICG directed sentinel lymph node mapping and biopsy with subsequent pelvic lymphadenectomy.

Fluorescence imaging (firefly mode) was used to visualize the ICG tracer in the lymphatics. A successful mapping was defined by observing a lymphatic channel leading from the cervix directly to at least one sentinel lymph node in at least one hemipelvis. Sentinel lymph nodes were evaluated and subjected for ultra-staging by pathologists.

Results

In the present study, the mean age of the patients was 59.7 years (range: 22-85 years). The majority of the patients presented with chief complaints of postmenopausal bleeding (PMB) (80.9%) with more than 80% of the patients being postmenopausal and multiparous. The mean BMI of the patients was 31.3 kg/m2 (range: 22-56kg/m2). Nearly half of the patients (54.5%) were obese having BMI of ≥30 and 9 patients (8.1%) were morbidly obese. Regarding the co-morbidities, hypertension (52.7%), hypothyroid (31.8%), and diabetes mellitus (35.4%) were the most prevalent comorbidities in our study subjects.

We found that 106 (96.3%) patients had successful SLN mapping (detection rate), of which 75.5% had bilateral SLN mapping while 24.5% had unilateral SLN mapping (Figure 1). Mapping could not be done in 4 (3.6%)

patients. None of the patients were allergic to indocyanine green (ICG). The SLN mapping sites were: obturator- 38.1%, external iliac- 36.5%, internal iliac- 19.8%, common iliac- 4.3%, low peri-aortic- 0.5%, presacral- 0.5%. The mean number of pelvic and sentinel lymph nodes was 16.6 (range: 3-33) and 2.28 (range: 1-11) respectively on the final HPE.

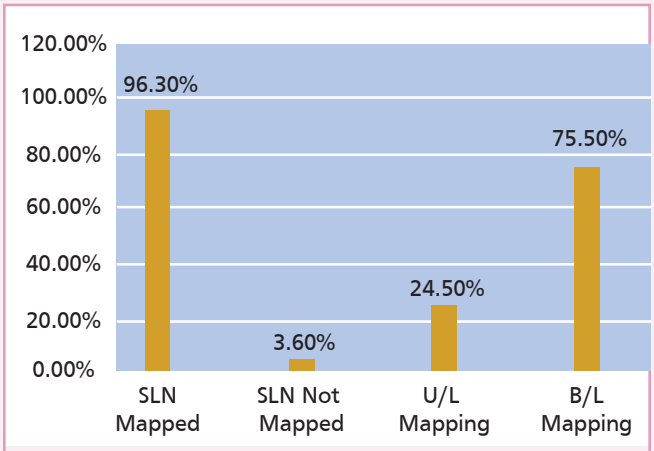

Figure 1: SLN Mapping

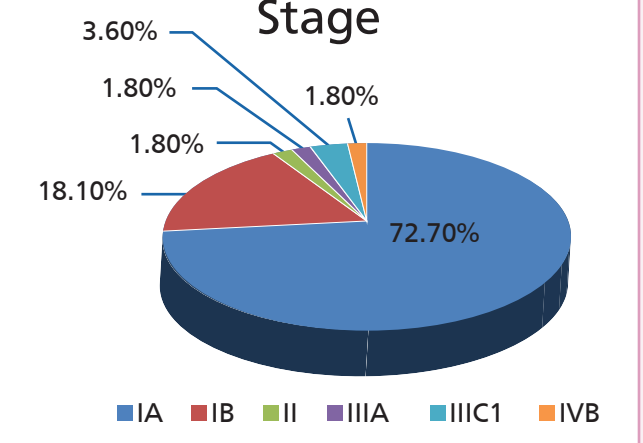

Figure 2: Final Surgico-pathological Stage distribution

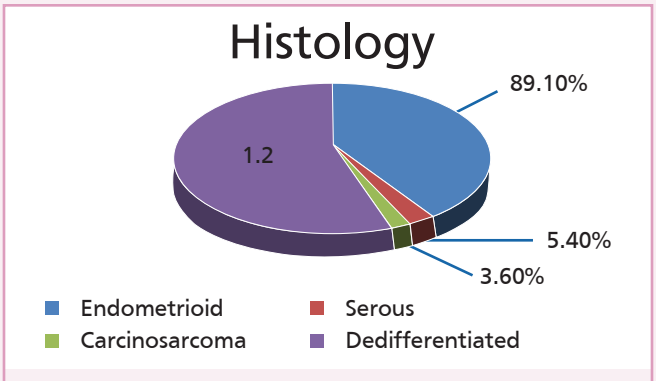

Figure 3: Histological distribution

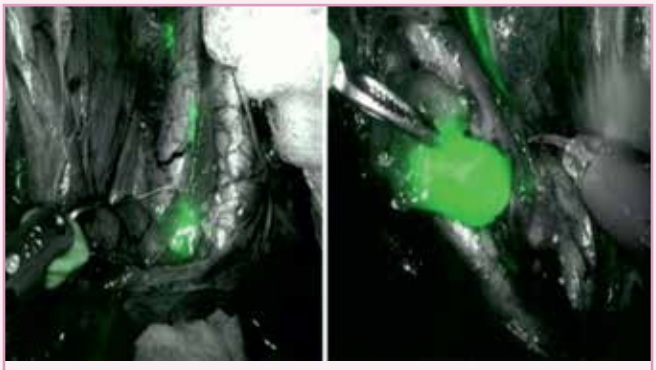

Figure 4: SLN mapping at common iliac

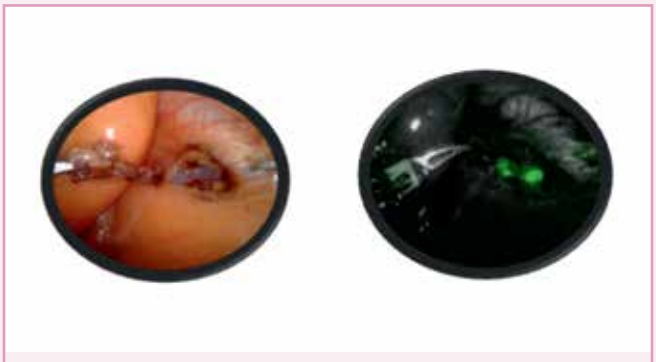

Figure 5: SLN mapping at presacral region

SLN Status	Final HPE Nodal Status (N=96)			
	Positive (N=3)		Negative (N=93)	
	N	%	N	%
Positive	3	100%	0	0%
Negative	0	0%	93	100%
SLN Biopsy				
Sensitivity	Specificity	PPV	NPV	Accuracy
100%	100%	100%	100%	100%

Table 1: Diagnostic accuracy of sentinel lymph node

Analysis of first 10 cases, which were included as learning curve for the procedure, showed one false negative case where sentinel lymph node was negative and pelvic lymph node was positive. On analysis of later 100 cases, the parameters were: sensitivity 100%, NPV 100% and accuracy of 100% In the present study, the only false negative case was the second case of the series, thus highlighting the importance of learning curve of SLN mapping before interpreting the results of SLN biopsy.

Discussion

SLN mapping was successful (detection rate) in 96.3% of the patients, out of which 75.5% had bilateral SLN mapping whereas 24.5% had unilateral SLN mapping. There were no allergic reactions in our study.

Among the four patients with positive lymph nodes on final histopathology, all had grade 2 endometrioid carcinoma. All had tumor size >2cm, three being ≥6cm. Out of the four patients, three had ≥ 50% myometrial invasion, involvement of lower uterine segment and lymph vascular space invasion. Two out of four patients had cervical stromal invasion. All the lymph nodal metastases were >2mm size i.e., macro metastasis. The only false negative case was the second case in our study.

Conclusion

We suggest that first 10 cases to be considered as part of learning curve in SLN mapping. Need for including learning curve in SLN mapping should be considered before implementing SLN biopsy in practice.

References

1. Kitchener H, Swart A, Qian Q, Amos C, Parmar M. Efficacy of systematic pelvic lymphadenectomy in endometrial cancer (MRC ASTEC trial): a randomised study. Lancet Lond Engl. 2008;373(9658):125–36.

Study	SLN Mapping Rate
Abu-Rustum NR et al (2009)	86%
Ballester M et al (2011)	88.8%
How J et al (2012)	92%
Paley PJ et al (2016)	96.7%
Present Study	96.3%

Table 2: SLN mapping rates.

Study	Sensitivity
Marchocki Z et al (2021)	92%
Abu-Rustam NR et al (2009)	100%
Ballester M et al (2011)	84%
How J et al (2012)	89%
Paley PJ ct al (2016)	100%
Rassi et al (2017)	97.2%
Present Study	100%

Table 3: SLN Sensitivity

Navigating Surgical Challenges with Precision: A Case Report on Robotic-Assisted Hysterectomy in Complex Pelvic Conditions

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Introduction

In August 2023, a 42-year-old patient, referred from Shahjahanpur, presented with a history of severe abdominal pain, menorrhagia, and dysmenorrhea persisting for several years. This case report outlines the challenges faced in diagnosing and treating the patient, ultimately leading to a successful robotic-assisted hysterectomy.

Clinical Presentation

The patient, a mother of two with a history of two previous caesarean sections with para median scar,

exhibited severe tenderness in the left iliac fossa upon examination. A 10cm TO mass was discovered via ultrasound, exacerbated by a recent transvaginal drainage of an endometriotic cyst. Further imaging with contrast-enhanced computed tomography (CECT) revealed a 10x12 cm TO mass with associated pus collection, causing the small bowel to adhere to the mass. Uterus of normal size was deviated to opposite side by the mass and the right ovary appeared normal. The patient exhibited elevated blood counts, and her CRP and procalcitonin levels were notably elevated, suggesting the presence of sepsis.

Treatment and Management

The patient was initially treated with high-end triple antibiotics for two weeks, leading to improvement in septicaemia. A pigtail catheter was inserted under ultrasound guidance to drain the accumulated pus. Approximately one liter of pus was successfully drained from the affected site. Following the patient's stabilization with the pigtail catheter, she was discharged home. Despite initial relief, the patient returned after ten days when the drainage ceased. Following catheter removal, robotic hysterectomy with bilateral salpingo-oophorectomy (BSO) was planned due to the severity of dysmenorrhea and menorrhagia attributed to endometriosis.

Robotic Surgery Approach: Robotic-assisted surgery was chosen for its advantages, including a history of two previous caesarean sections, endometriosis, and the suspicion of bowel adhesion to the TO mass. The 3D visualization provided by the robotic system facilitated a meticulous examination of the frozen pelvis, allowing for precise separation of the bowel from the TO mass and pelvic organs.

Surgical Procedure: As anticipated, the pelvis appeared frozen. The uterus was both immobile and adhered, while the bowel was intricately entangled within the TO mass and the pouch of Douglas (POD). If the procedure had been initially planned as a laparoscopy, we would have been compelled to abort and resort to open surgery. However, the application of the robotic system's helped with entrance into the abdomen via four ports which allowed a comprehensive view of the intricate pelvic anatomy. The robotic system's precision played a crucial role in successfully separating the bowel and uterus from the TO mass with minimal bleeding. The robotic hysterectomy with bilateral salpingo-oophorectomy (BSO), a task that would have been challenging with traditional laparoscopy, was completed in just one hour without intraoperative complications. Robotic assistance helped in performing this complex surgery with enhanced precision.

The patient experienced minimal postoperative pain, achieved early mobilization, and was discharged the day after surgery.

Conclusion

To conclude, in today's modern age of surgery after the advent of robotic assistance it has been possible to perform complicated surgeries with umpteen precision and great patient satisfaction.

Paradigm Shift to Robot Assisted Surgery in Endometrial Cancer, An Experience of Initial 100 Cases in the Department of Gyne Oncology, Fortis Memorial Research Institute, Gurugram

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Endometrial cancer is one of the most common gynaecological malignancy in women with a worldwide incidence of approximately 3,20,000 cases diagnosed annually. Globocan 2020 India showed annual incidence of 16,413, annual death of 6,385 and a 5-year prevalence of 43,484 per 100,000 women. The median age of diagnosis is 61 years, with the peak incidence between 55 to 70 years. About 95%, occur in patients over 40 years of age with only up to 5% in women younger than 40 years. At the time of diagnosis, 72-75% found to be confined within uterus. The estimated survival rates at the 5 years is approximately 82%

primarily treated with total hysterectomy, bilateral salpingo-oophorectomy, and surgical staging. At present, vaginal surgery, laparotomy, laparoscopic surgery, and robotic surgery are used to treat endometrial cancer. Minimally invasive surgery is preferable to laparotomy due to reduced blood loss and length of stay, faster return to activity, and better cosmesis. The largest randomized controlled trial, LAP-2 compare laparoscopic surgery with laparotomy and showed that patients who underwent laparoscopic surgery for endometrial cancer had improved survival outcomes compared with those who underwent laparotomy. However, laparoscopic surgery is limited by two-dimensional vision, incomplete articulation of instruments, and ergonomic restrictions, prompting the development of surgical robots in recent years to overcome these issues. In January 1999, the Da Vinci robotic surgery system was developed, and it received initial clearance from the US Food and Drug Administration in 2005 for the gynaecological surgeries. Reported advantages of this particular platform compared with conventional laparoscopy include, improved surgeon ergonomics, faster learning curve, facilitation of 7 degrees of freedom within the instrumentation, elimination of the fulcrum effect, a more seamless integration of fluorescence technology for lymphovascular assessment and less postoperative pain

Presenting Analysis of Initial 100 Robotic surgeries in the department of Gynaecologic Oncology, Fortis Memorial Research Institute, Gurugram:

Median age of our cohort was 60 years, mean BMI of 32.5 Kg/m2 (22.3-63.3kg/m2) and 13% patients were morbidly obese. 62% of patients had more than two comorbidities. A total of 82% patients had endometrioid histology, 18% had non endometroid with maximum of serous histology and out of which 71% were stage IA and 20% in stage IB. 44% patients had history of previous surgery. Median operating time in our analysis was 290 minutes (range 70-505 minutes). The median blood loss was 10 ml. In 34% of cases sentinel lymph node mapping were performed and a median of 20 pelvic lymph nodes retrieved. The median hospital stay was 2 days. Urinary tract infection in 6 patients, pelvic lympho-cyst in 7 patients and sensory deficit in thigh in 3 patients were the predominant postoperative morbidity observed. In our study, there was no perioperative mortality. 42% patients had not received any treatment and 42% had received brachytherapy. During 72 months of follow up, there were 3 recurrences and rest are disease free. One patient had recurred after 38 months of surgery having high grade endometroid carcinoma, stage IIIC1 who refused adjuvant treatment, second patient had endometroid carcinoma with squamous differentiation, stage IB and third was of carcinosarcoma histology, stage IA, both patients had recurred after 11 months. During entire follow up period, 10 patients were lost to follow up, 87 patients are alive and 3 patients died of disease. Disease free survival at 3 years is 98% and overall survival is 99%. Patients are on regular follow up, median survival has not yet reached (fig1).

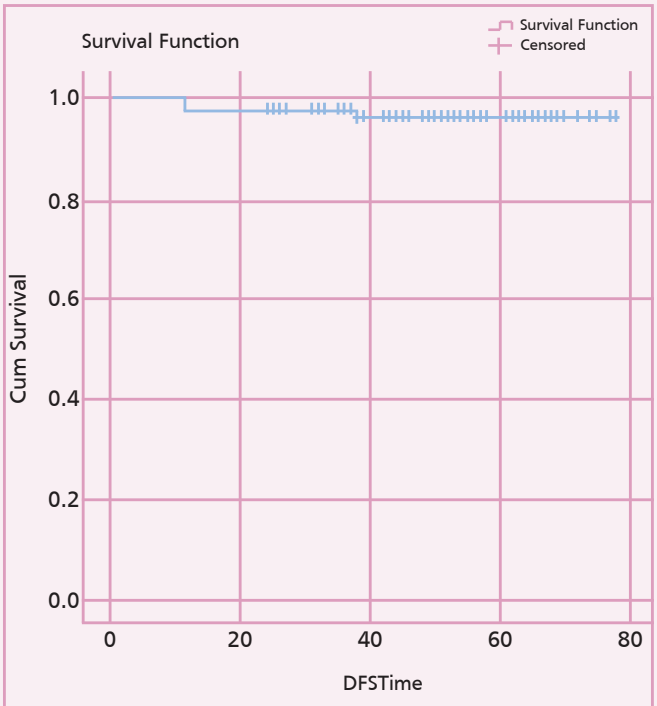

Figure 1: Disease free and Overall survival

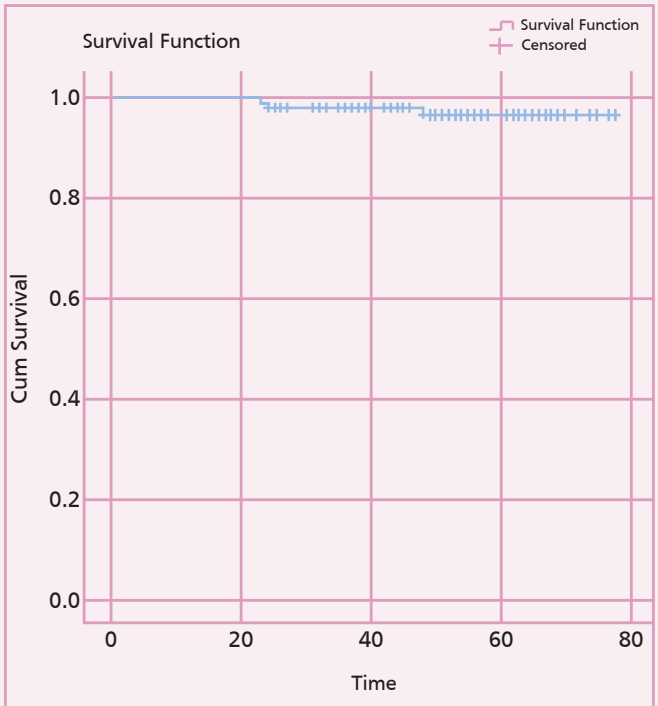

Figure 2: Intra operative pictures

Discussion

Robotic-assisted surgery has transformed the field of gynecologic oncology over the last 15 Years. This study reports the outcomes of the first 100 patients of uterus confined endometrial cancer, mean operative time was 287 minutes which is comparable to Veljovich et al, estimated blood loss was 15ml, as compared to other studies where Bell et al had 166ml and Magrina et al had 141ml. Lymph node retrieval were comparable to other studies. Our mean hospital stay was 1.6 days, Veljovich et al and Magrina et al reported 1.8 and 1.9 days respectively. Post operative complications were 6% which is in par with Boggess et al and Veljovich et al with 6% and 8% respectively.

Conclusion

In our experience robotic surgery for uterus confined endometrial cancer is safe and feasible with no blood transfusion, minimum pain, significantly shorter hospital stay, early recovery and return to daily routine activities. Better perioperative and oncological outcome makes robotic surgery a preferred surgical approach for uterus confined endometrial cancer.

Robotic Assisted Reconstructive Surgeries for Cervical and Vaginal Atresia

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Introduction

Congenital cervical and vaginal atresia is defined as absence or under development of the cervix and vagina respectively since birth in the female. Isolated cervical atresia is a rare Mullerian anomaly with an incidence of 1 in 80000 to 100000 births .Partial or Vaginal atresia has an incidence of 1 in 4000 to 10000 births. These patients usually present at the pubertal age with primary Amenorrhea associated with severe abdominal pain necessitating surgical correction.

Traditionally, hysterectomy has been the most commonly preferred surgery for such cases with functioning uteri Reconstructive surgeries without hysterectomy are more complex surgically and hence not widely performed. With the advent of Robotics, we are able to adopt these reconstructive surgeries as the primary surgical treatment with minimal morbidity to the patients.

We report two such cases performed at our institute. Ours is the fifth reported case worldwide of Robotic uterovaginal reconstruction for congenital cervical atresia.

Case 1

A 12-year old girl presented to our OPD with complaints of severe dysmenorrhea and scant menses. She was operated elsewhere 3 months back for drainage of hematometra and an attempt to create neovagina .Both of which were done via vaginal approach.

She was phenotypically female with 46 XX genotypes. On local examination, she had a blind vaginal dimple.

MRI showed uterus with hematometra and vagina with narrowing in middle one third causing hematocolpos with absence of cervix. After requisite pre-operative work up, she was posted for Robotic assisted drainage of hematometra and hematocolpos with uterovaginal reconstruction and vaginoplasty.

Procedure was explained to the patient and family in vernacular language and an informed consent was obtained. Under General anesthesia and aseptic precautions, pneumoperitoneum was created and 4 robotic ports, each of 8mm, were created under vision. Robot was positioned appropriately and the camera was targeted to the area of interest in order to adjust the arms of the robot ergonomically for the surgery. The arms of the robot were docked and instruments were introduced. Intraoperatively, it was observed that the uterus was bulky in size with normal tubes and ovaries. A vertical incision was made on the uterus below the level of fundus to drain the hematometra. Hematocolpos was drained by extending the same incision. The stenosed middle third of the vagina was incised and released. A peritoneal graft was placed over it for re-epithelialization. In order to keep the uterovaginal canal patent, a 24Fr Foley's catheter was inserted vaginally into the uterus up to the level of fundus. The Foley's bulb was then inflated and incised uterine wall was sutured.

Patient tolerated the procedure well. She reported minimal pain in the immediate post-operative period. She started ambulating 12 hours post-surgery and was discharged in a stable state on post- operative day 2. At 6 weeks follow up, the vagina had re-epithelialized and the intra uterine Foley's was removed after 3 months. At 6 months follow up, the patient continued to have patent utero vaginal anastomosis.

Case 2

A 24-year girl with known diagnosis of Turner's syndrome presented to the OPD with request for neovagina creation. On examination, she had a 0.5 cm blind vaginal pouch. After requisite pre- operative work up, she was posted for Robotic assisted Laparoscopic ileal neovagina creation. Similar protocol as above case for followed for Robotic port placement and docking.

Intraoperatively, a well vascularized segment of ileum was identified and dissected. The remaining portion of the small intestine was anastomosed side to side using stapler. The ileal segment along with its blood supply was pulled down. From the vaginal end, the vaginal pouch was incised and the ileal loop was anastomosed to the vagina. At the end of surgery, the neovagina measured 7 cm in length . A vaginal mould was placed using a silicone catheter with inflated bulb. She was managed initially with Total parenteral nutrition and gradually moved to normal diet over a period of 5 days and then discharged. The mould was removed after 3 weeks. At 1 year follow up, the patient has a patent, well lubricated, non-foul smelling, neo-vagina of 7.5 cm in length.

Discussion

Case 1

In such rare cases, there are not enough volume of treatment options reported to compare and contrast various approaches. Traditionally, owing to fear of restenosis and infection, hysterectomy was the preferred approach. Laparoscopic utero vaginal anastomosis has been attempted but not widely popular. Robotics gives the significant advantage of operating at such depths due to length of the instruments under the surgeon's control. This along with the 10x magnification and dexterity gives significant advantage in such precise reconstructive surgeries .

Case 2

Neo vagina creation has moved slowly from Mc Indoe's vaginoplasty to sigmoid vaginoplasty. But the disadvantage of the above surgeries include chances of restenosis and foul smelling vaginal discharge. Lately, Ileal neovagina has been the preferred modality of choice owing to the no foul smelling discharge from the ileal loop. Robotic technology enables this to be done with greater precision and significantly lesser morbidity.

Conclusion

Reconstructive surgeries need a great degree of precision. This precision is augmented with enhanced magnification and dexterity. Robotic facilitates this advantage thus ensuring higher rates of success with primary surgery which has been the challenge so far.

Robotic Urologic Surgery

Robotic Assisted Sacrocolpopexy - A 2-year Retrospective Analysis

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Abstract

Aims and Objectives: This study aimed to analyze operative time, postoperative pain score, ICU stay, and duration of hospital stay in patients who underwent Robotic-Assisted Sacrocolpopexy using the Da Vinci XI robot over a 2-year period from April 2021 to April 2023.

Results: The average age of the patients was 68 years (range: 65-81 years). Vault prolapse ranged from stage 2 to 4, with the most common being stage 2. The mean operating time ranged from 2 to 4 hours, with a mean of 2.5 hours, including robotic docking. This time significantly decreased after the first 8 cases to 60-90 minutes, highlighting the short learning curve and the importance of standardized operative steps. There was minimal intraoperative blood loss of less than 200 ml in all patients. The average postoperative pain score was 2 (range of 1-3) on day 0. All patients were discharged on postoperative day 2. At the 6-week follow-up, all patients were comfortable, with 2 patients reporting occasional constipation.

Discussion: In our case series, the operating time significantly shortened after the initial 8 cases, highlighting the shorter learning curve of Robotic surgery compared to laparoscopic surgery. Minimal intraoperative blood loss, along with reduced postoperative pain and short postoperative stay, may encourage widespread adoption of minimally invasive surgery.

Conclusion: Robotic-Assisted Sacrocolpopexy is an ideal minimally invasive approach to correct apical vault prolapse. With precise standardization and training of the entire surgical team, operating time and complications can be significantly reduced, enabling the delivery of the best available care on par with world standards.

Introduction: Pelvic floor disorders, such as pelvic organ prolapses (POP), urinary, and fecal incontinence, affect more than 21% of women in India. The prevalence increases with age, and over 10% of women in the US undergo surgical treatment for these conditions at least once in their lifetime. Although statistics for the same are not yet available in India, the impact of these disorders is significant.

First described in 1962 by Lane, open abdominal sacrocolpopexy involves the suspension of the vagina to the sacral promontory with a graft. It is a safe and effective procedure accepted as the gold standard for repairing apical vault prolapse. The advent of minimally invasive surgery, specifically the robotically assisted approach, has led to improved visibility, shorter surgical time, and hospital stay. In our retrospective analysis over a 2-year period, we aim to analyze the operative time, postoperative pain score, ICU stay, and

duration of hospital stay.

Materials and Methods

Retrospective data of 24 patients who underwent Robotic-Assisted Sacrocolpopexy between April 2021 and October 2023 were analyzed. The average age of the patients, stage of prolapse, operative time, intraoperative and postoperative complications, ICU stay, postoperative pain score, and duration of hospital stay were examined.

Preoperative evaluation: Among these patients, 23 had undergone post-hysterectomy procedures for benign gynecological issues, and 1 patient underwent hysterectomy along with sacrocolpopexy. They were evaluated with a thorough history and detailed physical examination, including staging of the prolapse. Co-morbidities were noted, and pre-anesthetic evaluation was performed with informed consent

Procedure: All patients were operated using the Da Vinci Xi by the authors at Fortis Hospitals, Bannerghatta Road, Bangalore. General anesthesia was administered, and an intraoperative nasogastric tube was placed to avoid stomach injury, as robotic arms are positioned 2 inches above the umbilicus. Abdominal entry was established with a Veress needle, and 4 standard robotic ports of 8 mm each were used. After ensuring that the patient is adequately strapped with shoulder support, a steep Trendelenburg position is given, and then the robotic arms are docked. The supraumbilical port was used for the camera, with the left port for monopolar scissors, and the 2 right ports for fenestrated bipolar and the prograsp forceps. An assistant laparoscopic port of 5 mm was placed in the left iliac region to facilitate suction and retraction of the sigmoid colon. Vaginal end dissection was done first to separate the vesicovaginal and rectovaginal fascia off the vault. At the sacral end, care was taken to identify the right ureter and right common iliac artery. The sacral promontory was then identified and dissected until the white glistening anterior longitudinal ligament was reached. A retroperitoneal tunnel was then established from the sacral to the vaginal end, taking care not to injure the right ureter and avoiding injury to the hypogastric plexus. A Y- shaped mesh was fashioned extracorporeally with a Type 2, macroporous polypropylene mesh, which was introduced inside. The short arms were sutured using non-absorbable Prolene sutures to the anterior and posterior vaginal vault, ensuring hemostasis. The mesh was then tunneled retroperitoneally, and tension was adjusted to ensure optimal reduction of prolapse, taking care not to make it too tight or too loose. The long arm of the mesh was then sutured to the anterior longitudinal ligament, taking care to avoid the presacral vessels. The excess mesh was then cut off and removed. After ensuring adequate hemostasis, reperitonization was done with 2-0 Vicryl. Skin ports were closed with 3-0 Monocryl.

The combination of three qualitative SWI features using LR provided the highest accuracy in differentiating PCNSL and GB. Thin-linear-uninterrupted -intra-tumoral-vasculature in PCNSL and broken-intra-tumoral- microvasculature with haemorrhage in GB are the major contribtutors to the differentiation.

Results: The average age of the patients was 68 years (range: 65-81 years). The vault prolapse ranged from stage 2 to 4, with the most common being stage 2. All the patients were symptomatic. The mean operating time ranged from 2 to 4 hours, with a mean of 2.5 hours, including robotic docking. The operating time considerably shortened after the first 8 cases. Only 1 patient needed postoperative ICU stay due to her co-morbidities. There was minimal intraoperative blood loss of less than 200 ml in all patients. There was bladder injury in the first 2 patients, which was recognized intraoperatively due to hematuria. For these two patients, intraoperative cystoscopy was done, the incorporated suture was cut, and fresh suture was taken. There were no other complications noted thereafter. Postoperative pain score with a numeric rating scale was done. The average score was 2 (range of 1-3) on day 0. All patients were started on liquids 6 hours postoperatively and moved to solids.

References

1. Krishna Rao et al., J Women's Health Care 2014, 4:3
2. Wu JM, Vaughan CP, Goode PS, et al. Prevalence and Trends of Symptomatic Pelvic Floor Disorders in U.S. Women. Obstet Gynecol 2014;123:141-8.
3. Fialkow MF, Newton KM, Lentz GM, et al. Lifetime risk of surgicalmanagement for pelvic organ prolapse or urinary incontinence. Int Urogynecol J Pelvic Floor Dysfunct 2008;19:437-40.
4. Lane FE. Repair of posthysterectomy vaginal-vault prolapse. Obstet Gynecol 1962;20:72-7.
5. Linder BJ, Occhino JA, Habermann EB, et al. A national contemporary analysis of perioperative outcomes for open versus minimally-invasive acrocolpopexy. J Urol 2018;200:862-7.
6. Jonsson Funk M, Edenfield AL, Pate V, et al. Trends in use of surgical mesh for pelvic organ prolapse. Am J Obstet Gynecol 2013;208:79.e1-7.
7. Bouquet de Joliniere J, Librino A, Dubuisson JB, et al. Robotic Surgery in Gynecology. Front Surg 2016;3:26.

Robotic Assisted Diverticulectomy For Giant Urinary Bladder Diverticulum - A Rare Occurrence

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Abstract

Urinary bladder diverticulum occurs when mucosa herniates through gaps in the muscular layer of the bladder. Although small diverticula are common in elderly, occurrence of giant diverticulum is rare. Treatment in symptomatic cases offers a challenge to the treating surgeon. We present a similar case operated via robotic surgery.

Case Report

A 72-year-old hypertensive man presented with recurrent urinary tract infections, overflow urinary incontinence, increased frequency and nocturia. Patient had undergone multiple procedures for prostate and stricture urethra. After careful examination and focused investigations he was found to have a giant urinary bladder diverticulum with capacity of more than 500 ml (Figure 1). Due to the failure of it to get empty he was having high post void residual urine leading to his symptoms. Rest of the investigations were normal. Patient was electively planned for surgery and Robot-assisted Bladder diverticulectomy was done using transperitoneal extravesical approach. Cystoscopy was performed before surgery which revealed normal urethra, wide bladder neck and a narrow neck diverticulum at the right posterolateral wall 4 cm above the right ureteric orifice (Figure2). The diverticulum was separated from bladder attachments and was ligated at its neck using vicryl 3-0 absorbable suture. Approximately 15 x 10 cm size diverticulum was excised (figure 3). Operative time was around four hours, and blood loss was minimal. Patient was discharged on a catheter on the second day and it was removed after getting a normal cystogram at 10 days (figure 4). His histopathology report came out to be benign with no evidence of malignancy.

Discussion

Bladder diverticula are broadly classified as two types

1. Congenital- which is rare and seen in conditions like posterior urethral valve or neurogenic bladder.
2. Acquired- which is more common and is secondary to bladder outlet obstruction (BOO)

Most common causes of BOO are benign hyperplasia of prostate (BPH), urethral stricture, or voiding dysfunction. These conditions lead to high intravesical pressure thereby causing herniation of bladder mucosa through detrussor muscle. Most of these are small and commonly seen but presence of giant diverticulum is extremely rare and is associated with problems.

Frequently reported complications are recurrent urinary tract infections (up to 68%), malignant intra-diverticular tumors (2%-20%), vesicoureteral reflux or ureteral obstruction (5%-15%), and rarely spontaneous rupture.

If the diverticulum is large or is symptomatic surgery is indicated. Earlier open extravesical, intravesical, or combined approaches were used; there are, however, many reports showing that diverticulectomy can be performed safely either laparoscopically or with robotic assistance.

To our knowledge, this is the first case of its kind of a giant bladder diverticulum, which was completely removed with the help of robotic surgery. With great degree of freedom and more precision doing dissection in such complicated cases becomes easy especially when the pathology is situated in the deep Pelvis.

References

1. Izumi J, Hirano H, Kato T, Ito T, Kinoshita K, Wakabayashi T. CT findings of spontaneous intraperitoneal rupture of the urinary bladder: two case reports. Jpn J Radiol. 2012;30(3):284–7.

doi: 10.1007/s11604-011-0042-7.

2. Faramarzi-Roques R, Calvet C, Gateau T, Ballanger PH. Surgical treatment of bladder diverticula: laparoscopic approach. J Endourol. 2004;18(1):69–72. doi: 1089 / 089277904322836712.

3. Edward G, Myer MD, Joseph R, Wagner MD. Robotic-assisted laparoscopic bladder diverticulectomy. Poster presentation at the New England Section of the AUA.Hartford: Hartford Hospital/University of Connecticut; 2006.

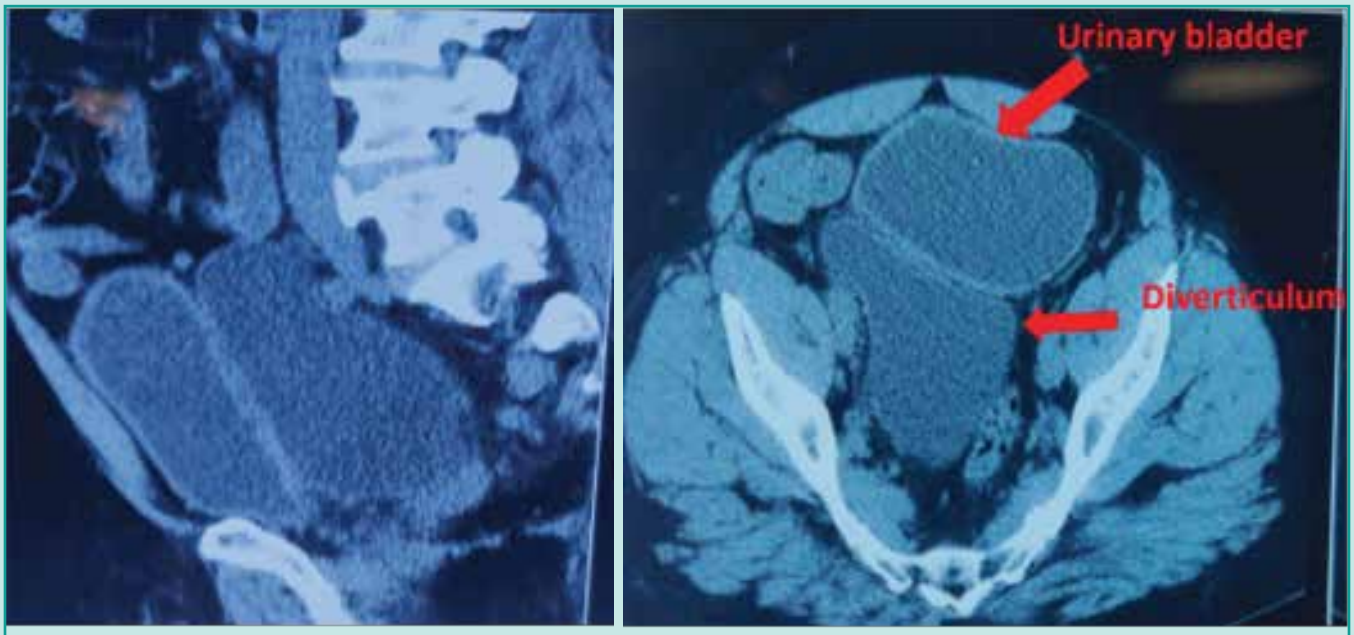

Figure 1: Sagittal and axial view on NCCT KUB showing native thick walled bladder with giant diverticulum arising from right posterolateral wall.

Figure 2: Cystoscopy view showing narrow neck of diverticulum.

Figure 4: Postoperative cystogram showing complete removal of pathology with no extravasation.

Figure 3: Resected diverticular wall

Robotic Assisted En-Bloc Dual Kidney Transplant

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Introduction and Objective

Robotic assisted kidney transplant for the recipient is being performed at several centres around the world with increasing frequency over the last decade. Several studies have shown equivalent outcomes as compared to open surgery, with better perioperative recovery. Here we present a case of Enbloc dual kidney transplant performed robotically, probably first such report to the best of our knowledge.

Materials and Methods

The deceased donor in this case was a 13-month old child weighing 8 kg. Bilateral kidneys were harvested enbloc along with aorta and Inferior Vena Cava (IVC). Careful bench dissection was performed and all the branches to the great vessels were carefully ligated. Top ends of the aorta and IVC were closed and lower ends were left open for the anastomosis to external iliac vessels.

The recipient was a 30 y old male on haemodialysis since 4 years. The en bloc kidneys were inserted through 6cm pfannelsteil incision through a handport. The aorta and IVC were anastomosed to external iliac vessels with 6-0 PTFE suture. Enbloc kidneys were placed in the extra peritoneal space. Bilateral ureters were joined together before extra-vesical reimplantation to the bladder.

Results

Total operative time was 235 min and ischemia time was 85 min. Arterial and venous anastomosis times were 19 and 21 min respectively. Brisk urine output was noted intra-operatively and doppler showed normal indices in both kidneys. Creatinine at discharge was 1.5

Conclusion

Robotic En-bloc kidney transplantation is feasible and safe at an experienced robotic center.

Robotic Pelvic Urological Surgeries: Do we really need steep Trendelenburg?

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Keywords

Robotic pelvic surgeries, Steep Trendelenburg, reduced tilt.

Introduction

Robot-assisted Pelvic surgeries are one of the most common types of surgeries performed with robotic systems. Robotic Pelvic urological surgeries need to be performed at steep Trendelenburg position to allow bowel to move out of pelvis and provide visibility. This manoeuvre is often associated with due risks. It can lead to positional neuropathy and other physiological impact on patient like increased cerebral and facial oedema, raised Mean arterial pressure (MAP), acidosis, raised end-tidal carbon-dioxide (ET-CO2). An ideal Trendelenburg position is still under debate.

Aim

We aimed to evaluate the feasibility and outcomes of performing Robot-assisted pelvic surgeries under reduced Trendelenburg tilt. We also aimed to compare physiological impacts of steep Trendelenburg position to reduced tilt position.

Methodology

It was a prospective case-control study with patients in the ratio of 2:1. Control group was operated with steep Trendelenburg position. Cases in the reduced tilt group were operated using a graduated method to achieve minimal optimal angle of operating table. Various body habitus parameters, console time, blood loss, rise in MAP and ET-CO2, duration of ileus, postoperative stay and complications were recorded.

Results

A total of 67 patients were included in the study with 44 patients in reduced tilt group and 23 patients in control steep Trendelenburg group. All demographic profile and body habitus parameters were comparable among two groups except age which was lower in Reduced-Tilt group. Cases were operated at a mean angle of 20.5 ± 3.1° compared to 30° in control group. Rise in MAP, ET-CO2 and facial swelling were significantly low in Reduced-Tilt group compared to control. Notably blood loss, duration of ileus, postoperative stay and complications were also low in patients with Reduced Tilt. Various body habitus parameters were analysed with multiple regression analysis to predict minimal angle required for performing surgery with Reduced Tilt. BMI, xiphisterno–umbilical distance, umbilical–pubic-symphyseal distance and subcostal angle were found to predict the same. We also generated a formula to predict the angle pre-operatively at which surgery can be performed based on patient's body habitus parameters.

Discussion

Multiple researchers have documented the complications arising out of steep Trendelenburg position. There is little doubt among urological community to avoid steep tilt as much as possible. However, the basic assessment of feasibility of this reduced tilt was not done previously. In our study, experienced robotic surgeons performed these surgeries and tried to reduce tilt without compromising on safety of patients and visibility of pelvic organs. At the end of our study, we were able to confirm that these surgeries can be performed at reduced tilt and they had positive physiological impact on recovery of patients.

Conclusion

Robot-assisted pelvic surgeries can be performed in reduced Trendelenburg tilt which is associated with less hemodynamic and respiratory stress, complication rates and early postoperative recovery. BMI, subcostal angle, xiphisterno – umbilical distance and umbilical pubic - symphyseal distance can predict the feasible angle of tilt.

Robotic-Assisted Kidney Transplant: Experience of a High-volume Tertiary Care Center

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Abstract

Introduction

Open kidney transplantation (OKT) is regarded as the gold standard treatment for patients with end-stage renal disease (ESRD). RAKT has proven to be a workable, reproducible, and safe procedure with a quicker recovery. RAKT adds the benefits of minimally invasive surgery while achieving similar patient and graft survival to open surgery. We report our experience with Robotic assisted kidney transplant (RAKT), focusing on surgical, perioperative and functional outcomes of RAKT in terms at a median follow-up of 6 months.

Materials and Methods

Data of 50 RAKT patients was prospectively and retrospectively collected from August 2021 to December 2022. We collected the demographic data of the recipient. Pre - operative Serum creatinine, hemoglobin was noted. Donor kidney data (site, vasculature, type) were also collected. Surgical outcomes included ischemia times, re-warming time, anastomotic time, total operative time, diuresis on-table, intra-operative and post-operative complications were recorded.

Results

The mean age of patients was 34.8±11 years with mean BMI of the recipients of 25.8±5.9. Mean pre-operative serum creatinine was 4.9±1.8 mg/dl while GFR was 14.6±3.9 ml/min/1.73 m2. We had mean warm ischemia time of 3.6±1.8 min, mean cold ischemia time of 48.4±12.4 min with the total ischemia time 57.4±15.4 min. The total operative time in our series was 258.6±46.4. We had prompt diuresis in all the cases. We had three intraoperative complications. The mean post-operative day (POD) 1, 7, 30 and 6-months creatinine was 3.1, 1.2, 1.0 and 1.2 mg/dl. There was no case of delayed graft dysfunction (DGF) in our series. At 6 months follow up the graft survival in our series is 100%.

Conclusions

RAKT is safe and feasible as OKT in terms of complication rate and functional outcomes in well-selected patients at experienced centres. The benefits of minimally invasive surgery are incorporated into RAKT, which offers an excellent substitute for OKT.

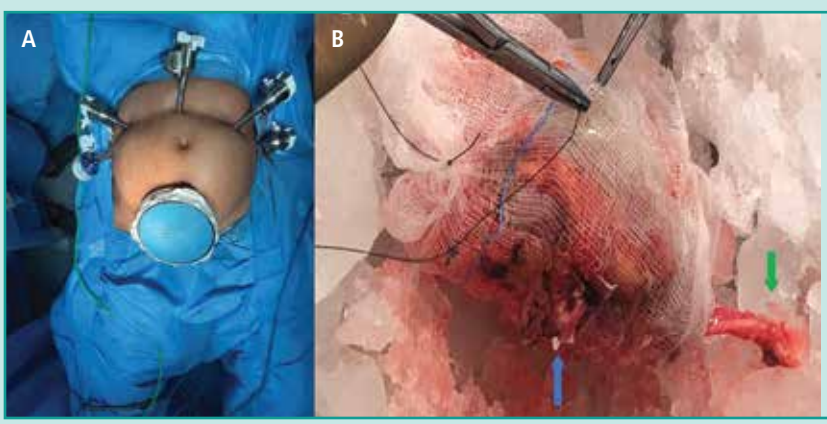


Figure 1: (A)Port placement and Handport placement. (B) Graft Hypothermia jacket-Kidney wrapped with two layered gauzes with ice slush (Blue arrow: Hilum, Green Arrow: Ureter).

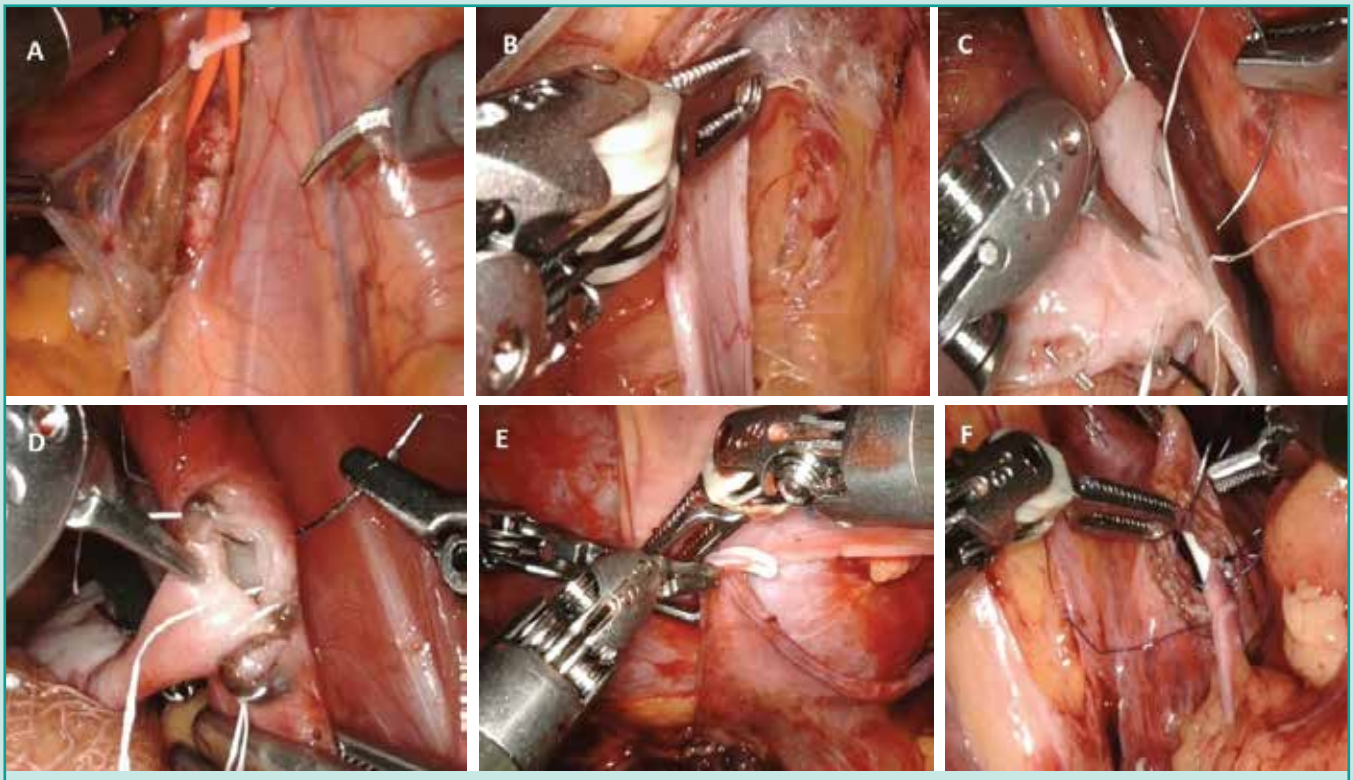


Figure 2: Steps of engraftment; A and B: Graft Bed Preparation, C: Vein anastomosis, D: Artery anastomosis, E: Retroperitonialization of the graft with peritoneal windows, F: Uretero-neocystostomy.

Table 1: Recipient demographics and Donor Data **(n=50)**

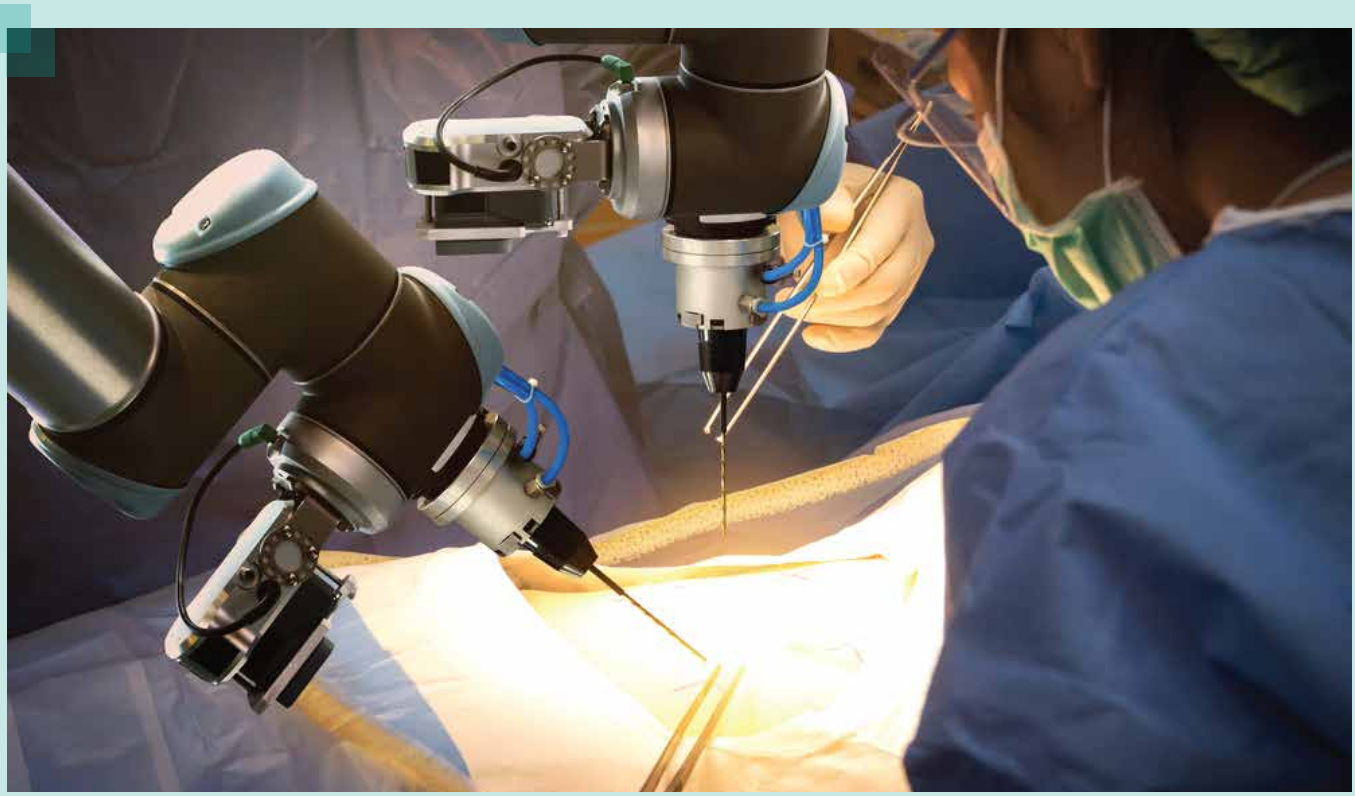
Age (yrs) mean±SD (range)	34.8±11
Sex (M:F)	32:18
BMI, mean±SD (range)	25.8±5.9
Nationality (Indian : Non-Indian)	43:7
Serum Creatinine (mg/dl) mean±SD (range)	4.9±1.8
GFR, mean±SD (range)	14.6±3.9
Live: cadaveric	50:0
Left: right	43:7
Vascular anatomy(Single : Multiple)	45:5
Donor Relationship	**Parents-** Father-5 / Mother-8
	Spouse- Wife-21 / Husband- 5
	Siblings- Sister- 7 / Brother- 4
No of Preemptive transplants	4

Table 2: Intra-Operative Parameters (n=50)		
Arterial anastomosis (EIA:IIA)	48:2	
Right iliac fossa: left iliac fossa	50:0	
Bench time (min), mean±SD	19.5±12.8	
Ischemia times (min), mean±SD	Warm Ischemia time	3.6±1.8
	Cold Ischemia time	48.4±12.4
	Total Ischemia time	57.4±15.4
Rewarming time	43.5±6.5	
Anastomosis time (min), mean±SD	Arterial	17.2±4.8
	Venous	19.4±5.3
	Uretero-vesical	22.5±6.3
Total operative time(min), mean±SD	258.6±46.4	
Diuresis on table	Prompt Immediate Diuresis in all cases	
Intra-Operative complications	• Graft bleeding at the anastomotic site after clamp release **(n=2)** • Poor blood flow on Doppler ultrasound, caused by kinking of the vessels **(n=1)**	
Estimated blood loss (ml)	185.6±25	

Table 3: Post-Operative Parameters (n=50)		
Serum Creatinine (mg/dl) mean±SD	Day 1	3.1±1.2
	Day 7	1.2±0.4
	Day 30	1.1±0.8
	6 months	1.2±0.8
GFR (ml/min/1.73 m2) , mean±SD	Day 1	21.2±12.3
	Day 7	64.6±20.4
	Day 30	68.17±14.4
	6 months	64.6±20.7
Graft survival at 6 and 12 months	100%	
Hb% drop, mg/dl, mean±SD	1.08±0.86	
Pain score, VAS scale, mean (SD)	12 h	4.0±0.8
	24 h	1.8±0.6
	Day 7	0.4±0.5
Duration of stay, days, mean±SD	7.5±2.4	
Delayed Graft Function	None	
Post-operative complications	• Paralytic Ileus (n=2) (Clavien Dindo Grade II)	

Table 4: Comparison of Perioperative outcomes in various studies

Parameters		RAKT* (Present study) n=50	OKT (Our Data) n=50	RAKT Mani Menon[26] (2014) n=25	RAKT Tugcu20 (2018) n=40	RAKT Nataraj S28 (2020) n=50	RAKT Ganpule A27 (2019) n=26
Ischemia time (min)	Warm Ischemia time	3.6±1.8	2.4	2.4	1.86 (0.49)	3 (2–5)	4.8±1.1
	Cold Ischemia time	48.4±12.4	41.5	-	40.47 (13.38)	33 (25–40)	113.8±20.9
	Total Ischemia time	57.4±15.4	-	75.3	96.7 (30.02)	90 (70–105)	118.7±21.2
Rewarming time(min)		43.5±6.5	-	46.6 (9.3)	54.70 (17.80)	60 (50–75)	62.5±10
Total operative time(min)		258.6±46.4	174	214.1 (39.8)	265.37 (46.6)	250 (210–300)	294.6±59.1
Estimated blood loss (ml)		185.6±25	350	151.7	182.25 (55.26)	-	-
Pain score (VAS) @24hrs		1.8±0.6	6.5	-	4.85 (1.21)	3	3.5±0.5 @12 hrs
Length of Hospital Stay		7.5±2.4	8.4	8.4 (1.1)	-	7 (5–15)	13.5±3
Serum Creatinine (mg/dl)	POD 7	1.2±0.4	1.12	1.3	1.40 (0.53)	1.6 (1.32)	1.8±0.8
	At 1month - 6 Months	1.1±0.8	-	1.1 (0.3)	0.95 (0.90)	1.5 (1.40)	1.2±0.3
GFR (ml/min/1.73m2)	POD 7	64.6±20.4	74	70.2	-	-	-
	At 1month - 6 Months	68.17±14.4	-	81.5	-	62.4 ± 24	53.16±16
Complications	Intra-Op	Graft bleeding (n=2) Kinking of the vessels (n=1)	Wound infections (n=6), Lymphocele (n=5), Blood Transfusions (n=5)	Graft biopsy Intra-peritoneal hematoma, Infection	Ileus - exploratory laparotomy, temporary dialysis, wound infection	Hemorrhage requiring Transfusions, Ileus, Graft Rejection	Topsy turvy Graft surface bleeding
	Post-Op	Paralytic Ileus (n=2)					Lymphocele Graft pyelonephritis



Robotic Partial Nephrectomy in Highly Complex Renal Tumours: Has the time arrived for it?

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Keywords

Robotic Kidney surgeries, partial nephrectomy, hemi-nephrectomy, complex kidney tumours

Case Report

Introduction

Robotic Partial nephrectomy has become standard of care worldwide for T1a and T1b Renal masses. At some pioneering centres across the world, this treatment has been offered to patients with complex renal tumours and high nephrometry scores. Renal tumours are classified on their complexity with the help of RENAL and PADUA scores based on their size, location, proximity to renal sinus and collecting system, polarity and laterality. Tumours with PADUA ≥10 are considered highly complex. We present a case with PADUA 12X and size of 8 cm (T2a) who underwent a successful robotic partial nephrectomy.

Case Report

22-year man developed left flank pain which was sudden in onset and single episode of haematuria. He underwent CT scan and routine investigations at nearby hospital and was stabilised. All the blood parameters were in normal range. His CT scan showed a 8cm complex cystic lesion in left kidney involving upper poleand interpole area.

Imaging

Patient then came to us and we performed a MRI renal protocol scan to better characterise the lesion. It showed this complex cystic lesion which was mainly endophytic and reaching on medial surface close to hilum. It was found to have a PADUA score of 12X which clarifies its complexity. We evaluated vascular anatomy in detail before planning partial nephrectomy.

Treatment

Robotic ports were placed by Hassan's technique and colon was mobilised. We dissected hilum extensively and isolated all arterial and venous branches and looped them with vascular sling. We mobilised kidney completely and identified tumour. Tumour was then marked on renal parenchyma all around and we planned to go for a hemi-nephrectomy excision after taking a margin of almost 5mm. we clipped and divided arterial branch going to upper pole and tumour. We started warm ischaemia time and clamped only renal artery. Tumour was cut as mentioned and enucleation was performed at medial aspect near hilum. Renal calyx was opened which was sutured with Vicryl 3-0 suture. 1st layer of renorrhaphy was performed with V-Loc 3-0 barbed suture from lateral to medial. A 2nd layer renorrhaphy was also performed with V-loc No 0 suture only at lateral site. Warm ischaemia time (only artery) remained 27 minutes. Haemostasis was confirmed and a drain was placed. Patient started mobilisation after 12 hours and drain was removed on day 2. Patient was discharged on day 3 after return of bowel functions. Biopsy showed clear cell renal cell carcinoma with clear margins, grade 2 and 7.5 cm in size. Follow up scan showed no recurrence of tumour.

Discussion

Complex renal tumours are always a challenge while performing partial nephrectomy and many times these patients are taken for radical nephrectomy directly. It is our feeling that a good imaging beforehand with reconstruction of renal tumour and vascular anatomy in surgeon's mind play a vital role in dealing with these kinds of complex tumours. Often performing hemi-nephrectomy may be safer option than performing a classical partial nephrectomy.

Conclusion

With the pushing of boundaries to these complex tumours, slowly we are moving towards a future where most (not all) of renal tumours receive a nephron sparing surgery.

Robotic Assisted Ureteric Mitrofanoff Conduit with Malone Antegrade Continence Enema Procedure

Source : Harinatha S, Keshavamurthy M, Tabrez S, Kumar P, Neelagar B, Rao K, Subudhi S. Robotic assisted ureteric mitrofanoff conduit with malone antegrade continence enema procedure. Urology Open A Open J. 2021; 2(1): 54. doi: 10.33169/uro.UOAOJ-2-114*

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Introduction and Objective

Neurogenic bladders requiring self-catheterizations have primarily been treated using appendix as the preferred Mitrofanoff channel. But in some cases, appendix may be absent or maybe required for other procedures as in MACE (Malone Antegrade Continence Enema) for chronic constipation. Here we demonstrate the feasibility of Ureter as the Mitrofanoff channel combined with bladder augmentation and MACE procedure done robotically.

Materials and Methods

The patient is a 14-year-old male with neurogenic bladder due to spinal dysraphism with inability to do per urethral self-intermittent catheterization due to sensitivity and recurrent urinary tract infection. He also had chronic constipation requiring digital evacuation frequently.

Evaluation with urodynamics and cystogram showed poor compliance with small capacity bladder with no reflux. He was planned for Robotic Augmentation Cystoplasty and Ureteric Mitrofanoff conduit with MACE procedure.

The patient was placed in Trendelenburg position and standard4 port docking of Da Vinci XI robot was done with additional assistant port. Ileal segment of 20cm was marked with sutures and delivered out of the abdomen through a small suprapubic incision and was partially detubularised and refashioned into a U- shaped patch with chimney and was returned to the abdominal cavity. Augmentation of bladder was done with single layer barbed sutures. Right ureter was divided at the lower one third level. Proximal ureter was anastomosed to the ileal chimney and distal ureter was brought out at the right iliac fossa as cutaneous stoma. Appendix was brought out at a separate site for cutaneous stoma for antegrade continence enema.

Results

Total operative time was approximately 4 hours. Estimated blood loss was about 200 ml. Patient was discharged on the 4th postoperative day. 4 weeks after the procedure, DJ stent was removed and patient initiated on self-catheterization and a ntegrade enemas which he was able to do comfortably.

Conclusions

Robotic assisted ureteric Mitrofanoff procedure with augmentation Cystoplasty and MACE procedure is technically feasible with good out - come in selected patients with combined neurogenic bladder and bowel dysfunction.

Feasibility of A Robotic Platform In A Complex Pelvic Surgery In A Patient with Multiple Co-Morbidities

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Introduction

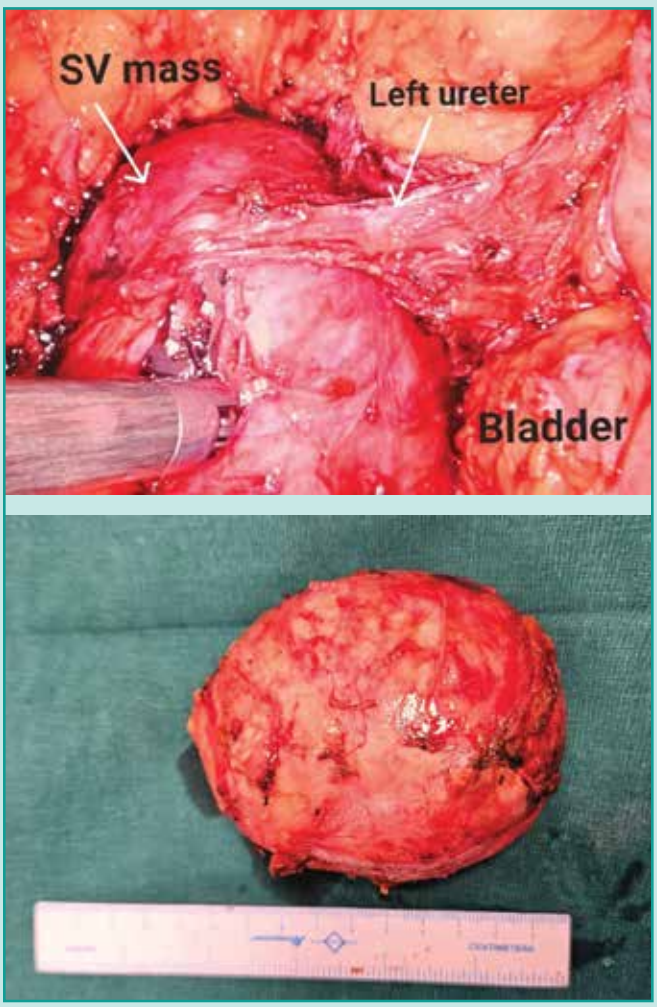
Primary tumors of seminal vesicles(SV) are very rare. Differential diagnosis of such pelvic masses often relies on a multimodality approach comprising magnetic resonance imaging and preoperative biopsies. We report a case of a large seminal vesicle spindle cell neoplasm causing recurrent lower urinary tract symptoms managed with robot-assisted s eminal vesicle mass excision. Most cases of SV tumors reported in published studies were managed with open surgical approaches. However robotic approach can be safely considered the reference standard treatment for tumors of seminal vesicles, because they combine a minimally invasive approach with optimal surgical, oncologic, and functional outcomes.

Case Presentation

A 70-year-old patient had been referred to our centre for sudden onset breathlessness, dyspnoea on exertion with lower urinary tract symptoms. Patient was a k/c/o hypertension, diabetes mellitus, ischemic heart disease post angioplasty, chronic kidney disease with acute exacerbation of COPD. In view of recurrent urinary retention and left hydroureteronephrosis, the patient was evaluated and USG showed a well-defined solid-cystic lesion postero-lateral to the urinary bladder, compressing the left lower ureter with proximal hydroureteronephrosis. The digital rectal examination revealed a tense mass with undefined boundaries, cranially to the prostate. CT urography suggested an enhancing solid-cystic mass, measuring 10x9x7cm, arising from the left seminal vesicle indenting the bladder and left ureter with resultant left hydroureteronephrosis.

A MRI scan confirmed the origin to be from seminal vesicle with maintained surrounding fat planes.

Management – After optimization of the patient, he was scheduled for robotic-assisted seminal vesicle mass excision. A cystoscopic placement of left ureteric



catheter was unsuccessful because of the huge mass indenting over the bladder and compressing the ureteric orifice. Robotic dissection was proceeded with posterior approach. The left ureter appeared stretched over the mass. The biggest challenge was a limited space for dissection. Because of the large mass initial dissection and retraction were difficult hence the fluid content was aspirated in controlled manner without spillage. The crumpled wall was used for retraction and left ureter and bladder were gently separated from the mass. Bladder leak test revealed no leakage. Specimen was bagged and removed via small Pfannensteil incision. After confirmation of haemostasis and instruments count, closure was done. Console time was 190 mins and the estimated blood loss was 100ml. The postoperative course was uneventful. In spite of multiple co-morbidities, old age and prolonged surgery, the patient recovered well and was discharged on the fourth postoperative day. At the last follow-up examination, the patient was free of symptoms with a complete preservation of continence.

Conclusion

Seminal vesicle tumors, especially the large ones, are challenging in view of the space constraint in pelvis. Robotic approach makes it safe and feasible, even in old patients with multiple comorbidities, with good benefits in terms of surgical and functional recovery.

Management of Urological Complications in a Renal Transplant Recipient Using Robot-Assisted Laparoscopy: A Case Report

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Abstract

We present a case of a 51-year-old female patient from Oman, a homemaker by occupation, who presented with right lower abdominal pain seven months after undergoing renal transplant recipient surgery at another facility. The patient experienced difficulty in micturition following graft kidney DJ stent removal, leading to subsequent restenting and graft kidney nephrostomy. Imaging upon admission revealed a dilated pelvicalyceal system of the transplant kidney, and a comprehensive pre- surgical evaluation resulted in a multidisciplinary approach.

Methods

The patient underwent cystoscopy, graft kidney double J stent removal, and a robot-assisted laparoscopic transplant kidney pelvic-cystostomy. Additionally, double J re-stenting was performed to address a narrowed transplant kidney ureter.

Results

Post-surgery, the patient was closely monitored in the ICU, with advice from the nephrology team for immunosuppression. After four days, the patient was shifted to the ward and subsequently discharged. The nephrostomy tube was removed ten days post-procedure, and the urethral catheter was removed three weeks post-procedure. A follow-up cystoscopy, combined with the removal of the graft kidney DJ stent, was performed six weeks after the initial procedure.

Conclusion

This case highlights the successful management of urological complications in a renal transplant recipient using a comprehensive, multidisciplinary approach that incorporated robot-assisted laparoscopy. The patient's postoperative recovery and the sequential removal of catheters were uneventful, demonstrating the efficacy of this approach in addressing complex urological challenges in transplant recipients.

Robotic Radical Cystectomy with Intra-Corporeal Urinary Diversion: Time to Extend Benefits of Minimally Invasive to Complex Cases

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Keywords

Urinary bladder cancer, Robotic radical cystectomy, Intra-corporeal ileal conduit, ntra-corporeal urinary diversion.

Introduction

Radical cystectomy has remained surgical standard of care for muscle invasive bladder cancer. The procedure involves removal of whole of urinary bladder after ligation of pedicles, removal of bilateral pelvic lymph nodes according to template and creation of urinary diversion (preferably from small bowel) in the form ileal conduit or neo-bladder formation. This surgery is considered one of the most complex surgeries in the field of urological cancers and often takes 4-5 hours to complete. It has been classically performed in open manner and is associated with slow prolonged recovery and various risks. With the advent of robotic technology in near past, this complex procedure is also performed robotically at some selected centres across world. We here share our experience of starting a program which includes robotic radical cystectomy at our centre.

Cases Details

We share a case series of 5 patients who all were diagnosed to have muscle invasive bladder cancer. Among these 5 patients, 2 received neo-adjuvant chemotherapy, 1 was ineligible for cisplatin due to raised creatinine and 2 opted for upfront surgery. These 5 patients (all males) underwent robotic radical cystectomy from June 2023 to September 2023. Surgery included removal of bladder, lymph nodes and creation of ileal conduit intra-corporeally. Age group was between 55-78 years. Average console time was 325 minutes for whole surgery and blood loss was 220 ml. All patients spent 1-2 days in speciality ICU after surgery and later were shifted to ward. Median Post op stay was 6 days and median return of bowel function was 4

days. Final pathology report showed transitional cell carcinoma in all cases with negative margins and adequate lymph node dissection.

Figure 1: Bladder CT scan

Figure 2: Bladder specimen

Surgical Methodology

Patient were kept in supine position and Trendelenburg of about 25 degrees to allow bowel to drop down from pelvis. Initial dissection starts at level of crossing of ureter to iliac vessels. Adequate space created behind sigmoid mesentery to allow left ureter to traverse to right side. Then both ureters slowly dissected down to urinary bladder and bladder pedicles are exposed. Meticulous posterior dissection performed to create

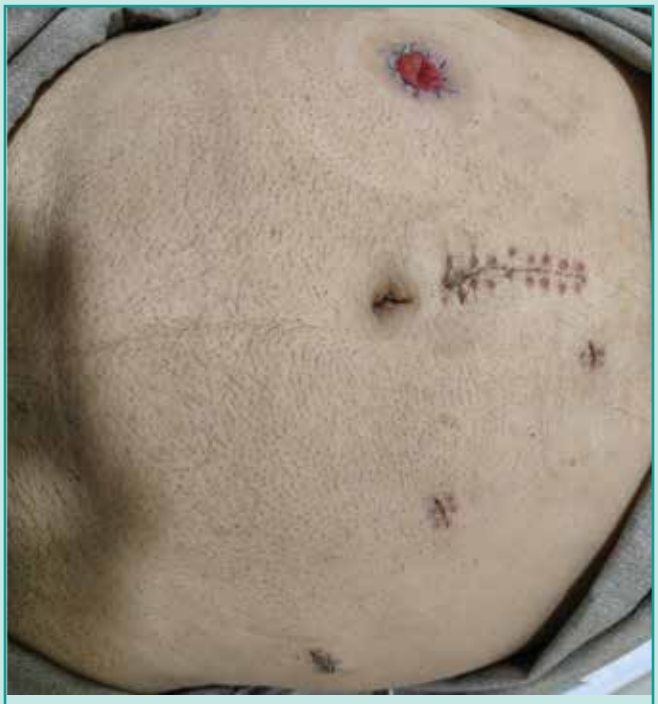

Figure 3: Cystectomy

Figure 4: Cystectomy wound

plane between bladder and rectum. Postero-lateral pedicle ligation done with hem-o-lok clips and harmonic. DVC cut and sutured with V-Loc 3-0 suture. Extra care is taken to clip urethra before dismantling to avoid any tumour spillage in abdominal cavity. Bilateral standard pelvic lymph node dissection performed. 15 cm of ileum taken about 20 cm proximal to ileo-caecal junction and ileal conduit segment taken with endo-GI bowel staplers. Ileo-ileal anastomosis also performed with staplers. Further, both ureters anastomosed to proximal end of ileal conduit with monocryl 4-0 suture over 6 Fr stent. Stoma completed with Vicryl 3-0 sutures.

Discussion and Conclusion

Robotic radical cystectomy is a complex surgery and is performed at very few centres. We have started performing this surgery in last few months with very exciting results. Overall recovery has become very fast with lower blood loss and hospital stay. Also, post-operative pain is significantly better compared to open surgery. To conclude, I will say that it is now time to extend the benefits of minimally invasive procedures to even complex surgeries without hesitation in skilled hands.

Robotic-Assisted Laparoscopic Partial Nephrectomy in a Complex Case of Clear Cell Carcinoma with Horse-Shoe Kidney Anomaly: A Clinical Showcase

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Patient Presentation

A 54-year-old homemaker residing in Bangalore, presented with a history of upper abdominal pain. Upon evaluation, the case revealed a horse-shoe kidney with a suspicious lesion in the left upper moiety.

Diagnosis and Imaging

Ultrasound examination raised concerns about the left upper moiety, prompting further investigation. Contrast-enhanced computed tomography (CECT) of the abdomen and pelvis unveiled a horse-shoe kidney with mal-rotated right and left moieties fused through a parenchymal isthmus at their lower poles anterior to retroperitoneal vessels. Notably, a partially exophytic, heterogeneously enhancing, space-occupying lesion measuring 3x2.8x2.9 cm emerged from the upper pole of the left moiety. The lesion exhibited washout on the delayed phase. Fortunately, perinephric fat and Gerota's fascia appeared normal.

To further confirm these findings, FDG PET CT was performed, validating the CT results without significant renal hilar or retroperitoneal lymphadenopathy. Notably, no abnormal enhancing or FDG avid lesions were detected in the brain, lungs, liver, or skeleton.

Treatment

Following pre-surgical evaluation, approval from the physician and anaesthesia team, the patient underwent a comprehensive procedure. This included cystoscopy, left retrograde pyelogram (RGP), left double J stenting, and robot-assisted laparoscopic left partial nephrectomy.

Mrs. X remarkably withstood the procedure and was subsequently transferred to the Intensive Care Unit (ICU) for postoperative observation and care. She transitioned to the ward on postoperative day 1 and was discharged three days later.

Pathological Insights

The histopathology report provided valuable insights, identifying clear cell carcinoma with an International Society of Urological Pathology (ISUP) nuclear grade of 2. Importantly, the report indicated free parenchymal cut margins and an uninvolved hilar lymph node, leading to a pathological stage classification of pT1aN0.

Follow-up Intervention

Four weeks post-surgery, Mrs. X underwent cystoscopy along with the removal of the left double J stent, marking a crucial step in her ongoing care. This clinical case not only highlights the complexities associated with horse-shoe kidney anomalies but also underscores the successful management of clear cell carcinoma through a meticulously planned and executed robotic-assisted laparoscopic partial nephrectomy. The patient's journey showcases the collaborative efforts of various medical disciplines, ensuring a comprehensive and effective approach to diagnosis, treatment, and recovery.

Multi-Quadrant Robotic Surgery for a Rare Case of Bilateral Pheochromocytoma with Pre Sacral Paraganglioma

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Introduction

In earlier times, open surgery was the only surgical option for adrenal lesions but after the first successful laparoscopic adrenalectomy in 1992, minimally invasive surgical techniques have taken over as the gold standard surgical option for functional and non-functional adrenal lesions with reported masses up to 11–12 cm in size, except for malignant tumors potentially infiltrating surrounding organs. Robotic approach was first described in 1999 and since then has become widely accepted surgical option in view of the shorter length hospital stay, lower blood loss and minimal morbidity.

Robotic technique offers advantages like stereoscopic 3D-magnified vision, additional degree of freedom by means of multi-articulated robotic arms with Endowrist technology, and a stable camera all of which was deficit in laparoscopic surgeries. Also with robotic approach the natural hand tremor is eliminated and the position is more ergonomic, thanks to a comfortable sitting.

All these factors played a vital role which helped us to perform this rare and difficult surgery in a single sitting with minimal morbidity even when the disease involved 3 different quadrants of abdomen.

Case Summary

A 14 year-old male patient, without any comorbidities, who was under evaluation of phimosis was detected to have elevated blood pressure.

Clinically no other positive findings were found.

Imaging studies were done to evaluate the cause of hypertension in a young male who had positive family history of pheochromocytoma (Mother had phechromocytoma).

Imaging studies showed Bilateral adrenal mass with presacral paraganglioma.

After necessary workup he was diagnosed bilateral pheochromocytoma (functional) with pre sacral paraganglioma.

In view of his young age he was planned for a Bilateral Cortical sparing adrenalectomy with excision of pre sacral extra adrenal pheochromocytoma / para ganglioma. This was decided as it would prevent the need of lifelong steroidal and hormonal supplements.

Challenges

- Apart from the routine challenges of cortical sparing pheochromocytoma one unique aspect here was operating bilaterally along with a right pre sacral mass.
- As it was multi-quadrant surgery, the ports for excision of all three mass had to be different.
- Hence, after proper planning the port placement was made in such a manner that we could perform the surgery using minimum ports by maximizing the use of same ports for all three sites.
- This figure shows the ports used for left pheochromocytoma and right pre sacral mass excision as they were in diagonally opposite quadrants.
- This figure shows the ports used for right phechromocytoma excision.
- This figure shows the common ports that were used to minimize excess port placement.
- Final port placement
- For each quadrant surgery, although the ports used could be same, the position of the patient and robotic arms had to be changed.
- The robot had to be undocked and re-docked for each quadrant.
- One of the main advantage of Da Vinci Xi robot is the ability to adjust the robot boom distance and direction which allows such complex surgeries to be performed.

Conclusion

With the advent of Robotic surgeries it is now possible to do such complex multi-quadrant surgeries in one sitting with minimal patient morbidity. The advantages of the robotic system like increased dexterity, 3-D magnified vision, tremor-filtering technology, use of Indocyanine green fluorescence imaging and fine movements with minimal tissue insult has made a huge difference in better patient outcome in terms of surgical results along with smoother post operative recovery.

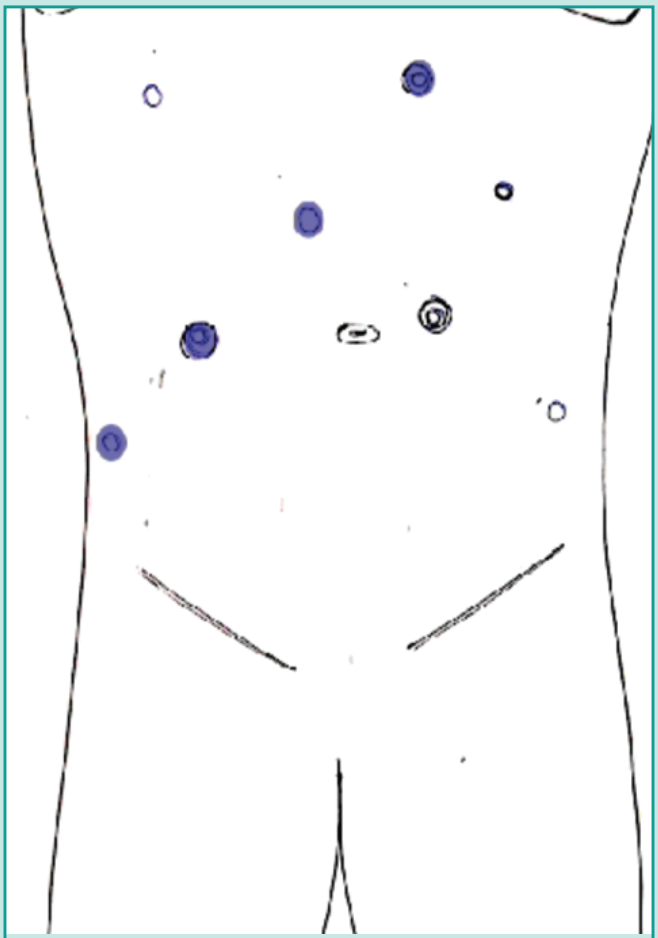

Figure 1: figure shows the ports used for right phechromocytoma excision

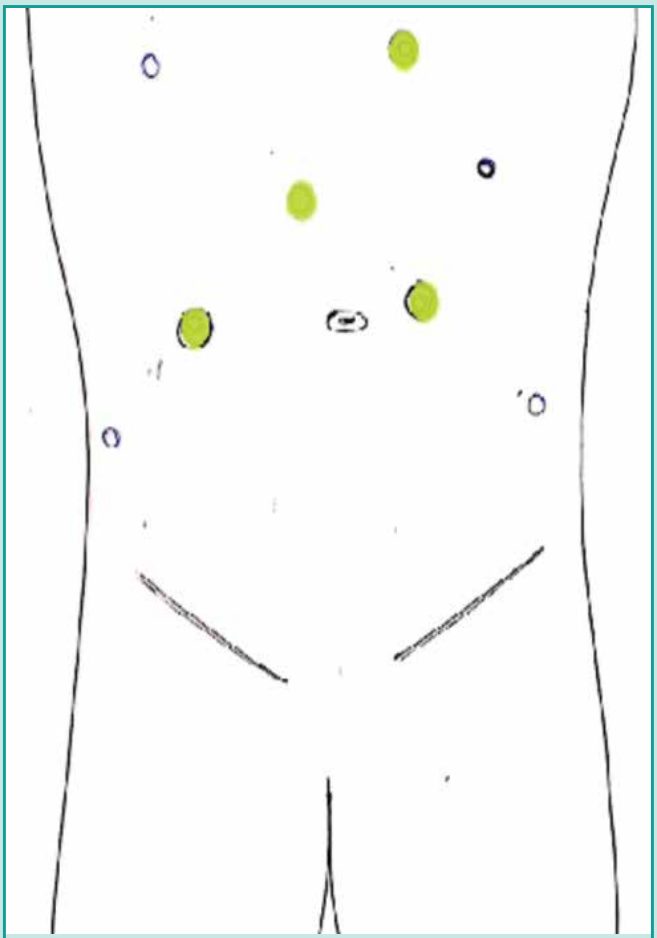

Figure 2: The common ports that were used to minimize excess port placement

Figure 3: The final Port placement

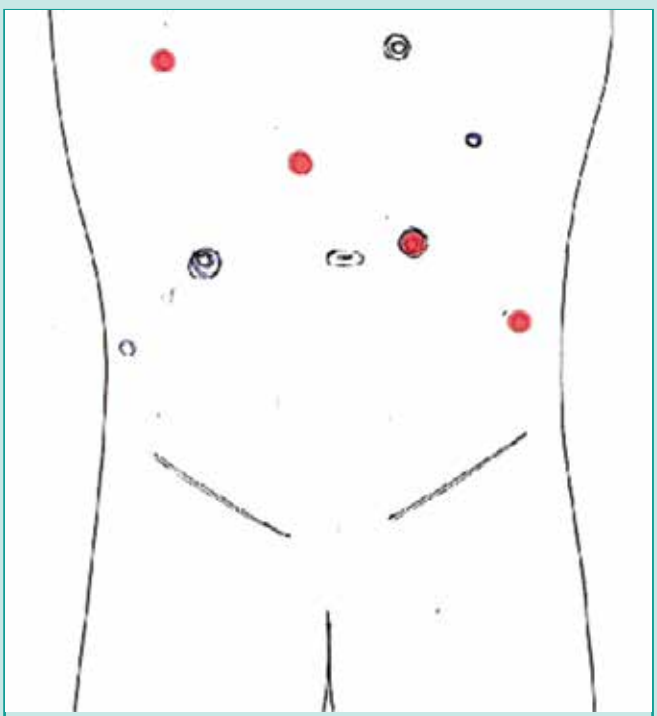

Figure 4: The ports used for left pheochromocytoma and right pre sacral mass excision as they were in diagonally opposite quadr

Robotic Paediatric Urologic Surgery

Paediatric Robotic Assisted Kidney Transplant

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Introduction and objective

Many studies have shown the feasibility of Robotic assisted kidney transplant in adult patients with graft function on par with open surgery while retaining the advantages of minimally invasive procedure. There are fewer reports of this procedure in paediatric age group. Here we assess the feasibility of the same in a paediatric patient.

Methods

The patient is a 12 years old girl with ESRD due to Lupus nephritis, on haemodialysis since 1 year. Donor is the mother, left kidney harvested by laparoscopy. Four 8mm robotic ports and one 12mm assistant port were inserted. External and common iliac vessels were dissected. Bladder mobilisation done. 5cm pfannelsteil incision made and a hand port placed. Kidney inserted through handport after being wrapped in an ice jacket to maintain cold ischemia. Renal vessels were anastomosed to common iliac vessels which were clamped with bulldogs. Artery and vein anastomosis completed with 6-0 PTFE suture. Bulldogs were released and brisk urine output observed.

Results

Cold ischemia time was 40 min. Total operative time was 180 min. Estimated blood loss was around 200ml. Post-operative pain scores and analgesic usage was minimal. Patient was mobilised on postoperative day 1. Serum creatinine at the time of discharge was 0.6 on postoperative day 5.

Conclusion

In properly selected patients, benefits of minimally invasive surgery can be provided to paediatric age group recipients of kidney transplants. Anastomosis to common iliac vessels with robotic assistance in paediatric patients is feasible and safe.

Precision Surgery in Paediatric Urology: Robot-Assisted Pyeloplasty for Gross Hydronephrosis in a 1-Year-Old

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Abstract

We report the case of a 1-year-old male child from Oman with a history of recurrent urinary tract infections. Radiological evaluation, including CECT abdomen and pelvis, revealed an enlarged right kidney with gross hydronephrosis. The imaging further indicated diffuse cortical thinning measuring approximately 0.3-0.4 cm in thickness. A prominently dilated extra renal pelvis was observed, and notably, the right ureter remained un-visualized during the 30-minute scan. Further investigation, including an Ethylene Cysteinate (EC) diuretic renogram, showed normal sized left kidney with good function and no obstructed outflow tract. However, it confirmed obstructed outflow and markedly impaired function in the affected kidney, indicative of Pelvi-Ureteric Junction Obstruction (PUJO). Additionally, delayed sections could not be performed due to the child's restlessness, a symptom indicative of significant hydronephrosis secondary to Pelvic-Ureteric Junction (PUJ) obstruction. Following pre-surgical evaluation and approval from the paediatrician and anaesthesia team, the patient underwent a successful robot-assisted laparoscopic right pyeloplasty, along with right DJ stenting to address the narrow right PUJ.

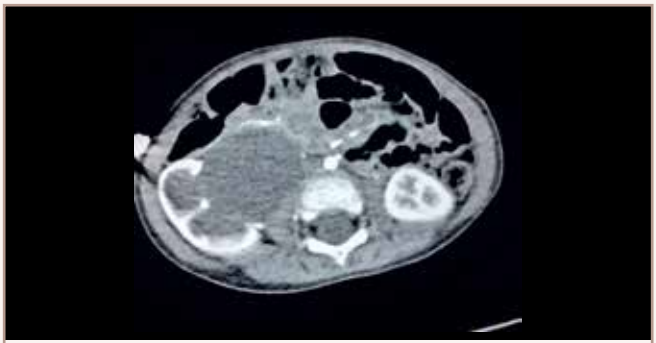

Figure 1

Figure 2

Results

Post-surgery, the patient was carefully monitored in the paediatric surgical ICU and shifted to the ward on Postoperative Day 1. The drain and Foley catheter were removed on Postoperative Day 2, and the patient was discharged. A follow-up cystoscopy, combined with the removal of the right DJ stent, was performed six weeks after the initial procedure.

Conclusion

The case demonstrates successful resolution of gross hydronephrosis in a 1-year-old male through a minimally invasive approach, specifically robot-assisted laparoscopic pyeloplasty. The timely intervention and multidisciplinary collaboration led to a favourable outcome, emphasizing the effectiveness of this approach in managing paediatric PUJ obstruction.

Robotic Surgical Oncology

Robotic-Assisted Beast-Axillo Insufflation Thyroidectomy (RABIT): A Retrospective Case Series of Thyroid Carcinoma

Source: Nayak SP, Sadhoo A, Gangadhara B, Reddy S, Khan A, Munisiddaiah D, Ramakrishnan A. Robotic-assisted breast-axillo insufflation thyroidectomy (RABIT): a retrospective case series of thyroid carcinoma. Int J Clin Oncol. 2020 Mar;25(3):439-445. doi: 10.1007/s10147-019-01568-x. Epub 2019 Oct 31. PMID: 31667663.

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Abstract

Objective: To evaluate the feasibility and safety of robotic-assisted breast-axillo insufflation thyroidectomy (RABIT) for differentiated thyroid cancer.

Methods

In this retrospective case series, patients with differentiated thyroid carcinoma were enrolled in our hospital from Jan'18 to Dec'18. All patients underwent indirect laryngoscopy to assess the status of vocal cord preoperatively. RABIT was performed with five separate breast-axillo incisions. All procedures were performed using Da Vinci Robot, using CO2 insufflation.

Results

Twelve patients completed RABIT, in which one case needed conversion to open thyroidectomy. The mean age was 30.25±7 with male to female ratio being 1:1. Preoperative diagnosis showed papillary carcinoma (n=9) and follicular neoplasm (n=3). The mean operative time for RABIT was 140±50.45 min and average blood loss during surgery was 22.92±9 mL. Mean hospital stay was 4.42±1.08 days. Final pathology confirmed classical papillary thyroid carcinoma (n=10; 83.3%) and follicular variant of papillary carcinoma (n=2; 16.7%). None of the cases reported injury or paralysis to the recurrent laryngeal nerves.

Conclusion

RABIT is a safe and feasible approach for thyroidectomy. It has several advantages in that it provides similar symmetrical view to conventional open surgery and enables to maintain specimen integrity and use of assistant port permits better handling of the gland. Additionally, the largest operating angles with this technique prevent collision between the robotic arms and provide excellent cosmetic satisfaction due to very small, five separate breast-axillo incisions.

Robotic Sphincter- Saving Surgery for Low Lying Rectal Cancer Avoiding Permanent Stoma Bag

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Case Details

- 71-year-old male patient presented with bleeding per rectum, changes in bowel habits and loss of appetite since last 3 months.
- On investigations further with Colonoscopy, MRI scan and PET Scan he was diagnosed to have stage 3 low lying locally advanced rectal cancer. Biopsy was Adenocarcinoma.
- He was started with combined radiation therapy and chemotherapy (NACTRT) to shrink the tumor and make feasible for sphincter saving surgery.
- He was reassessed with MRI scan and planned for surgery 6 weeks after completing NACTRT.

Treatment

Following discussions with the Tumour Board, there was a good response to NACTRT and **Robotic sphincter saving surgery (Ultra Low Anterior Resection)** was planned for the patient.

It was a complex surgery which included rectal cancer removal (Total Mesorectal Excision – TME) ensuring tumor free distal margin with removal of the local lymph nodes. The surgery took around 6 hours. After the tumor was removed, ends of large intestine and anal canal were joined (anastomosis) **avoiding permanent stoma bag.** The **Patient** had a smooth post-operative recovery, started walking on Day 1 of surgery, resumed oral feeds on Day 2 and was discharged 5 days after the surgery on 3rd March this year. He has completed his adjuvant chemotherapy and is leading a normal life today.

Discussion on the treatment

Low lying Rectal cancer (within 5 cm from anal verge) surgery is challenging owing to its location within the pelvis especially in males/high BMI patients and relation to adjacent important structures including anal sphincter which controls the passing of stools. The case attains significance as rectal cancer is one of the commonest GI cancers in the country and permanent stoma bag after surgery is a major concern for majority of patients.

Keyhole surgeries (laparoscopic and robotic) have been used extensively in rectal cancer (large intestine) surgeries worldwide. The general advantage of these surgeries as compared to open surgery include lesser pain, small scars on abdomen and early resumption of normal activities.

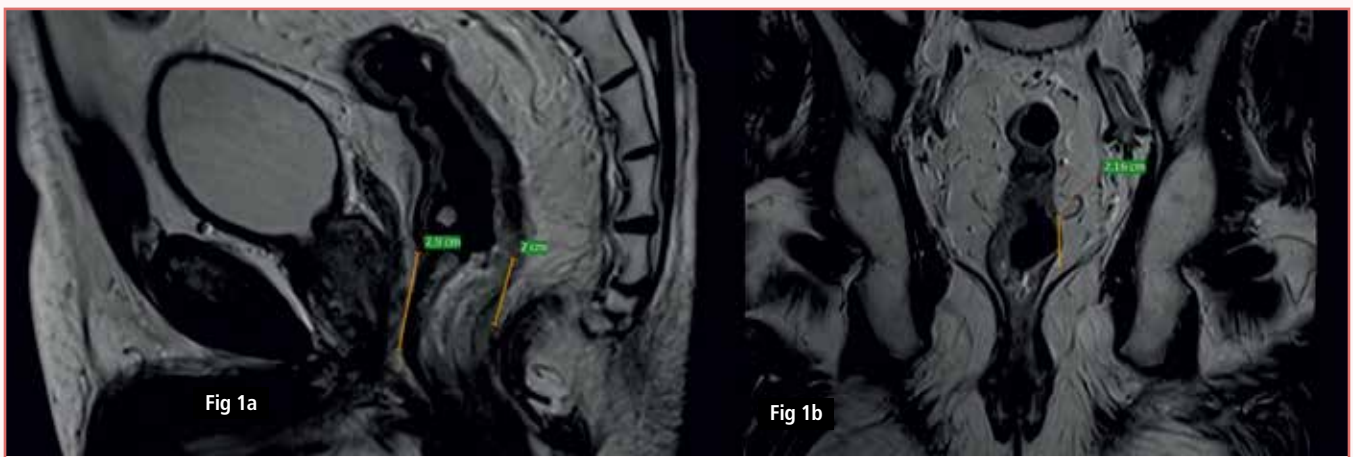

Fig 1a & 1b: MRI films (Sagittal and Coronal cuts) showing low lying rectal cancer close to anal sphincter complex

The latest Robotic surgery systems (Da Vinci Xi) can improve surgical precision using wristed instruments with seven degrees of freedom (wrist like movement) and a stable three-dimensional (3D) better vision for the surgeon to perform rectal cancer surgeries and allows us to preserve the anal sphincter (avoiding permanent stoma bag); preserve nerves which supply the urogenital organs which can allow these patients to have a good urinary and sexual function after surgery.

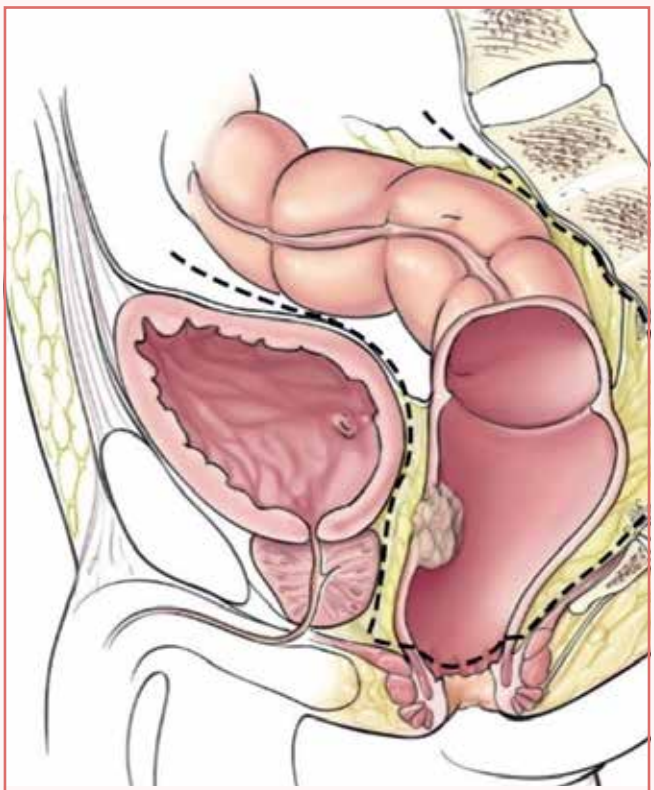

Figure 2: Pictorial diagram of sphincter preserving surgery - ultralow anterior resection for carcinoma rectum ensuring negative distal and circumferential margins.

Figure 3: Surgical Specimen of Ulta low anterior resection with Total mesorectal excision (TME) showing negative distal margin (1.5cm)

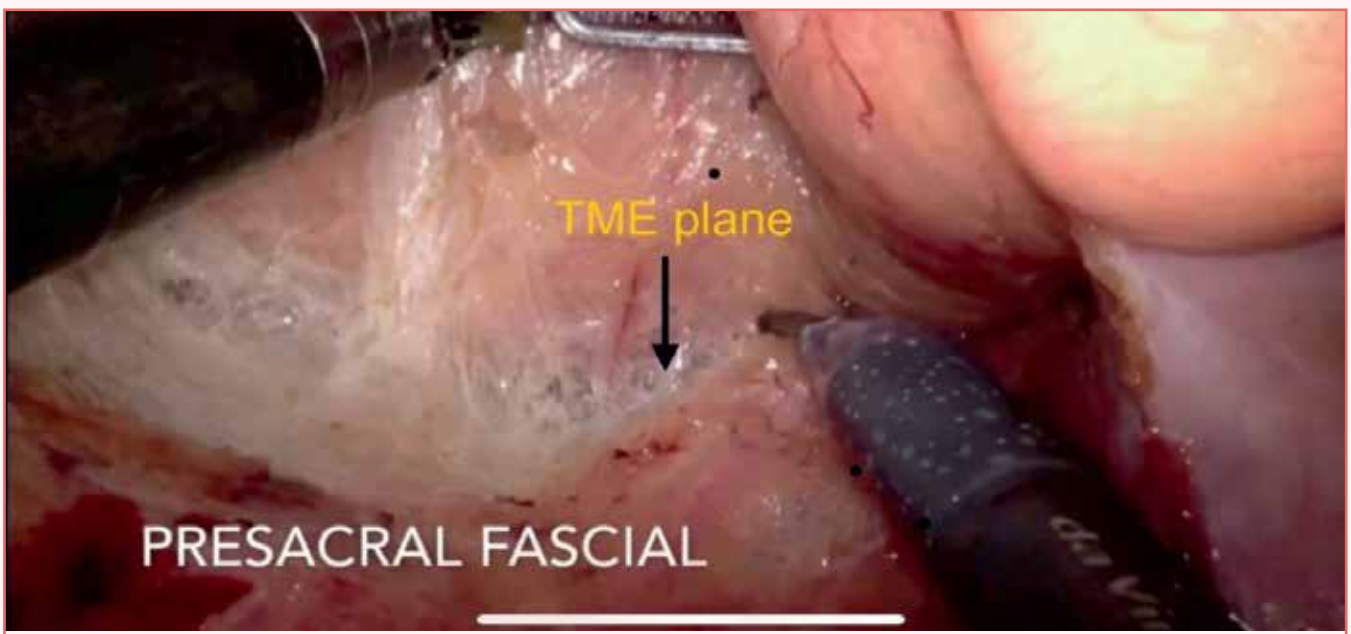

Figure 4: Robotic pelvic phase of dissection showing excellent magnified view with wrist like movement of longer robotic instruments makes surgical dissection more precise and ensures less blood loss.

Experiences and Opinions
on Robotic Assisted Surgery

Successful Robotic Assisted Surgery Program at Fortis Hospital, Mohali

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Head - Strategic Business Unit
Fortis Hospital, Mohali

Fortis Healthcare has been at the forefront of introducing newer therapies and associated technologies in the country and we were fortunate to be a part of the DaVinci surgical robot roll-out programme. It is one of the most significant developments in the field of medical science and has led to very promising surgical outcomes. It has been a boon to our patients, particularly in specialties like Urology, Oncology, Gynaecology, ENT and Kidney Transplant. Fortis Hospital Mohali boasts of India's most advanced 4th Generation robotic machine - Da Vinci Xi - and the facility has made remarkable progress by successfully conducting 183 robot-assisted surgeries in the last quarter.

Robot-assisted surgery is the latest form of minimally invasive surgery and has become a gold standard for many surgical procedures, especially in the fields of Urology & Gynaecology-Onco surgery. At Fortis Hospital Mohali, our expert team of surgeons in both specialties have been very efficiently running the robotic programmes and have achieved a new milestone every month. Under the Uro-Robotic Campaign, 38 robot-assisted surgeries were successfully conducted, of which 19 were for prostate problems. Robotic Surgery has also been the biggest revolution in the management of gynaecological problems like endometriosis, gynaecological cancers, fibroids, cysts etc. Benefits like increased precision, minimal scarring and post-operative pain relief are unique to it. Under the #SaveTheOvaries #SaveTheUterus campaign, a lot has been done around organ-saving robotic surgeries for endometriosis, fibroids and cysts, giving women a chance to be disease-free without having to sacrifice their womanhood. While the Department of Gynaecology has performed 98 robot-assisted surgeries, 6 were conducted by the ENT Department and 41 by the Oncology & General Surgery teams.

Robot-assisted Surgery has become the need of the hour. Today, we are able to discharge patients on the same day of surgery or within 24 hours. Even for the most complicated of onco-surgeries, which require several days of ICU stay, we were able to reduce it to a day, followed by a swift discharge within 3 or 4 days. As the demands of patients today are not just limited to becoming disease-free but being treated in the most efficient way, such state-of-the-art medical service can be rendered through robotic surgery. It provides a 3D view of the operative field via a special camera inserted into the patient's body. Parts of the body that are difficult to reach with the human hand can be accessed by robot-assisted arms that can rotate 360 degrees. The additional feature of reducing tremors or jerks not only makes the surgery ever more precise, it also increases the operating life of a surgeon. Patients have minimal blood loss, less scarring, and faster recovery.

We are delighted to receive positive feedback from our patients. It assures us that we are on the right track in terms of clinical excellence and keeping up with technological advancements. We believe that patient satisfaction is a testament to our commitment to provide the best possible care and services.

Robot Assisted Surgery in Urology: Expanding the Horizon

Dr Anil Mandhani
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The integration of robotic interfaces and artificial intelligence is poised to revolutionize the field of surgery across various specialties. Initially introduced and FDA-approved in Urology with the DaVinci robot, this technology has since been embraced by a multitude of medical disciplines for diverse applications, offering the advantages of minimally invasive procedures. As the number of companies producing surgical robots continues to grow and costs decrease, it becomes the responsibility of surgeons to shape the future of technological advancement for the genuine benefit of patients, transcending commercial motivations.

Common urological procedures performed worldwide include radical prostatectomy, partial nephrectomy, nephroureterectomy, and radical cystectomy, which have firmly established their suitability for robotic assistance. However, emerging applications such as donor nephrectomy and kidney transplant surgery are still in the process of gaining recognition.

There are scenarios in which the judicious use of robotic interfaces can enhance surgical precision and potentially lead to superior outcomes. In cases where the surgical steps are complex and challenging to execute through open or laparoscopic techniques, robots can offer a convenient solution for accomplishing these tasks with greater ease.

We have successfully performed four such surgeries where the robotic approach clearly outperformed the open surgical approach, expanding the spectrum of indications for robot-assisted surgery.

1. Robot assisted neourethra reconstruction for total incontinence
2. Pelvic fracture and posterior urethral distraction defect
3. Lateral approach for inguinal block dissection in carcinoma penis.
4. complex vesicovaginal fistula

1. Robot assisted neourethral reconstruction

A young woman experiencing her first childbirth encountered obstructed labor, leading to the complete loss of her urethra, with the bladder neck directly opening into the vagina. Given the compromised health of the anterior vaginal wall, a comprehensive reconstruction was essential, and the bladder was deemed the most suitable organ for the procedure. The Tanagho procedure, outlined to craft a neourethra using the anterior bladder wall, was employed. Opting for a robotic approach provided superior magnification, enabling precise tube reconstruction with the incorporation of the anterior bladder wall. A neo meatus was formed and a sling procedure was done to increase the continence. (refer to Fig. 1). Six months post-surgery, the patient expressed satisfaction with the outcome. Notably, a video detailing this case was accepted for presentation at the 2020 European Urology Conference.

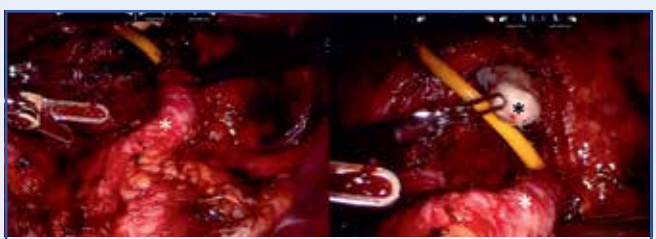

Figure 1: A 5 cm tube was formed from the anterior bladder wall (white Asterisk) and brought out through the neo-meatus seen a finger coming in (black Asterisk)

2. Posterior urethral distraction defect and urethroplasty

In cases of membranous urethral disruption resulting from a pelvic fracture, the conventional procedure involves performing an open end-to-end anastomosis. This often requires an inferior pubectomy or the adoption of a transpubic approach. However, due to the invasiveness of this method, achieving precise mucosa-to-mucosa approximation and ensuring proper suture placement can be challenging, thereby impacting the overall outcome. The use of robotic technology allows for enhanced access to the perineal depth, facilitating a more effective mucosa-to-mucosa anastomosis. (Fig. 2 and3)

Given the limited global cases performed using this approach, a comprehensive long-term analysis of the results would be intriguing to explore.

Figure 2: Surface robot use: a new paradigm in urethroplasty for posterior urethra distraction defect.

Figure 3: Suture being placed at the posterior urethra at almost the apex of the prostate seeing the mucosa (white Asterisk)

3. Lateral approach to robot assisted inguinal block dissection for carcinoma penis

In patients with carcinoma penis, inguinal block dissection is conventionally done with an open surgery, which involves complications of flap necrosis prolonging the misery of the patients. Robotic assistance reduces this complication significantly. in standard approach for robot assisted inguinal lymphadenectomy (RAIL), camera port is placed in the line of apex of femoral triangle, which often leads to difficulty in finding correct planes. We modified this approach by placing the ports laterally. (Fig. 4) As the fascia lata is thickest laterally, lateral approach helped in identifying correct planes to facilitate anatomical dissection with oncologic safety. The robot (da Vinci SI) was docked from the opposite side. Dissection was done from lateral to medial side. This video detailing this case was accepted for presentation at the 2020 European Urology Conference.

Figure 4: Lateral approach was useful in identifying the correct plane of superficial and deep inguinal lymph nodes.

4. Complex vesicovaginal fistula

A 38-year-old African woman sought the expertise of a Gynecologic Oncologist due to vaginal bleeding and the presence of a mass in her vagina. Despite undergoing pelvic MRI and PET CT scans, the diagnosis remained unclear, as the lesion exhibited non-enhancing characteristics and a signal void on MRI. Consequently, she was referred to our facility.

Upon examination, we suspected the presence of a large stone in the vagina, particularly since she had previously undergone sling surgery for incontinence in her hometown. A CT scan confirmed our suspicions, revealing a substantial vaginal stone thatwas eroding through the bladder, forming a dumbbell-shaped structure connecting the vagina and bladder. (Fig. 5,6)

Due to inflammation in the vagina, a transvaginal approach was deemed unfeasible. The initial step involved transvaginal lithotripsy to remove the vaginal portion of the stone. Subsequently, employing a robotic approach, we reconstructed a large vesicovaginal fistula at the bladder neck. This involved closure and omental interposition, along with a sling surgery to address continence issues. The patient's recovery was successful, achieving full continence following the procedure.

Figure 5: MRI and CT films show a dumbbell shaped stone and vesicovaginal fistula.

Figure 6: Cystoscope is coming through vagina at the large defect at the bladder neck

Concluding remarks

Although robots have taken over certain roles in various industries, in the medical field, it is the human—the surgeon - who manipulates the robot to execute specific surgical procedures. Consequently, given that the surgeon remains the commander in the surgical arena, the application of robotic technology should be investigated for cases that prove challenging to address through open or laparoscopic surgery.

Our Experience of Robotic Surgery so Far Over A Period of One Year

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Fortis Hospital, Shalimar Bagh

Dr Nitish Jain

Senior Registrar - GI Surgery
Fortis Hospital, Shalimar Bagh

Surgical robotics is a new technology that holds significant promise. Robotic surgery is often heralded as the new revolution, and it is one of the most talked about subjects in surgery today. Robotic surgical systems are rapidly entering international clinical practice. Robotic surgical systems have been in development since 1950s; however, they were more broadly adopted in 2000 when Intuitive Surgical entered the clinical market with the daVinci system. There have been thousands of articles published on robotic surgery. Literature review will demonstrate that the vast majority of these studies focus on a specific procedure or surgical specialty, with the purpose of establishing safety, feasibility, and economics of the robotic procedure compared to an open or laparoscopic approach. There have been few studies that have looked at robotic surgery from a programmatic standpoint. Reviewing a robotic surgery program as a whole has advantages over reviewing specific operations individually. While looking at individual operations, some robotic operations are more expensive, have longer length of stay, or higher readmission rates compared to equivalent open or laparoscopic operations, while some robotic operations show an advantage over traditional platforms.

Our institution, the Fortis hospital Shalimar Bagh, New Delhi, acquired our first da Vinci robotic surgical system in November, 2022. As we reached one years of having an established robotic program, we performed a review of the evolution of robotic surgery at our institution. This study will look at over one years of robotic surgery data from a single academic institution. This study will give a picture of the robotic program as a whole, and show how the program has grown and changed over time.

Before the establishment of robotic platform in our center, we were routinely performing very basic laparoscopic surgeries like laparoscopic cholecystectomy

laparoscopic appendectomy , laparoscopic hernia repair (IPOM plus) to more advanced laparoscopic surgeries like laparoscopic hiatal hernia repair with fundoplication , laparoscopic resection anastomosis of bowel, laparoscopic sigmoid and peritoneal vaginoplasty , laparoscopic radical cholecystectomy, laparoscopic radical gastrectomy, laparoscopic right and left radical hemicolectomy , laparoscopic abdominoperineal resection, laparoscopic Whipple's pancreaticoduodenectomy, laparoscopic thoracoscopic esophagectomy etc.

It is a valuable skill for a trained laparoscopic surgeon as trained robotic surgeon. For this our team has underwent education and training, simulation and practice, after enrolling in formal training programs specifically designed for robotic surgery and by using surgical simulators. Robotic surgical systems require the learning of new skills in docking, instrument use and in-console operating, particularly with adaptation to the loss of tactile feedback present in laparoscopic or open surgery and our team has proficiently overcome all these by intuitive training programs.

Because of apprehension for the new modality in our institution, we started our robotic journey from very basic surgeries so as to get familiarize with intuitive wristed movements, three- dimensional vision, dexterity skills and loss of tactile feedback. For this we started our journey with robotic cholecystectomy. The patients were selected according to criteria currently used for laparoscopic surgeries. This procedure was chosen for initial learning curve. The mean operative time for initial phase of learning curve was slightly longer. After, gradual acquisition of skills, operative time was gradually decreased.

After getting proficient in basic acquisition in robotic platform, we progressed our journey towards robotic ventral hernia repair. We have done many Robotic assisted ventral hernia repair and inguinal hernia repair with trans abdominal preperitoneal approach (rTAPP). our study showed that there is reduction in the risk of complications related to intra-peritoneal position of mesh and fixating devices, postoperative pain level, material costs and hospital stay of the robotic ventral-TAPP patients are significantly lower compared to lap. IPOM patients.

Double surgical procedures were also performed gradually over a time like robotic cholecystectomy with ventral or inguinal hernia repair, results of which were fairly good.

Gradually we did robotic hiatal hernia repair with robotic fundoplication, results of which were excellent as compared to laparoscopic surgery. As we get more competent in robotic surgeries, we did robotic assisted bariatric surgeries like robotic sleeve gastrectomy and robotic Roux-en-Y gastric by-pass, robotic choledochoduodenostomy, robotic partial gastrectomy for GIST.

We did robotic assisted peritoneal flap gender affirming vaginoplasty which was also the one of the initial cases done by robotic approach in India.

After initial training with basic robotic surgeries, we extended the indications to other procedures including major abdominal surgeries and gastro-oncology procedure like robotic radical cholecystectomy, robotic radical right hemicolectomy, robotic assisted low anterior resection, robotic assisted abdominoperineal resection, resection in Whipple's pancreaticoduodenectomy, robotic pelvic lymph node dissection. All these major surgeries have advantage as compared to laparoscopic approach, in form of enhanced precision and dexterity, better surgeon ergonomics thereby reducing surgeon fatigue during long and complex procedures, improved visualization thereby reducing the chances of leaving behind residual cancer cells, Increased access to difficult- to-reach areas is particularly helpful in tumors that are located deep within the body and are difficult to reach with traditional surgical approaches.

After all these surgeries we have successfully completed fastest hundreds of robotic surgeries in India without any morbidity and mortality.

The one-year success story of robotic surgery at Fortis Hospital Shalimar Bagh, New Delhi is a remarkable achievement. In first year of this journey 281 cases have been done across all specialties out of which 185 cases have been done by our GI surgery team. We are at the forefront of robotic surgery, demonstrating the potential of the da Vinci system to improve patient outcome. With continued innovation and dedication, future prospects of robotic surgeries at FHSB, New Delhi in the field of healthcare as a whole are bright.

Benefits of Robotic Surgery in Urology

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Fortis Hospital, Noida

The field of urology has witnessed remarkable advancements in surgical techniques over the years. One such ground-breaking innovation is the Da Vinci Xi Robotic Surgery system, which has revolutionized the way urological procedures are performed. In this blog post, we will delve into the intricacies of the Da Vinci Xi system and its impact on urology.

The Da Vinci Xi Robotic Surgery system is a state-of-the-art surgical platform that combines advanced robotics, precision instruments, and high-definition imaging to enable surgeons to perform complex procedures with enhanced precision and minimal invasiveness. It consists of four interactive robotic arms controlled by the surgeon, a high-definition 3D visualization system, and ergonomic control console.

Benefits of Robotic Surgery in Urology

1. **Enhanced Precision:** The Da Vinci Xi system provides surgeons with exceptional control, allowing for precise movements and delicate tissue manipulation. The robotic arms filter out hand tremors, enabling accurate surgical maneuvers, especially in intricate urological procedures.
2. **Minimally Invasive Approach:** Robotic surgery in urology offers a less invasive alternative to traditional open surgery. The system's small incisions and slender instruments minimize trauma to surrounding tissues, resulting in reduced pain, decreased blood loss, and quicker recovery times for patients.
3. **Improved Visual Clarity:** The 3D high-definition visualization system of the Da Vinci Xi provides surgeons with an immersive view of the surgical site, offering superior depth perception and enhanced precision. This clear visualization allows for better identification of anatomical structures, reducing the risk of complications.
4. **Reduced Complications:** The robotic system's advanced technology helps minimize the risk of complications during urological procedures. Surgeons can access hard-to-reach areas with greater ease, reducing the likelihood of inadvertent damage to critical structures. Additionally, the system's intuitive interface enhances surgical safety.

Common Application of Robotic Surgery in Urology

1. **Prostatectomy:** Robotic - assisted radical prostatectomy is one of the most common urological procedures performed using the Da Vinci Xi system. The enhanced visualization and dexterity provided by the robotic arms aid surgeons in removing cancerous prostates while preserving surrounding nerves and tissues, thereby improving patient outcomes.
2. **Nephrectomy:** Partial or radical nephrectomy, which involves the removal of all or part of a kidney, can be performed using robotic surgery. The precision and accuracy offered by the Da Vinci Xi system enable surgeons to perform complex kidney surgeries with reduced blood loss and faster recovery times.
3. **Pyeloplasty and Reconstructive Surgeries (Intra-abdominal):**

   Robotic-assisted pyeloplasty, a procedure to correct a blockage between the kidney and ureter, has become increasingly popular. The precise suturing capabilities of the robotic arms facilitate the reconstruction of the urinary tract, resulting in improved patient outcomes.

At Fortis Hospital, Noida; the Da Vinci Xi Robotic Surgery system has undoubtedly transformed the landscape of urological surgeries. Its precision, minimally invasive approach, and improved visual clarity have led to better patient outcomes, reduced complications, and faster recovery times. As technology continues to advance, the future holds even more potential for the integration of robotics and artificial intelligence in urology, ultimately benefiting both surgeons and patients alike.

Role of Robotic Surgery in Gynaecologic Cancers

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Fortis Memorial Research Institute

Dr Rama Joshi

Principal Director and Head - Gynae Oncology
Fortis Memorial Institute, Gurugram
Chairperson, Fortis Robotic Speciality Council

Before we delve into the role of robotic surgery in gynecological malignancies, let us first understand what is this Robotic Surgery. In simple terms, when a computer interface and mechanical arms are integrated between a surgeon and a patient, it is referred to as "robotics." Through the use of three- dimensional (3D) stereoscopic immersion optics, wristed refined instrumentation, and increased 7- degree freedom in instrumental range of motion, this complex technology is able to reduce fatigue and improve surgeon comfort while enabling scaled (1:3) delicate movements with increased dexterity and reduced tremor. Because robotics has made it possible for surgeons to use open surgical methods in a MIS setting, more patients are using MIS, and even complex, older, and obese patients have a decreased conversion rate to laparotomy.

Since the 1980s when the National Aeronautics and Space Administration, better known as NASA, and the Stanford Research Institute developed Robotic Surgical Systems with the intention to do remote surgeries in space, robotic surgeries have come a long way, both in technical refinement and oncological indications. Historically, radical hysterectomy could be performed using either an open or minimally invasive (laparoscopic) surgical technique. The first robotic-assisted gynecologic oncology procedure was performed in 2005 by Sert and Abeler, who reported a case of robotic radical hysterectomy and pelvic lymphadenectomy for cervical cancer, and soon a case-control study of robot-assisted type III radical hysterectomy with pelvic lymph node dissection compared with open radical hysterectomy for early cervical cancer was done by Boggess et al. The first documented robotic-assisted radical hysterectomy in 2005 marked the start of a trend toward a rise in the use of the robotic platform. Based on the National Inpatient Sample (NIS) statistics, 3563 radical hysterectomies were conducted between 2008 and 2015, with robotic and laparoscopic procedures accounting for 27.5% of these procedures. Previous research had shown that less intrusive (laparoscopic or robotic) procedures were linked to lower blood loss, fewer problems, and a shorter hospital stay when compared to an open method. Further analyses had revealed no statistically significant variations in recurrence or mortality rates between robotic-assisted radical hysterectomy and open surgery. Gynecologic oncology has seen a remarkable rise in the use of the Da Vinci robotic platform since its initial approval. The advantages of enhanced ergonomics and cutting-edge equipment are significant factors in surgeon preference, even if the majority of the discussion surrounding the use of robotic surgery has been on its financial viability and the immediate results of the procedure. Uterine, cervical, and more recently ovarian cancers have all been treated by robotic surgery. Most gynecologic cancer surgical operations, such as extra-fascial hysterectomy, radical hysterectomy, radical trachelectomy, pelvic and para-aortic lymphadenectomy staging, debulking procedures, and exenterations, have been documented using robotic techniques.

The reason for increasing acceptance of Robotic surgery is in its manifold advantages. These Advantages of Robotic Surgery may be classified as

1. Common to Minimally Invasive Approach

   a. Reduced hospital stay when compared to conventional open surgical technique.

   b. Improved cosmesis and reduced risk of cellulitis, superficial wound separation, hernia formation requiring mesh, diasthesis, intra-abdominal adhesions with associated discomfort, and small bowel obstruction

   c. Less time to reach postoperative milestones (voiding, ambulation, regular diet, bowel function, pain control, driving, exercise, return to work)

   d. Visualization magnified (less blood loss, fewer blood transfusions, fewer complications

Specific to Robotic approach

   a. Ergonomically superior

   b. Intuitive nature

c. Better Camera stabilization

d. Wristed instrumentation with improved dexterity (precision with dissection, ease of suturing, facilitates development of surgical planes in areas riddled with disease)

e. Motion dampening sensors (tremor filtration)

f. Depth perception due to 3D camera (which translates to less blood loss, reduced transfusions, reduced complications)

g. May facilitate use of minimaly invasive techniques for morbidly obese, where conventional laparoscopy may be difficult

h. Lower conversion rate to open surgery

Among its limitations, are the increased cost, availability of the robotic system, and trained surgeons. But with innovative technologies, the costs will gradually reduce, and the learning curve for Robotic surgery is considerably less when compared to that of advanced laparoscopic surgery.

In this review we will appraise various indications and present evidence for use of Robotic Surgery in Gynecological malignancies.

1. Cervical Cancer

a. Radical Hysterectomy

Historically, either an open or minimally invasive (laparoscopic or robotic) surgical approach was acceptable for radical hysterectomy, but the role of minimally invasive surgery in treatment of early-stage cervical cancer has become controversial since the recent publication of the LACC trial. This randomized controlled noninferiority trial showed lower rates of progression-free and overall survival in those treated with MIS compared to open laparotomy. Crtitics of these trials suggested that since only 15.6% of the patients randomized to the MIS arm had robotic surgery (45 cases) and all the MIS surgeries were analyzed together, it was difficult to extrapolate the data to the use of robotic surgery for the treatment of cervical cancer. A systematic review comparing 932 robotic, 373 laparoscopic, and 892 open radical hysterectomies showed that the robotic approaches had significantly less blood loss, transfusion requirements, and intraoperative complications, with a shorter hospital stay and similar oncologic outcomes to the open radical hysterectomy cases.

Table 1: Recent Evidence regarding Robotic Surgery for Cervical Cancer

Source/year	Study Design	Significance
Chong 2018	Retrospective	RRH associated with longer operative time; OS lower in RRH compared to LRH (P = 0.0762), no difference in recurrence pattern (P = 0.7) however peritoneal recurrence only in RRH group
Gallotta 2018	Retrospective	RRH associated with longer operative time; no difference in 3- year DFS or OS
Jin 2018	Meta-analysis	17 studies included; RRH and LRH lower EBL and LOS compared to ORH
Ramirez 2018	Prospective phase III RCT	Disease free survival lower in LRH/RRH (86%) compared to ORH (96.5%) and overall survival (93% vs 99%)
Melamed 2018	Population- based cohort study	Increased 4 year mortality in LRH/RRH group (9.1%) compared to ORH (5.3%)
Siesto 2019	Retrospective case series	RRH 40 month follow-up, DFS 90.4% (95%CI 85.3–95.6) and OS 94.5% (95%CI 91.8–97.2)
Matanes 2019	Retrospective	Recurrence rate lower in RRH (17% vs 7%); no difference in OS or PFS at 46 months
Zhang 2019	Meta-analysis	12 studies included, RRH less EBL, shorter LOS compared to ORH; no difference between RRH and LRH in tumor recurrence
Doo 2019	Retrospective	No difference in recurrence risk, PFS or OS; however in tumors ≥2 cm higher risk of recurrence, in RRH, higher risk of recurrence (30 vs 8%, P = 0.006) and shorter PFS (HR 0.31)
Alfonzo 2019	Population- based cohort	No difference in 5-year OS or DFS between open and robotic groups
Cusimano 2019	Population- based retrospective	MIS associated with increased rates of death and recurrence compared to OH in patients with IB disease but not IA disease

Abbreviations: ORH, Open radical hysterectomy; LRH, laparoscopic radical hysterectomy; RRH, robotic-assisted radical hysterectomy, EBL – Estimated Blood Loss, LOS – Length of Hospital Stay, OS – Overall Survival

To resolve this controversy of Robotic Surgery in Cervical cancer, an international multicenter phase III randomized trial is accruing patients, comparing robotically assisted radical hysterectomy with open radical hysterectomy for FIGO 2018 stages IB1, IB2, and IIb1 cervical cancer (NCT03719547) with an estimated completion date in 2027.

a. Radical Trachelectomy

The use of radical trachelectomy for early cervical cancer has been shown to have similar efficacy and safety when compared with radical hysterectomy. The feasibility of robotic radical trachelectomy with sparing of the main branches of the uterine artery was described in 2008 by Geisler et al, and the possible benefits of the technique have been elucidated in several small series. Persson et al. compared 13 robotic radical trachelectomies with 12 vaginal radical trachelectomies and found the remaining cervical length to be equivalent in each group, but more accurate placement of the cervical cerclage with the robotic approach. A systematic review by Bentivegna et al showed that the fertility rates for those trying to conceive were higher for trachelectomies done with minimally invasive approach than with laparotomy (65% and 44%, respectively)

b. Endometrial Cancer

a. Hysterectomy and Retroperitoneal Lymph Node Dissection

Most of the first reports of robotic gynecologic oncology surgery involved hysterectomy and staging of patients with endometrial cancer and this remains one of the major applications. Several series have reported the outcomes of robotics for endometrial cancer staging and have shown decreased morbidity compared to laparotomy and laparoscopy, with low rates of conversion. Two recent systematic reviews looking at the safety and effectiveness of robotic surgery or endometrial cancer have summarized the evidence. The review by Park et al. highlights the benefits of robotic surgery compared to laparotomy including shorter length of hospital stay, less blood loss and transfusions, fewer complications, and fewer readmissions. There was no significant difference in survival outcomes, but there was a longer operating time and an increased vaginal vault dehiscence rate.

Both reviews demonstrated that compared to laparoscopy, robotic surgery had significantly decreased blood loss, shorter hospital stay, and fewer overall complications. The conversion rate was found to be significantly decreased for robotic compared to laparoscopic surgery, ranging from 0–15%. A comparison between robotic and standard laparoscopic surgery has also demonstrated lower postoperative pain and pain medication requirements when robotic surgery was used for endometrial cancer staging.

b. Specific Population groups

i. Robotic Surgery in Obese Patients

Obesity is a wellestablished risk factor for the development of endometrial cancer. In this high-risk group that has traditionally been treated by panniculectomy with hysterectomy, these patients now can benefit from robotic surgery that can include surgical staging, fast recovery time, and a short hospital stay.

ii. Table 2. Evidence regarding Robotic Surgery for Endometrial cancer on Robotic Surgery in Elderly Patients

Author	Year	Operative Time	Mean Hospital Stay	Complication rate	Conversion rate
Menderes et al	2014	189 min	2 days	12%	0%
Stephan et al	2014	269 min	2.1 days	20%	20%
Corrado et al	2018	170 min	3 days	36%	7%

Another subgroup that has been shown to have particular benefit from robotic approach is elderly women with Endometrial cancer, which is frequently seen to be of high-grade histology. Robotic surgery has been shown to reduce the need for narcotics and antiemetics in the postoperative period, and this translates to reduced risk of postoperative complications including confusion, delirium, and bowel dysfunction that are commonly seen in this high-risk group.

iii. Nerve Sparing Techniques

Nerve-sparing techniques for radical require meticulous dissection to preserve the hypogastric

nerve plexus in an attempt to reduce postoperative bladder and rectal dysfunction. It is speculated that the precision and stereotactic vision of robotics may help facilitate these nerve- sparing approaches.

c. Ovarian Cancer

a. Early-Stage Ovarian Cancer

Robotics has proven to be an effective method for treating early-stage ovarian cancer, with outcomes that are comparable to other approaches. Researchers have explored the use of robotics for primary debulking surgery, which involves radical procedures such as primary debulking surgery with radical dissections such as supracolic omentectomy, diaphragmatic stripping, bowel and liver resections, and splenectomy. Various techniques have been employed to achieve optimal cytoreduction. For instance, when using the da Vinci Si robotic system, multiple docking positions were needed for multiquadrant surgery, while the newer Xi version allowed for a single robotic position for the same purpose. A hand-assisted port can also used to enable manual examination, and it is even possible to bring out the bowel for thorough inspection. The robotic approach has been found to result in less blood loss and shorter hospital stay. Patients are able to start adjuvant chemotherapy sooner after a robotic surgery than an open surgery. However, not all patients are suitable candidates for robotic surgery on Ovarian Carcinoma. Patients were selected based on the possibility of achieving complete debulking. According to published data, robotics did not offer any advantages for patients who required more than two major procedures, such as resection of the bowel, diaphragm, liver, or spleen.

b. Interval Debulking after Neoadjuvant Systemic Therapy

One application of robotic surgery has been in Interval debulking of ovarian cancer after neoadjuvant treatment. Abithol et al, Ackroyd et al and Feuer et al have assessed Robotic Surgery in this setting. They have found that the overall rate of debulking to no residual disease is comparable to those reported for open laparotomy.

a. Secondary Cytoreduction for Recurrence

Another application of robotics in ovarian cancer has been for secondary cytoreduction of recurrent cancer. The goal may be complete cytoreduction in a patient who has achieved a prolonged disease-free interval following chemotherapy, or it may be to resect disease that is causing symptoms. The feasibility of robotic secondary cytoreduction has been reported in a selected series of patients and compared with laparotomy by Magrina and colleagues, in which robotics was associated with reduced blood loss and shorter hospital stay, but had similar operating time, complication, and complete debulking rates when compared to laparotomy. Components of robotic secondary cytoreduction may include resection of isolated liver and full-thickness diaphragmatic recurrences.

d. Pelvic Exenteration

The first case report including robotically assisted surgery for the treatment of recurrent cervical cancer with an end colostomy, an ileal loop urine diversion, and a complete pelvic exenteration was reported by Lim et al. in 2009. They reported excellent visualization, minimal blood loss, and the ability to perform the fine suturing required for the urinary diversion with the articulating instruments. Since then, a large number of robotic exenterative surgical cases for ovarian, cervical, endometrial, or vulvar tumors that are centrally recurrent have been documented. The clinical and oncological outcomes obtained from the robotic approach were found to be similar to those obtained from the open technique. For total, anterior, or posterior pelvic exenteration in carefully chosen patients, robotic surgery may be an option if a skilled multidisciplinary surgical team is available.

Table 3. Evidence regarding Robotic Surgery after Neoadjuvant therapy for Ovarian Cancer

Author	Year	Approach	Blood Loss	Hospital Stay	Complications	Optimally Debulked	Overall Survival
Feuer et al	2013	Robotic Vs Open	95 ml Vs 385 ml	2 days Vs 6 days	16% Vs 23%	73% Vs 50%	1 yr - 97% Vs 90%
Ackroyd et al	2017	Robotic	107 ml	2 days	17%	66%	Median 40 months
Abithol et al	2019	Robotic	131 ml	1 days	-	83%	Median 54 months

e. Sentinel Lymph Node Evaluation

There is increasing acceptability of Sentinel lymph node evaluation in endometrial and cervical cancer. Although, traditional methods for locating and removing SLN in endometrial cancer have been applied to the robotic platform's enhanced visual system and instrumental dexterity, its real advantage lies in the visual system of the more recent robotic = models, which has near-infrared fluorescent imaging capabilities, making it easier to use newer methods for sentinel node detection using indocyanine green (ICG) fluorescent dye. It is possible for the surgeon to toggle the camera between the regular light mode, and a special near-infrared mode, which highlights lymphatic channels and lymph nodes containing the ICG dye, improving the sensitivity of the procedure. A novel use of the robotics platform is an inguinal SLN dissection for patients with vulvar cancer, with the intention to avoid the morbidity that comes with an open incision in the inguinal area.

To conclude, it is suffice to say that the advent of robotic technology has significantly amplified the influence of Minimally Invasive Surgery in the surgical treatment of gynecologic cancers. The application of robotics in the management of endometrial cancer has proven successful, with comparable oncologic results. Its utility in cervical cancer is currently under further investigation. While it is technically viable, the oncologic outcomes have been subject to scrutiny. In the case of ovarian cancer, it seems to be beneficial for early-stage disease and for interval debulking following neoadjuvant chemotherapy for advanced disease.

The advantages of robotics are especially noticeable in complex patients, such as the elderly and obese. Despite the high costs associated with robotic equipment and maintenance, overall expenses can be mitigated by savings related to shorter hospital stays and decreased postoperative morbidity. When compared to laparotomy, robotic surgery is associated with significantly less blood loss, fewer blood transfusions, reduced postoperative morbidity and pain, and shorter hospital stays. Robotic systems have proven to be highly compatible with other innovative technologies, such as fluorescent imaging. It is anticipated that future advancements in computer interfaces, along with the development of innovative surgical tools resulting from ongoing collaboration between surgeons and engineers, will allow an increasing number of patients to benefit from MIS.

Mirror Mirror on the Wall… Can you see the Scar at All: Our Experience of Robotic Thyroidectomy?

Dr Shubham Garg
Senior Consultant and Clinical Lead - Surgical Oncology
Fortis Hospitals, Noida

When you think of Robotic surgery, immediately an image of an abdominal surgery being done comes to the mind and the obvious advantage of avoiding a painful scar strikes us. The lesser blood loss, shorter hospital stays and early return to work are the added advantage of a robotic abdominal surgery. But I experienced another beautiful aspect of this technological marvel when I did a thyroidectomy by robotic assistance. And t hat was Finesse. Robotic movements are so fine that they are accurate to the millimetre. They are so delicate that they pick up the thinnest the tissue and are able to cut the finest of the strands. The vision is so clear that you can see smaller to the vessels and energy device so accurate that you burn only what you intend to burn.

And it is this finesse which makes the difference between a good surgery and a great surgery. It is this finesse which is needed to dissect the recurrent laryngeal nerve. It is this finesse which gives you the confidence that the vascularity of parathyroid is preserved and that the patient will not have any postoperative complications.

Ours was a 62-year old lady with a suspected thyroid malignancy for whom we did a thyroidectomy by the RABIT approach (Robot Assisted Breast - Axillo Insufflation Technique). In this surgery, we were blessed to be guided by the master i.e. Dr Sandeep Nayak, which is another blessing to be working in the Fortis

ecosystem.

Some would say one of the main advantages of robotic thyroidectomy is avoiding the scar. Yes! I completely agree but our 62-year patient may have accepted the scar. But what she wouldn't accept would be any hoarseness of voice. What she wouldn't like is to eat calcium tablets to make up for the non-functioning parathyroid. I am a convert and would offer robotic thyroidectomy to all deserving patients... not because I want to avoid a scar but because I want to do a better and safer surgery.

Robotic Surgery vs. Traditional Surgery for Gallstones

Dr V S Chauhan
Director - General and Lab Surgery
Fortis Hospital, Noida

Gallstones are a common medical condition that affects millions of people worldwide. Traditional surgical methods, such as open cholecystectomy, have long been the standard of care for removing gallstones. However, with the advancements in technology, robotic surgery has emerged as a modern approach to gallstone treatment. In this blog, we will explore the differences between robotic surgery and traditional surgery for gallstones and how the former has revolutionized the operating room.

Robotic Surgery for Gallstones

Robotic-assisted surgery utilizes state-of-the-art robotic systems, operated by skilled surgeons, to perform minimally invasive procedures. The da Vinci Surgical System is a widely used robotic platform in gallstone surgeries. With its high-definition 3D camera and precise instruments, robotic surgery offers improved visualization and dexterity, allowing surgeons to perform intricate tasks with greater accuracy.

Benefits of Robotic Surgery

1. **Minimally Invasive:** Robotic surgery involves smaller incisions, resulting in reduced postoperative pain, shorter hospital stays, and faster recovery compare to traditional open surgery.
2. **Enhanced Precision:** The robotic arms can rotate 360 degrees, enabling surgeons to access hard-to-reach areas with exceptional precision, minimizing the risk of complications.
3. **Less Blood Loss:** Robotic surgery typically involves less blood loss compared to open surgery, which can reduce the need for blood transfusions.
4. **Reduced Scarring:** Smaller incisions mean minimal scarring, promoting better cosmetic outcomes and boosting patient satisfaction.
5. **Shorter Hospital Stay:** Patients undergoing robotic surgery may have a shorter hospital stay and a faster return to normal activities compared to open surgery.

Traditional Surgery for Gallstones

Traditional open cholecystectomy requires a large abdominal incision to access the gallbladder for stone removal. While effective, this approach involves longer recovery periods and a higher risk of infection and bleeding.

Robotic surgery has revolutionized the treatment of gallstones by offering patients a modern and less invasive alternative to traditional surgical methods. The improved precision, smaller incisions, and faster recovery times associated with robotic surgery make it an attractive option for patients and surgeons alike. However, the choice between robotic and traditional surgery should be based on individual patient factors and the surgeon's expertise. Collaborative decision-making between patients and healthcare professionals is essential to ensure the best possible outcome for gallstone treatment.

Robotic Surgery for Cancer Treatment

Dr Shubham Garg

Senior Consultant and Clinical Lead - Surgical Oncology
Fortis Hospitals, Noida

1. **What is Robotic Surgery all about?**

   Robotic Surgery is based on the Master and Slave concept where the surgeon controls robotic arms and guides them to perform manoeuvres required to complete the surgical procedure. Robotic arms are like our wrists' ability to make 7 different movements that provide 360-degree motion and literally mimic the hands of a surgeon. The advantage which a robot has is that these arms are much thinner than a surgeon's arms and hence can reach in difficult places. This is of great advantage to us in surgeries for cancer.

2. **How Robotics is making cancer surgery safer and more successful?**

   Cancer surgery is all about precision and accuracy. The more accurate the surgery is going to be, the better will be the outcome. The use of robotics in any surgery allows better magnification, 3-dimensional vision, and more dexterity. This allows the surgeon to have better control and hence make the surgery more precise and eventually safer for the patient.

3. **Can Robotics improve cancer surgery rate and tackle complicated cancers?**

   Robotics has brought a sea change in surgery for cancer. Robotic arms allow us to reach deep-seated difficult areas like the prostate in the pelvic cavity and the base of the tongue in the mouth. We are able to now offer surgery in these areas of the body that we previously thought to be inoperable. Similarly, robotic surgery uses 3d cameras which provide depth perception and make surgery safer. This increases the success rate of cancer surgery. Surgery for thoracic cancers and GI cancers like the colon and rectum have become much safer as robotics provide an added layer of safety.

4. **If the robot performs then what does the surgeon do?**
   This is a very important question as it is very commonly asked by almost all our patients. Please understand that there is no artificial intelligence involved in this. The robot cannot think for itself. It just follows the command of the surgeon who is there in the same operating room as the patient and robot. The surgeon controls the robot with his hands and legs. This is similar to controlling a car where the driver is in command and can move in any direction and at any speed as they want.

What is the future of Robotic surgery?

There is a major challenge in the availability and accessibility of robotic surgery in our country. Presently robotic surgery is being offered in metro cities only and that too in major hospitals. Even when it is available, it is not accessible to all patient groups because of prohibitive costs. The next 5 years should see robotic machines percolating into tier 2 cities and a lot of new robotic surgeons being trained. There should be a significant drop in prices too as more and more robots will be available and more and more surgeons will also be available.

Most of the patients nowadays are actually demanding robotic surgery. The results of robotic surgery are beginning to show and people are now not adverse to getting a robotic surgery done. Also, as the misconceptions about robotic surgery are disappearing, people don't hesitate to opt for robotic surgery. Patients in general are more bothered about the quality of surgery and eventually their quality of life and don't mind spending extra for a more advanced procedure.

Enhancing Patient Outcomes: A Comprehensive Look at Robotic Surgery for Prostate Cancer

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Robotics and Kidney Transplant
Fortis Hospital, Noida

Compared with traditional open surgery, patients who undergo robotic-assisted radical prostatectomy experience:

- Less blood loss
- Less pain
- Shorter hospital stays

Robotic prostatectomy is a type of laparoscopic minimally invasive surgery that uses robotic surgical instrumentation to remove the prostate. The robotic laparoscopic method allows surgeons to operate through small rather than large incisions. This results in less pain, shorter recovery times, fewer complications and reduced hospital stays.

Surgical robotic platforms - like the da Vinci Robotic Surgical System™ used at Advent Health - combine minimally invasive techniques with highly advanced guidance technology. Robotic surgery also provides 3D vision, which helps with nerve sparing.

The da Vinci 3D vision system magnifies the surgical field up to 10 times and enhances the ability of the surgeon to control small blood vessels for less blood loss. Minimally invasive procedures can be performed with more precision thanks to this robotic technology. Robotic arms remain steady, and robotic wrists make it easier for surgeons to manipulate tissue and work from positions that would be harder to reach with traditional methods.

Robotic surgery for prostate cancer offers many benefits to patients. Safety, precision and faster, better healing are key advantages.

Benefits During Surgery

- **Can perform every movement of a surgeon:** Robotic surgery for prostate cancer enables flexibility and precision. The arms of the robot and its tools can bend, angle and maneuver just like the surgeon' hands.
- **Magnification enables the surgeon to perform precise movements:** The surgeon can see parts of the body with greater magnification. Essential structures, like the nerves, blood vessels and muscles, can be preserved. It also aids in minimizing blood loss.
- **Some movements are performed even better by the robot:** The robot's tiny instruments are able to maneuver into small, narrow parts of the body that are difficult for a surgeon's hands to reach. The robot can perform small movements to help save nerve endings and structures important to urinary and erectile function.
- **The robot offers a steady hand:** This removes any possibility of human hand tremors, ensuring the smoothest, steadiest surgery possible.

Benefits After Surgery

- **Less blood loss and transfusion:** Because of the ability for more precise movements by your surgeon and the robotic arm, your surgery is safer.
- **Reduced pain:** Most patients have their catheter removed within 4 to 6 days and do not require pain medication after discharge.
- **Reduced risk of incontinence and impotence:** Nearly all patients regain full bladder control within three months, and 30% within one week.
- **Shorter hospitalization:** Most patients go home the next day.
- **Quicker return to normal activity:** Most of our patients are back to normal daily activities in 1 to 2 weeks, rather than the 4 to 6 weeks expected with traditional methods.

Robotic prostate surgery is highly effective in completely eliminating prostate cancer. Its success in each individual is also based on other factors, such as:

- Adherence to postoperative penile rehabilitation
- Aggressiveness of the cancer
- Experience of the surgeon performing the surgery
- For sexual function recovery, the presence or absence of a sexual partner
- For sexual function recovery, the type of nerve sparing performed
- Patient's pre-operative fun

Celebrating World Antibiotic Awareness Week (WAAW) at Fortis

In 2015, the World Health Organization (WHO) launched World Antibiotic Awareness Week (WAAW), in response to the growing global threat of antibiotic resistance. WAAW underscores responsible antibiotic use to combat resistance, aiming to raise awareness globally among the public, healthcare professionals, and policymakers. By promoting proper usage, WAAW strives to curb the rise of antibiotic resistance and safeguard the efficacy of these vital medications.

Dr Bishnu Panigrahi, Head Medical Strategy and Operations Group (MSOG) initiated the celebrations of World Antimicrobial Awareness week under the theme of WHO "Preventing Antimicrobial Resistance Together". Recognizing the urgency of the global situation, he called for collective action to engage proactively in raising awareness. He urged the Fortis family to unite in learning about antimicrobial resistance and taking corrective measures.

Dr Anita Arora (Group Head - Infection Control and Practices GHICP MSOG) played a pivotal role in spreading awareness by facilitating live sessions to share knowledge, and encourage active participation in addressing the critical issue of Antimicrobial Resistance (AMR). 'Mega live' by Fortis on social media platform, was broadcasted featuring distinguished microbiologists, ID physicians, and clinicians including Dr Mrinal Sircar, Dr Anita Sharma, Dr Kirti Sabnis, Dr Neha Rastogi Panda, and Dr Sushmita Roy Chowdhury as panellist across Fortis Network. Under the title "Control Today for a Better Tomorrow: Save Antimicrobials" the online session, aimed to broaden public awareness by highlighting the importance of responsible antimicrobial use.

GH-ICP MSOG organized another online session on 24th November 2023, with the theme "FHL Guardians Against Superbugs: Uniting against AMR," where we saw active participation from all Fortis units. This exclusive session was tailored for our Antimicrobial Stewardship (AMS) team members, including Clinicians, Infectious diseases physicians, personnel from Administration, and Infection Control Nurses (ICN) pan-Fortis. The session comprised of two activities designed to be both engaging and informative. The first activity involved a Quiz Competition facilitated by Ms Gayatri Sapkale (Team Lead Clinical Pharmacist, MSOG), while the second activity, conducted in region-wise breakout rooms, featured 2-Minutes Talk.

Participants were grouped into four breakout rooms representing Delhi NCR, North and East, South, and the Mumbai Cluster. On-the-spot topics related to AMR were provided, allowing each region a few minutes for preparation. A representative from each region then presented a 2-minute talk on the assigned topic.

The primary objective of these activities was crafted to stimulate collaborative discussions and the sharing of diverse perspectives on addressing the challenges posed by antimicrobial resistance. Dr Ritu Garg (Chief Growth and Innovation Officer), Dr Akash Sud (Head Clinical Governance, Quality and Patient Safety, MSOG) and Dr Narayan Pendse, (VP MSOG) assessed the "2-Minute Talk" focusing on a given theme.

Winners of the activities were recognized for showcasing exemplary knowledge. Dr Praveen from Fortis Hospital, Faridabad bagged the first prize in the Quiz competition where Dr Gautam from Fortis Hospital, Rajajinagar, Bangalore was the winner for the 2-minute talk on "Combating Superbugs: Your Role Matters."

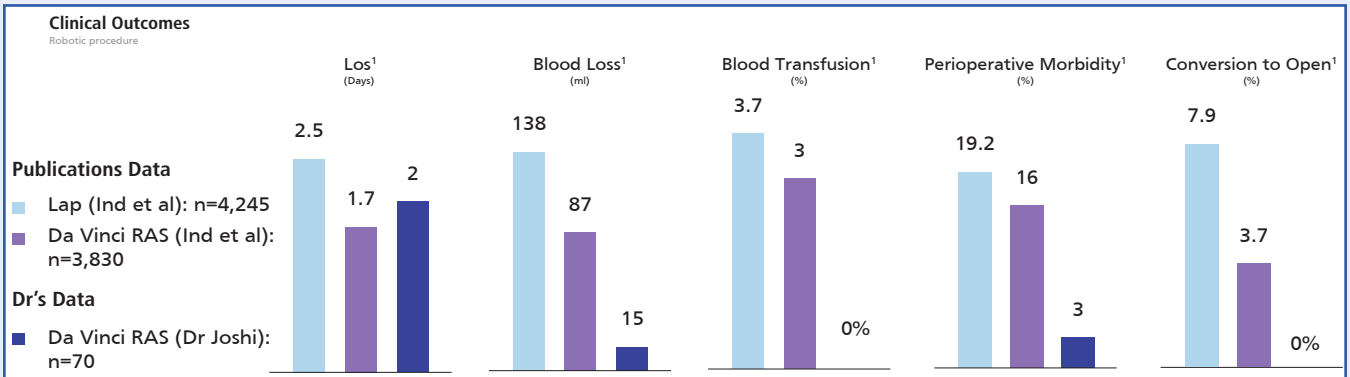
Glimpse of Live Session: FHL Guardians Against Superbugs: Uniting against AMR

QTI - The QTI Advantage in Surgical Outcome

Source: Intuitive Surgicals

QTI or Quantify the Impact (as it is known) is a user-friendly representation of clinical outcomes reported by a surgeon. These representations are in the form of a bar graph/chart and are meant to be display clinical outcome parameters of a surgeon compared across different modalities (eg open, lap, robotic-assisted surgery). The QTI chart hence becomes a very easy read for Hospital executives, referral networks and sometimes even patients. The QTI analysis and its charts are intended to be directional and to aid basic informal conversations.

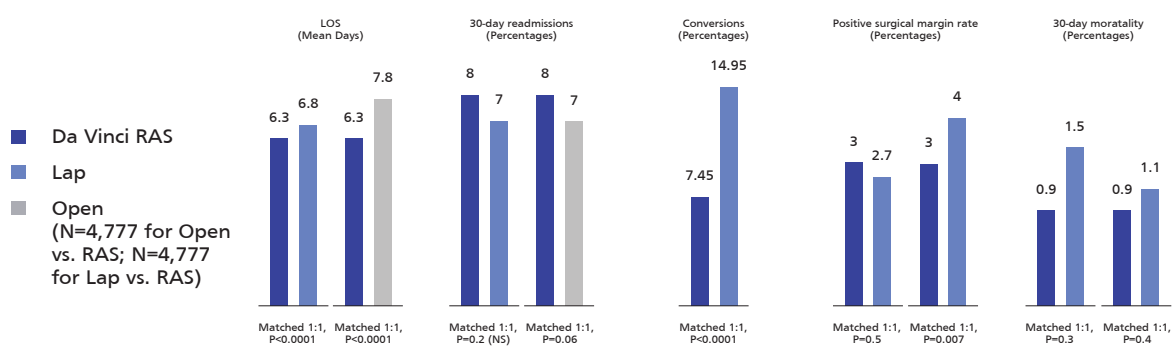
The advantages that a QTI holds is that is a simple, effective and a versatile tool to directionally define the clincal outcomes. There are no complex data mining expected in a QTI and QTI can help a surgeon speak better about his/her own experiences than clinical studies. A surgeon can also use QTI to track how their results changed over time, especially when looking at the results before and after training.



1. Ind et al. A Comparison of operative outcomes between standard and robotic laparoscopic surgery for endometrial cancer: A systematic review and meta-analysis from The International Journal of Medical Robotics and Computer Assisted Surgery 2017 (Lap N=4,245, RAS N=3,830).

Note: Data represented here is not collected under a formalized study. Data is not peer-reviewed and not published. Data may or may not be reproducible and is not generalizable. This data comparison is not case-matched for patient complexity and/or disease status and may not be comparable across these surgical modalities. As such, this data presentation should be considered as informational only and is not conclusive.

Sample QTI



Hyde LZ, Baser O, Mehendale S, Guo D, Shah M, Kiran RP. Impact of surgical approach on short-term oncological outcomes and recovery following low anterior resection for rectal cancer. Colorectal Dis. 2019 Aug 21 (8):932-942. doi: 10.1111/codi 14677. Epub 2019 May 25. PMID: 31062521.

Additional studies have shown that low anterior resections with da Vinci systems:

Compared to open have: Lower or comparable rate of positive surgical margins.

Compared to lap have: Shorter or comparable length of hospital stay, lower or comparable rate of conversion to open surgery.

Sample QT2

FORTIS @ INTUITIVE 360 AND ESL 2023

Dr Narayan Pendse
Convenor
Vice President – Medical Strategy and Operations Group
Fortis Healthcare

Dr Pradeep Jain
Principal Director – GI, GI Oncology
Fortis Hospital, Shalimar Bagh

Dr Swapna Mishra
Director - Obstetrics and Gynaecology
Fortis Hospital, Mohali

Background

Intuitive Surgical Inc, the manufacturer of da Vinci Surgical Systems, organizes two prestigious annual events – Executive Surgeon Leader (ESL) and Intuitive 360 which were held simultaneously in Aurora, USA in October 2023. Dr Swapna Misra (Director -Obstetrics and Gynecology, Fortis Hospital, Mohali), Dr Pardeep Kumar Jain (Principal Director- GI, GI Oncology, Fortis Shalimar Bagh) and Dr Narayan Pendse (VP - Medical Strategy and Operations) represented Fortis Healthcare at these events.

Executive Surgeon Leader

Developing and sustaining a strategic and viable robotics service line requires active support from and vertical alignment between hospital administration and the surgical team. Executive Surgeon Leader is an opportunity to share and learn from experiences gained from leadership at established robotic-assisted surgery programs.

Intuitive 360

Presented in collaboration with American College of Healthcare Executives (ACHE), 360 empowers the pursuit of programmatic excellence. It is an opportunity to learn from the experience of peers and explore the many ways Intuitive is helping to advance what's possible for hospitals and healthcare systems.

The programs include panel discussions, networking with like-minded professionals, getting hands-on in technology showcase, and engaging with knowledgeable resource teams.

Key Observations and Learnings

1. Strength of surgical robot – Definition (i.e. vision) and Dexterity (i.e. movement)
2. USA – majority procedures are benign while in Asia majority are oncology related.
3. General and GI Surgery especially 'general' procedures like Hernia are driving volumes in US market.
4. Same Day surgeries are becoming popular in many markets.
5. Japan and South Korea have large share of installations in Asia Pacific region
6. Single Port system – is the latest robotic offering from Intuitive
    a. Can be used subcostal/sub xiphoid thus Nerve sparing
    b. Suited from narrow access surgery, extraction site surgery, alternative site surgery, and nipple sparing Mastectomy
    c. Larger port size (27mm) to accommodate endoscope plus instruments
    d. Expected launch in India is in the year 2025
7. Operating Room (OR) efficiency is a key factor for improving robotic volumes. Some of the good practices are:
    a. Using an Induction Room (or free OT) for intubation, extubation and port placement
    b. Shorter TAT between cases
    c. Incentivization for 'off peak' surgeries – e.g. early start, weekends, late hours, etc.
8. Follow Quadruple Aim –
    a. Better Patient outcomes
    b. Improved Patient experience
    c. Improved Physician experience
    d. Lower Cost of care

9. Role of Robotic Coordinator – hospital should have a designated Robotic Coordinator to take care of operational aspects of the program including OR Scheduling, resource availability, etc
10. Robotic Steering Committee to own and guide theRobotics program – hospital should have a formal RSC consisting of:
    a. Surgeon Champion
    b. Robotic Coordinator
    c. Executive Rep
    d. Operations Rep
    e. Intuitive Rep

Fortis Participation

1. Dr Pradeep Jain and Dr Swapna Misra attended the ESL program.

2. Presentation on 'Drivers for a successful RAS Program – Fortis experience' delivered in the APAC session by Dr Narayan Pendse. The presentation covered –

- Overview of Indian Health system and Fortis Healthcare
- What sets us apart – Clinical Governance, Clinical Outcomes
- Our Robotic journey
- Volume trend and Specialty Mix
- Opportunities to collaborate

The presentation was very well received and Fortis practices were appreciated.

The Fortis Network

Amritsar


Anandapur, Kolkata


Bannerghatta Road, Bangalore

Chirag Enclave, New Delhi


Cunningham Road, Bangalore

Defence Colony, New Delhi


Faridabad


FEHI, New Delhi


FHKI, Kolkata


FLF Greater Kailash, New Delhi


FMRI, Gurugram


Greater Noida


Jaipur

Kalyan


Ludhiana


Mohali


Mulund, Mumbai


Nagarbhavi, Bangalore


Noida


Raigarh, Chhattisgarh

Rajajajinagar, Bangalore


Richmond Road, Bangalore

Shalimar Bagh, New Delhi


SL Raheja, Mumbai


Vasant Kunj, New Delhi


Vashi, Mumbai

Please send your comments, feedback and suggestions to
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