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# Single-Port Robotic Inguinal Lymph Node Dissection for Penile Cancer

Victor A. Abdullatif, Jared Davis, Chase Cavayero, Andrew Toenniessen, and Ryan J. Nelson

<b>OBJECTIVE</b>	Inguinal lymph node dissection (ILND) is an essential component in the diagnosis, management, and treatment of penile cancer. Recent advances in minimally invasive surgery may play an important role in decreasing the adverse effects and complications of lymph node dissections. We present our technique utilizing a single-port (SP) robot assisted laparoscopic bilateral ILND in a patient with pT3N2Mx penile cancer s/p partial penectomy and sentinel lymph node biopsy.
<b>METHODS</b>	We present a case of a 64-year-old man who underwent a radical penectomy for previously diagnosed penile cancer. Pathology report showed invasive squamous cell carcinoma of the penis. In accordance with NCCN guidelines, we performed a bilateral inguinal and pelvic lymph node dissection using robotic assisted SP laparoscopy with the DaVinci Single-Site platform. Our methods are detailed in this technical report.
<b>RESULTS</b>	Total operative time was 3 hours and 38 minutes in duration with minimal blood loss (<20 mL). A 3 cm inguinal lymph node was excised and positive for malignancy without involvement of other nodes. The patient was discharged 90 minutes after recovery in PACU without narcotics and returned to normal bowel function within 6 hours.
<b>CONCLUSION</b>	We present a successful surgical outcome of a SP robotic ILND in treating a patient with T3N2M0 penile cancer. At the time of publication, the patient is cancer-free with no palpable lymphadenopathy on exam. Utilization of the SP DaVinci system may soon become the standard of care in select cases as it is currently the least invasive approach and is associated with lower morbidity and mortality. UROLOGY 00: 1–4, 2021. © 2021 Elsevier Inc.

A 64-year-old male presented initially complaining of a large fungating penile lesion and 30 pounds of weight loss. The patient had nonpalpable lymph nodes on physical examination. He underwent office biopsy of the penile lesion which revealed invasive squamous cell carcinoma with positive margins. Radical penectomy with dynamic sentinel lymph node biopsy was then performed given the extent of the lesion and positive margin status. Surgical pathology revealed a  $6.7 \times 5.1 \times 4.0$  cm primary tumor with invasion into the corpus cavernosum. In accordance with current NCCN guidelines and following tumor board discussion, the patient was then scheduled for bilateral inguinal lymph node dissection (ILND). The present case demonstrates

our technique of a single-port (SP) robotic ILND using the DaVinci platform.

A supplementary video associated with this case can be found in the supplementary data provided in Appendix 1.

## METHODS

After informed consent was obtained, the patient was taken to the operating room and placed on the operating table in supine position. General anesthesia was administered by the anesthesia team. His abdomen, genitals, and bilateral lower extremities were prepped and draped in usual sterile fashion. A timeout was performed verifying the correct patient, procedure, and location. Following general anesthesia, the patient's legs were positioned in slight flexion, external rotation, and abduction. A 16 French foley catheter was placed in the penile stump.

To create a space to place the SP port, a proprietary DaVinci access port with an approximately 2 cm circumferential fascial opening was created. In order to create this space and ensure correct placement, a scalpel was used to create an approximately 3 cm incision in the left mid-thigh, and a combination of blunt dissection and electrocautery were used until the fascial layer was reached. Once in the fascial layer, a gloved finger was inserted, and a finger swipe was used to create an approximately 2 cm circumferential space where the access port wound was retracted. The proprietary DaVinci access port for small incisions was inserted, connected to insufflation, and the robot was docked. Our initial setup is depicted in Figure 1.

CABG: coronary artery bypass graft, ILND: inguinal lymph node dissection; NCCN: National Comprehensive Cancer Network, O-ILND: open-inguinal lymph node dissection; PACU: post anesthesia care unit, PISA: pelvic and inguinal single-site approach; SP: single-port, VEIL: video endoscopic inguinal lymphadenectomy

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**Figure 1.** Photo demonstrating the initial setup following the establishment of single-site access with the proprietary DaVinci access port for small incisions. Color version available online.

Once the SP robot was docked on the patient's leg, the robotic instruments were then used to take down the deep tissues until the muscle layer was encountered. A clean plane was dissected along the muscle until the inguinal canal. Dissection was continued along this plane to take down all tissues anterior to this plane, thus creating a circumferential ring.

Using electrocautery and a judicious amount of robotic clips, dissection was carried down through the fascia lata overlying the sartorius laterally and the adductor longus medially. The deep inguinal nodes were resected using blunt and sharp dissection and several Hem-o-lok Weck clips (Teleflex, Morrisville, NC) were placed for meticulous control of the lymphatic channels. The great saphenous vein was identified, preserved, and



elevated, and the femoral vessels were then skeletonized in the femoral triangle.

Resection of all lymphatic tissue was carried out medially to laterally over the femoral vein, artery, and nerve. Of note, there was significant fibrotic tissue in the deep nodes with a large bulky node adherent to the femoral vein which was dissected free. Upon completion of left superficial and deep ILND, all specimens were removed and sent for pathology. The area was inspected for any residual bleeding and excellent hemostasis was achieved. The resection sites were covered with Tisseel sealant (Baxter, Deerfield, IL) and Surgicel SNOW (Ethicon, Inc, Somerville, NJ). The robot was undocked, and the gel port was removed. A 19 French Blake drain was placed in the lateral aspect of the wound and secured in place with 2-0 prolene suture. The incision was closed in multiple layers using 0 and 3-0 Vicryl suture, and the skin was closed with 4-0 Vicryl suture in a continuous subcuticular fashion. A total of 10 cc of local anesthetic was injected into the subcuticular tissue and into the underlying muscle.

At this time, robotic superficial and deep ILND was performed in identical fashion on the right as on the left. The lymphatic tissue on the left side was significantly less fibrotic and without grossly appearing, bulky nodes. For this reason, the left side is primarily showcased in the video report. The steps, landmarks, and surgical techniques used to achieve a successful procedure are demonstrated in our video.

## RESULTS

Following the procedure, bilateral ACE elastic compression bandages were placed from the patient's ankles to the groin crease in a standard fashion of postoperative CABG. He was awoken from anesthesia and transferred to PACU in stable condition. He tolerated the procedure well with no complications. The patient was discharged 90 minutes after the procedure without narcotics. He was given ibuprofen and acetaminophen for pain and a 7-day course of sulfamethoxazole/trimethoprim. He was seen in our outpatient clinic for follow-up 1 week after the procedure. A doppler ultrasound was negative for deep vein thrombosis. Bilateral 19 French Blake drains had negligible output over a 24-hour period and were removed in the office a week later.

Pathology of the surgical specimen revealed a  $6.7 \times 5.1 \times 4.0$  cm primary squamous cell carcinoma with invasion into the corpus cavernosum. A 3 cm inguinal lymph node was excised and positive for malignancy. Pathologic staging was consistent T3N2M0 squamous cell carcinoma.

## DISCUSSION

The evolution of robotic technologies has resulted in a shift away from open inguinal lymph node dissection (O-ILND) to video endoscopic inguinal lymphadenectomy (VEIL). O-ILND has classically been associated with multiple complications including lymphedema, lymphoceles, wound infection, and flap necrosis.<sup>1,2</sup> One rare but potentially life-threatening complication reported after O-ILNDs is pelvic arterial pseudoaneurysm formation.<sup>2</sup> VEIL and minimally invasive robotic procedures have repeatedly demonstrated lower morbidity and mortality in lymph node dissections (LNDs).<sup>3</sup> David Subirá-Ríos, et al have demonstrated low rates of major complications

utilizing the pelvic and inguinal single-site approach (PISA) in LNDs performed in patients with invasive penile cancer.<sup>4</sup> However, the site of access for the PISA technique differs from that which was used in our protocol.

Because of advancements in surgical technology and the minimally invasive nature of robotic surgery, the multiport DaVinci robotic systems (SI, X, XI) are now becoming the widely accepted standard for lymph node dissections.<sup>4</sup> Upon an examination of the literature, only 1 study reports utilization of the single-site SP system for an ILND with single-site access at the anterior thigh.<sup>5</sup> We wish to report our case and confirm that this is a feasible and exceptional alternative with promising outcomes. We believe that this can rapidly become a same-day surgery. Our goal is to bring single-port robotic surgery to the forefront of robotic surgeries that can be done safely and with less overall complications.

## LIMITATIONS

Despite the encouraging outcomes of our technical report, SP surgery is not without its limitations. The main drawback of SP surgery is the limited access to the SP technology. Moreover, we acknowledge that there may be a lack of support staff for the development of this technique. Additionally, because SP is a relatively new technology, long-term oncologic outcomes have not been clearly established compared to older procedures. Finally, in cases where patients require pelvic lymph node dissection at the time of ILND, the robot must be redocked for a trans-abdominal procedure which increases total operative time and the potential for more complications. Despite these limitations, our impression is that SP technology has continued the progression of minimally invasive surgery through demonstrating significant improvements in outcomes compared to open surgery.

## CONCLUSION

We present a successful surgical outcome of a Single-Port robotic ILND in the treatment of a patient with T3N2M0 penile cancer. At the time of publication, the patient is cancer-free with no palpable lymphadenopathy on exam. It is our impression that incorporating the Single-Port DaVinci robot gives the advantage of a much less morbid procedure, including same day discharge, decreased blood loss, decreased need for narcotics, and enhanced time of recovery

## SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.urol.2021.12.007](https://doi.org/10.1016/j.urol.2021.12.007).

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