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Implementation of surgery clinical pathway for training in urologic robotic surgery: preliminary experience with the radical prostatectomy in Central America

Abstract

Introduction and objective: Robotic surgery for urologic disease is becoming increasingly widespread. However, there is a known learning curve for this technology that can inhibit its adoption; this concern may be particularly important in an international, non-academic setting. Our institution introduced the first robotic system in our geographic region (Central America), and we reviewed our experience in implementing a training pathway for urologic robotic surgery, specially in radical prostatectomy.

Methods: In March 2012 a daVinci SI robotic system was installed at a private hospital in Panama; this was the first system installed in Central America. Our implementation pathway was comprised of an online virtual course, video reviews, on-site surgical system training, off-site Surgical skills training using animate and inanimate models, off site Live Procedure Observation, and on site surgery with an experienced preceptor. We prospectively tracked intra-operative parameters: time for patient preparation, docking of the robot, and console time. We also reviewed early patient results for radical prostatectomy.

Results: During a 48 month period, 500 robotic-assisted laparoscopic surgeries were performed. 210 urology cases included: 118 radical prostatectomies, 31 partial nephrectomies, 20 radical nephrectomies, 4 donor nephrectomy, 17 pyeloplasties, 3 sacrocolpexias, and 1 partial cystectomy. All surgeons complete the clinical pathway solution. Mean console time for the first 8 cases, with preceptor, was 251 minutes and for the following 31 cases 110 minutes. Regarding robotic-assisted laparoscopic radical prostatectomies: patient preparation was 17 min, docking time 5.6 min, console time 150 min. Total operative time range from 2 to 5 hours (Mean 210 minutes). Mean patient age was 61. Mean PSA 8 ng/ml. Average hospitalization days: 2,7 (range 1-14d) The dominant preoperative Gleason was 3+3, while the predominant postoperative was 4+3. There were no intra operative major complications.

Conclusion: Our structured clinical training program assisted in the rapid development of our robotic surgical program, and we believe was responsible for our safe and effective experience. As robotic surgery continues to expand to diverse international regions and non-academic institutions, detailed protocols such as ours can aid in its successful adoption elsewhere, as well.

Volume 3 Issue 6 - 2016

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Received: October 27, 2016 | **Published:** December 7, 2016

Introduction

Prostate cancer is the most common malignant tumor in our country.[1] Radical surgery is used for the management of localized disease. Consistent results globally confirm the safety, reproducibility and effectiveness of roboticsurgery.[2–4] Robotic surgery for urologic disease is becoming increasingly widespread.[5–6] However, there is a known learning curve for this technology that can inhibit its adoption; this concern may be particularly important in an international, non-academic setting.[7] Our institution introduced the first robotic system in our geographic region (Central America). We reviewed our experience in implementing a training pathway for robotic urologic surgery, especially with radical prostatectomy.

Methods

In March 2012 a daVinci SI robotic system was installed at a private hospital in Panama; this was the first system installed in Central America. Our implementation pathway was comprised of:

Phase I - Introduction to da Vinci® Surgery

I. Sign up for On-line da Vinci community

II. Live Procedure Observation

Phase II – Preparation & System Training

I. da Vinci SISystem on-line training. Take Assessment (Link). Printout score or sabe printscreen and email or provide certificate

II. Watch On-line or CD Procedure Video and take Online Assessment

III. On-site Training with da Vinci clinical sales representative

IV. System Component Overview and OR Setup

V. Procedure Port Placement

VI. Docking, Instrument Overview

VII. Surgeon Console Overview

VIII. Emergency Procedures

IX. Surgical Skills Practicum

X. Dry Lab training certificate.

XI. Bedside Assist Training - Must complete bedside assist cases to include docking of Robot.

Phase III- Simulation Tasks and Scores:

I. Trainees are encouraged to practice 30-60 minutes per week.

II. The da Vinci simulator trainer was used by all surgeons. 91% performance scores was required for all exercises.

Phase IV – Post-System

i. Trainees will their procedure experience as either an assistant and/or console surgeon. Must complete 20 cases as console surgeon.

ii. Phase V Robotic Credential Accreditation.

iii. Four surgeons with previous experience in laparoscopic surgery completed the Clinical pathway. No one previously performed robotic surgery.

We prospectively tracked intra-operative parameters: time for patient preparation, docking of the robot, and console time. We also reviewed early patient results for all procedures, specially, radical prostatectomy (RALP). Patients undergo RALP via transperitoneal forced Trendelenburg position and carried out by four different surgeons with previous experience in open and convention all aparoscopic radical prostatectomy. All surgeons follow the Clinical pathway. Surgical technique: Standart location of six trocars was used in order to perform dissection of the prostate. Ligation of the dorsal vein complex to the pubis withbarbed suture (V -Loc 2.0 Absorbable Wound Closure Device ®-Medtronics). Opening of the union besico prostatic with cautery. Then, exposure back plane of the bladder, dissection of the vas deferens and seminal vesicles.

Then Denonvilliers fascia is dissected, ligation of the prostatic pedicles is done with plastic clips, release and athermalpreservation of neurovascular bands through intra fascial technique in selected cases. Posterior reconstruction of the Denonvillers fascia was performed using barbed sutures (3.0). The urethrovesical anastomosis was done with two barbed sutures (3.0), drainage and finally the removal of the piece. Sexual potency was defined as the ability to achieve and maintain an erection sufficient for satisfactory sexual intercourse with or without the use of inhibitors of 5-phosphodiesterase (PDE-5) and the score Sexual Health Inventory for Men (SHIM) greater tan or equal to 21.Continence was defined as patients who are kept dry and not "require" any protection (towel, napkin, diaper, etc.) in their daily activities.

Results

During a 48 month period, 500 robotic-assisted laparoscopic surgeries were performed. 210 urology cases included: 118 radical prostatectomies, 31 partial nephrectomies, 20 radical nephrectomies, 4 donor nephrectomy, 17 pyeloplasties, 3 sacrocolpexias, and 1 partial cystectomy. All surgeons complete the clinical pathway solution. Mean console time for the first 8 cases, with preceptor, was 251 minutes and for the following 31 cases 110 minutes. Regarding robotic-assisted laparoscopic radical prostatectomies: patient preparation was 17 min, docking time 5.6 min, console time 150 min. Total operative time range from 2 to 5 hours (Mean 210 minutes). Mean patient age was 61. Mean PSA 8 ng/ml. Average hospitalization days: 2,7 (range 1-14d). The dominant preoperative Gleason was 3+3, while the predominant postoperative was 4+3. There were no intraoperative major complications (Table 1).

Table 1 Results for radical prostatectomy

Results	n=100
Preoperative Gleason	3+3 (51%)
Postop Gleason	3+4 (60%)
Transfusions	3%
Pulmonary edema	1%
Acute renal insuficiency	1%
Convulsions	1%
Transient hidronefrosis	2%
T2	54%
$T3_a$	26%
$T3_b$	14%
$T3_c$	6%
Urethral stenosis	2%
Mildincontinence (Sling)	2%
Post-incisional hernia	2%
Bladder Stone	1%

In the immediate postoperative period the complication rate was 5% (6/118): Two pts. Had transient hydronephrosis, one patient with a cute renal failure and another had pulmonary oedemadue to fluid overload and transient cardiac failure. Twopts. Received transfusions. Positive Surgical margin rate for pT2 was 1% and 15%for pT3 cases. Continence (0 to 1 pad daily): 88%. Erectildis function was present in 10% of the pts before surgery. Erectile function was present in 69% of patients, using most of them oral medications (Taladafil or sildenafil with a follow-up of 8 to 12 months for 73 patients). Two patients have required placement of a transobturatormesh. Other complications included incisional hernias, bladderstone and urethralstenosis (6% mid-term complication rate).

Conclusion

Since the advent of robotic surgery surgical special ties have received few more influence tan urology. Currently RALP is a technique that is firmly established in medical practice of many health centersaround the world, replacing traditional open and laparoscopic technique as a standard treatment for prostate cancer.[8] However, there is a known learning curve for this technology that can inhibit its adoption. For non-academic center in Latin America, to achieve similar results can be troublesome. Patel et al.[9] published excellent results in the largest series RALP by a single surgeon. These authors reported an average of 105 min (55-300), an intraoperative bleeding of 111 cc (50-500), an average rate of 4.3% complications,

a hospital stay of 24 hours and no deaths were reported. O Castillo et al.[10] reported 254 minutes in his first 25 cases, and then 189 min in his next 25, 3 conversions and a positive margin rate of 12%. H Davila et al.[11] reported an average operating time of 253.44±51.51 min (90-540), bleeding 309.8 cc (25-1500), 12.9% complications and hospitalization time of 3 days.

There are no reports of erectile disfunction for open or laparoscopic prostate surgery in Panama. Latin American results from Coelho and Davila[11] report postoperative recovery of erectile function in 94% and 54%, 18 months following robotic surgery. The outcomes are still mainly influenced by the preoperative patient characteristics and the experience of the surgeon. Our preliminary results are similar to other Latin American surgeons. Implementation of the robotic training pathway has complimented our surgical training. The pathway seems to be a valuable tool for robotics kill development to obtain competency.

Our structured clinical training program assisted in the rapid development of our robotic surgical program, and we believe was responsible for our safe and effective experience. In our institution, robotic surgery is the method of choice for treatment of localized prostate cancer. As robotic surgery continues to expand to diverse international regions and non-academic institutions, detailed protocols such as ours can aid in its successful adoption elsewhere, as well.

Acknowledgments

None.

Conflicts of interest

The author declares there is no conflict of interest.

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