



## Ρομποτική Χαμηλή Πρόσθια Εκτομή: tips&tricks

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ΣΥΝΕΡΓΑΤΗΣ ΙΑΤΡΙΚΟΥ ΚΕΝΤΡΟΥ ΑΘΗΝΩΝ 🥨

Αθήνα, Ιανουάριος 2020

### Savas C. Hirides MD, MSc, FACS

No disclosures

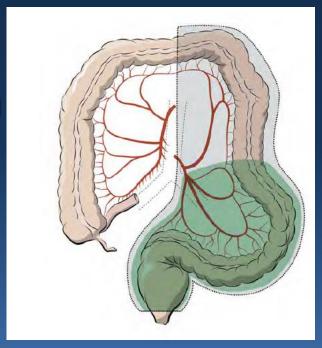
## TAKE HOME MESSAGE: Respect Colorectal (and especially Rectal) Cancer!



NO ROBOT WILL DO THE OPERATION FOR YOU!

## Αντιμετώπιση Καρκίνου Ορθού

- Απαιτεί ειδική αντιμετώπιση εξαιτίας υψηλών ποσοστών τοπικής υποτροπής μετά από τη χειρουργική εξαίρεση
  - 16.2% μετά από χαμηλή πρόσθια εκτομή (LAR)
  - 19.3% μετά από κοιλιοπερινεϊκή κολεκτομή (APR)
  - σπανιότερη στο ενδοπεριτοναϊκό κόλον
- Αναλόγως το στάδιο μεγαλύτερα ποσοστά υποτροπών:
  - 8.5% για Dukes stage A,
  - 16.3% για stage B,
  - and 26% για stage C.<sup>77</sup>





### Surgery for Rectal Ca

#### Low anterior resections (sphincter-sparing procedures):

- upper to middle parts of the rectum
- For cancers located in the distal rectum without invasion to the anal sphincter,
  - a very low anterior resection (VLAR)
  - or ultra low anterior resection (ULAR) have been recommended
  - Provided the distal margin is clear of malignant cells, the anastomosis between the colon and anal sphincter can be performed as a straight side-to-end reservoir, a colonic J-pouch reservoir, or a transverse coloplasty.
- The side-to-end coloanal anastomosis has been reported with a 51% success (complete fecal continence) in previous studies
- The colonic J-pouch provides a larger reservoir with a side-to-side anastomosis at the distal 8 cm of the colon to create a pouch with an undistended volume capacity of 60-105 mL
  - colonic J-pouch has better short-term bowel function and lower morbidity, but longterm function and mortality are comparable in these two methods
- In order to protect the anastomosis, a **temporary diverting ileostomy** has been recommended if the anastomosis is low, under tension, presence of an air leak on proctoscopic testing, preoperative chemoradiation, or history of immunosuppressive medication.

### Σύγχρονες Αρχές Χειρουργικής Παχέος Εντέρου για Κακοήθεια

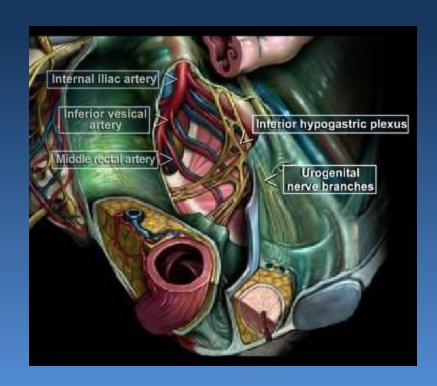
Τεχνική 'no touch'

MEDIAL to LATERAL

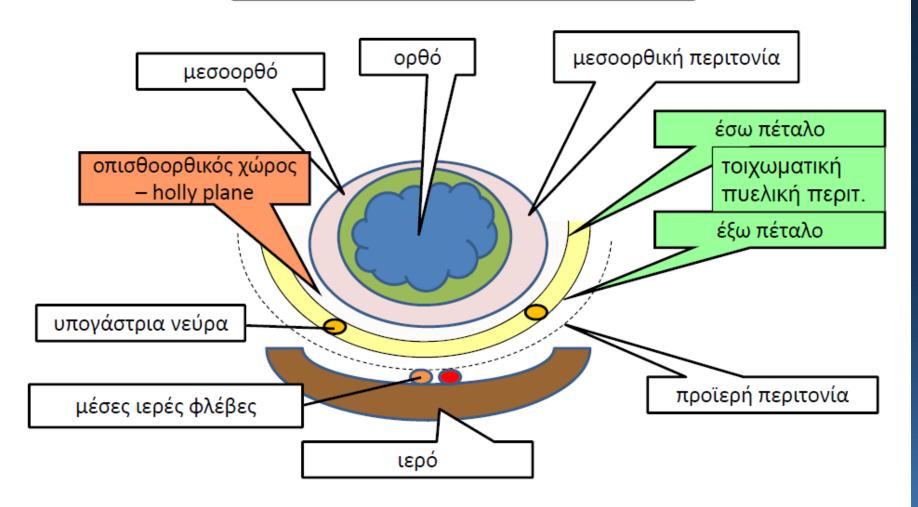
Στόχος: η ολική εκτομή μεσοορθού

## Ολική Εκτομή Μεσοορθού (TME)

- Heald et al.
- Επαναστατική τεχνική στη χειρουργική του ορθού
- Μεσω οποιασδήποτε προσπέλασης
- Παγκόσμια αναγνώριση ως τεχνική εκλογής
  - Μειώνει τα ποσοστά τοπικής υποτροπής



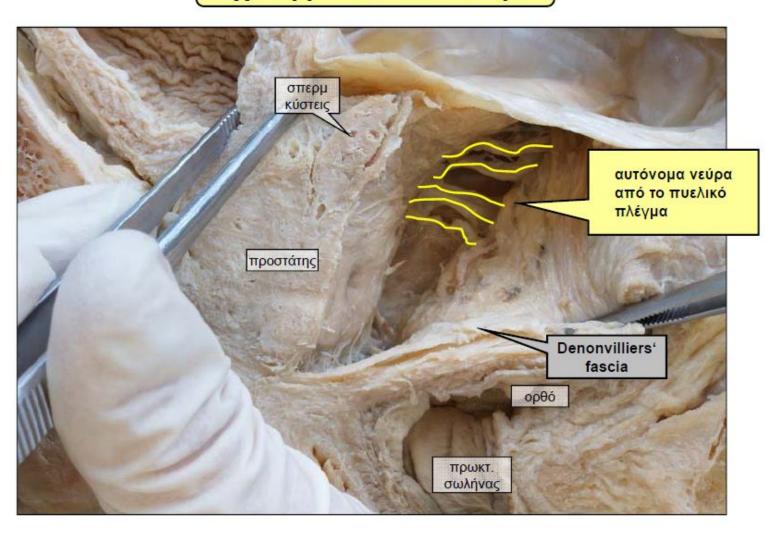
### οπίσθια περιτονιακά πέταλα



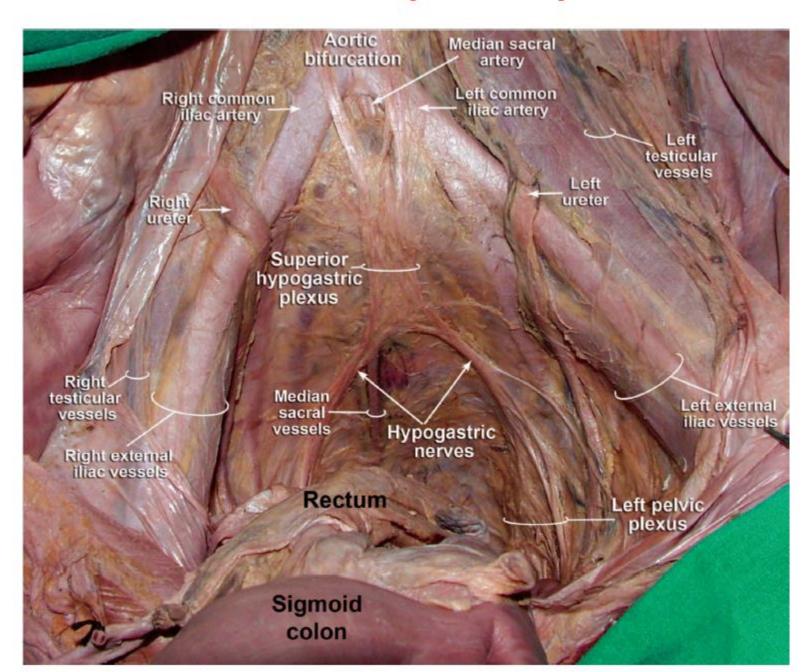
«Hypogastric sheath» – δύο πέταλα τοιχ πυελικής περιτονίας

### πρόσθια παρασκευή ΤΜΕ

### σχέση με πυελικά νεύρα

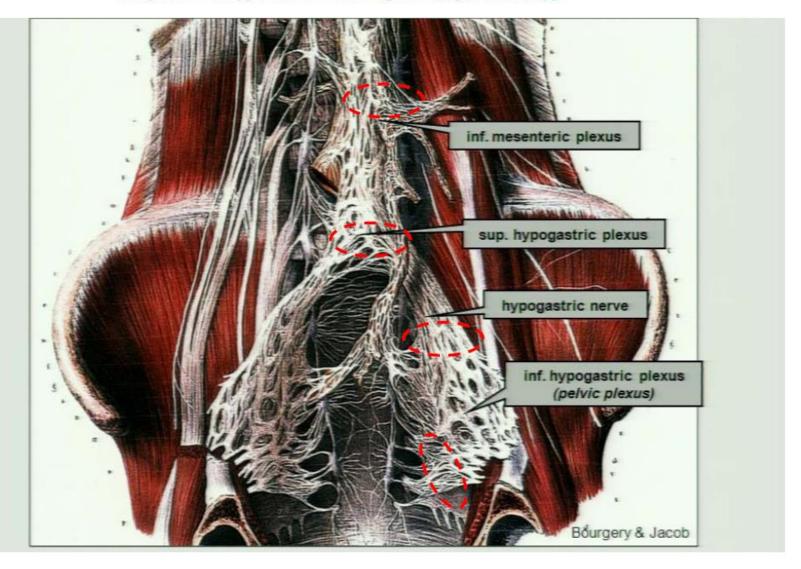


### οπίσθια παρασκευή



### πύελος

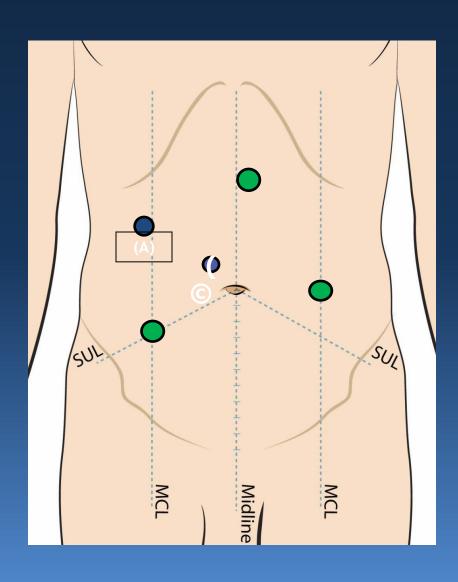
#### νευρικά πλέγματα – πιθανές θέσεις κάκωσης



## Λαπαροσκοπικές Τεχνικές

- Αρχικές ανησυχίες που δεν τεκμηριώθηκαν βιβλιογραφικά:
  - Υποτροπή port-site
  - Κόστος European COlon cancer Laparoscopic or Open Resection (COLOR) trial
  - Ποιότητα ζωής: Clinical Outcomes of Surgical Therapy (COST) study, United States, found that laparoscopicassisted colectomy
  - Ογκολογική ριζικότητα: μελέτη COST

### POMΠΟΤΙΚΕΣ ΤΕΧΝΙΚΕΣ – Tips&Tricks



#### Τροκαρ

C, ο ρομποτικά σημεία εισόδου:

- 12 mm καμερα 30° μοιρών
- 8 mm 2-3 τροκαρ για: ψαλίδι υπερήχων ή vessel sealer. Διπολική διαθερμία, μονοπολικό hook

A - επικουρικά λαπαροσκοπικά ports - 12- 15 mm:

- λαβίδες συλλήψεως, αναρρόφηση, εργαλείοι τοποθέτησης clip
  - Liga-Sure Atlas TM
  - Endo GIA κοπτορράπτες

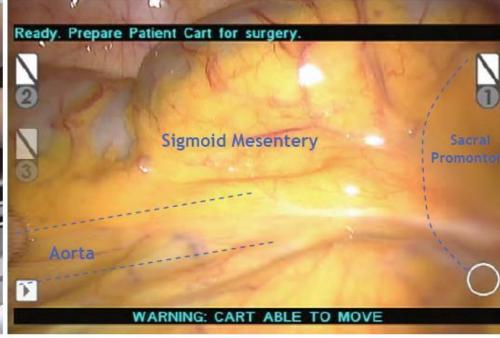
Χωρίς αλλαγή στη θέση του ρομποτικού συστήματος

Πλήρως ρομποτική (ενδοκοιλιακή) επέμβαση στο 95% των ασθενών

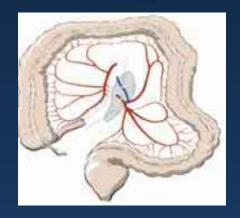
### POMΠΟΤΙΚΗ ΤΕΧΝΙΚΗ – Tips&Tricks

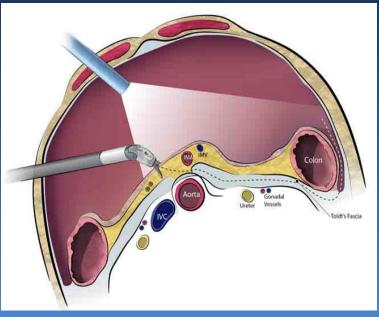


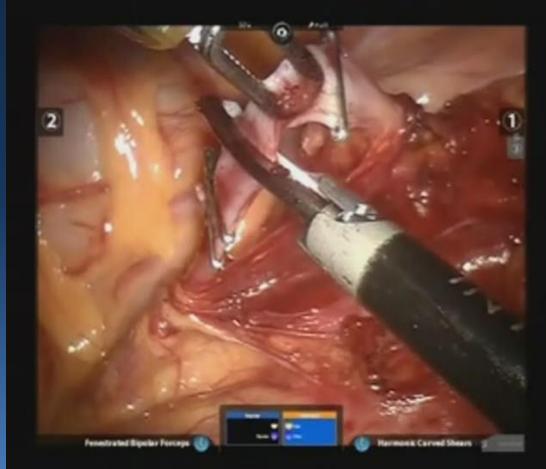


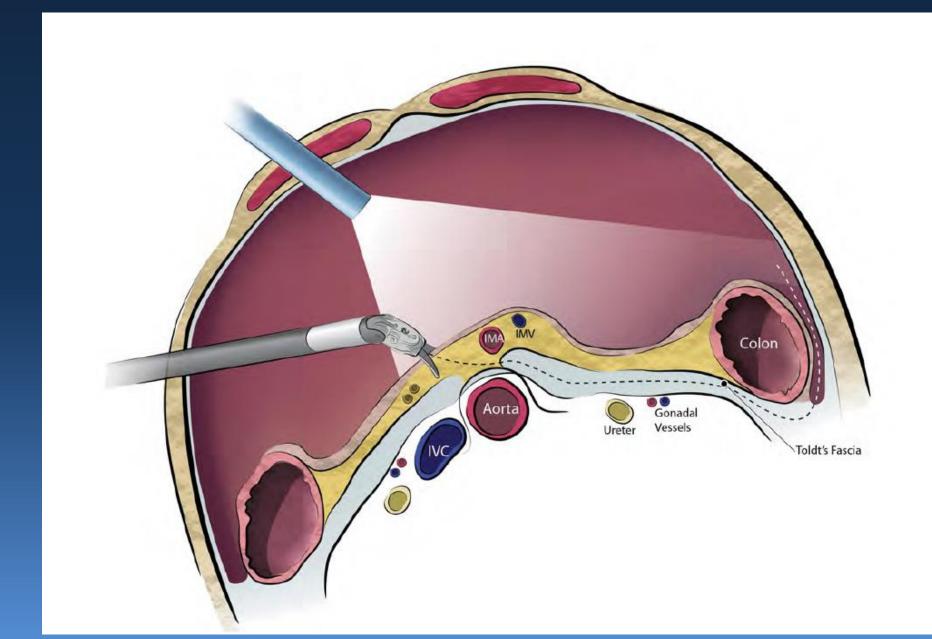


Απολίνωση της ΚΜΦ στο κάτω χείλος του παγκρέατος και της ΚΜΑ στην έκφυσή της (με κλιπς)





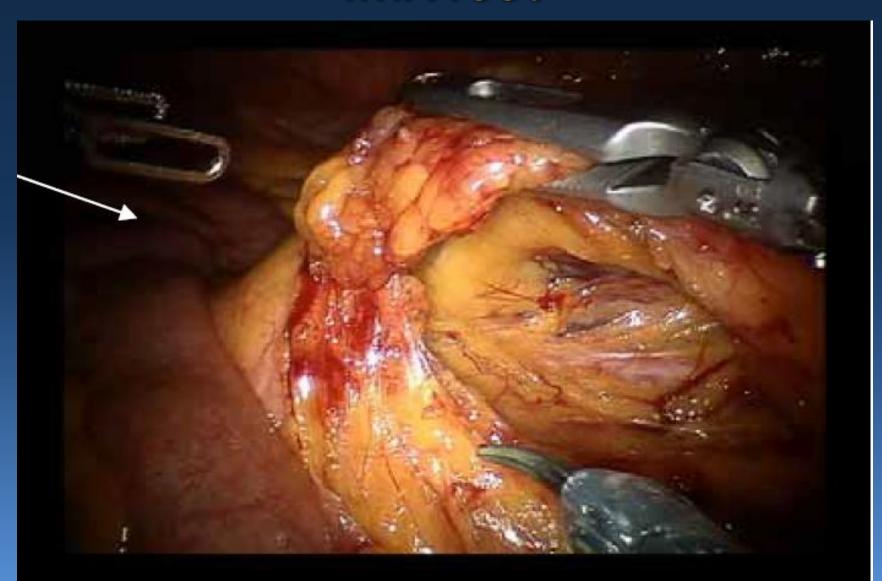




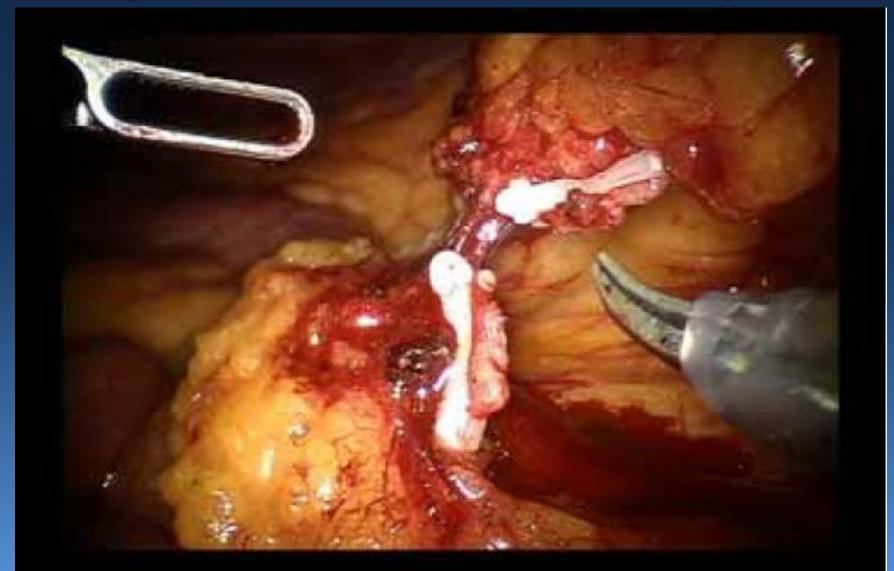
Initial dissection starts with incision of the peritoneum around the base of the sigmoid mesentery



## Identification and exposure of the IMA root

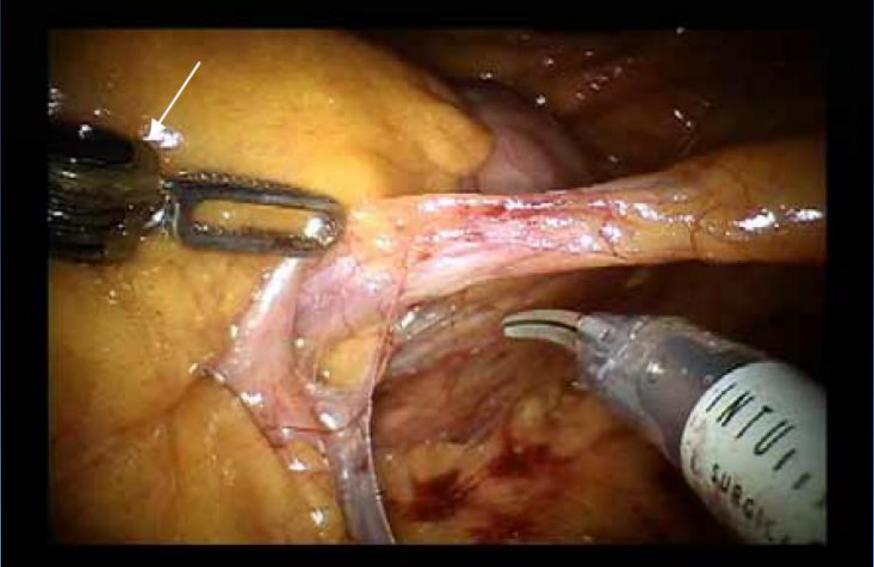


## IMA transected after pervious placement of *Hem-o-lok* clips

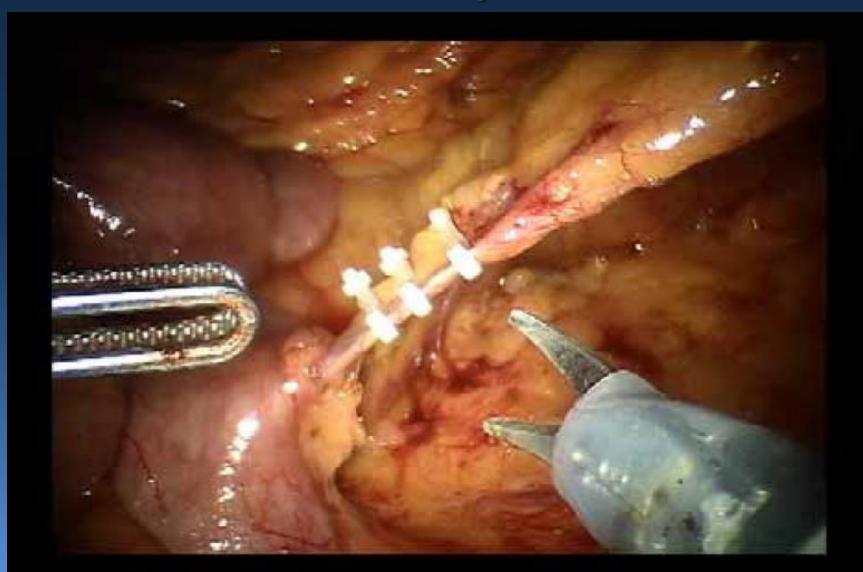


#### Identification and exposure of the IMV

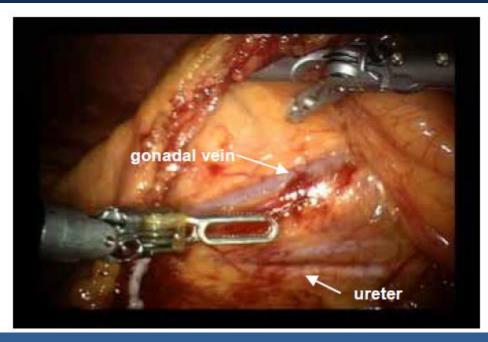
• Transect the IMV close to the inferior border of the pancreas with the *Hot Shears* 

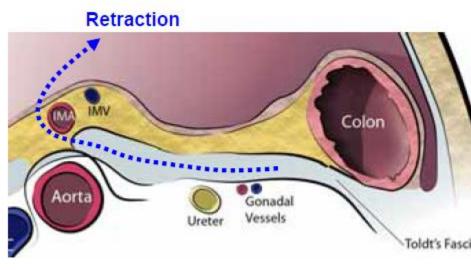


## IMV is clipped and ready for division close to the pancreas

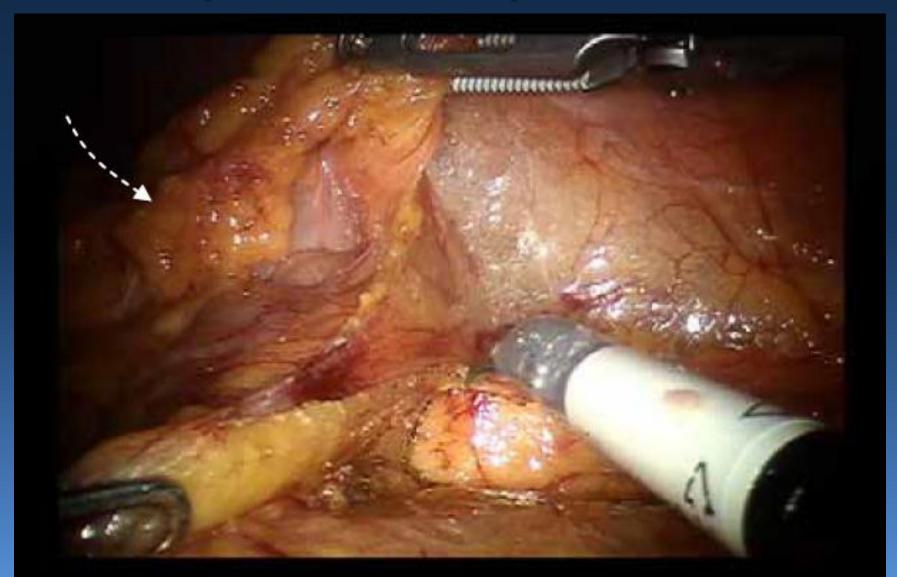


# Avascular dissection plane beneath Toldt's fascia with ureter and gonadal vessels identified





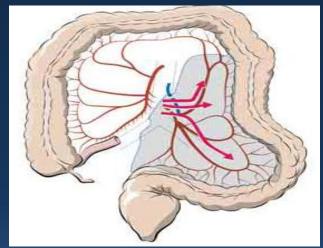
## Division of the last lateral attachments to fully mobilize the splenic flexure

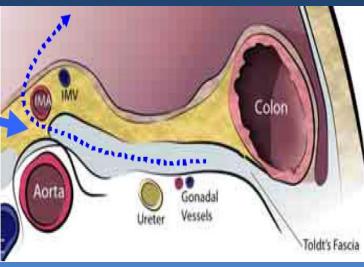


## Endoscopic stapler placed across the colon for transection



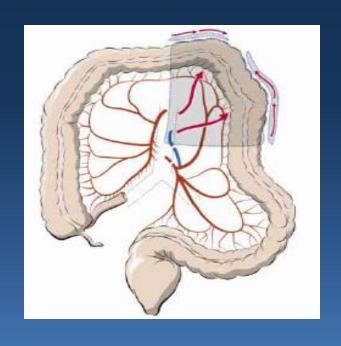
Κινητοποίηση του αριστερού παχέος εντέρου και του μεσοκόλου Εντοπισμός αριστερού ουρητήρα





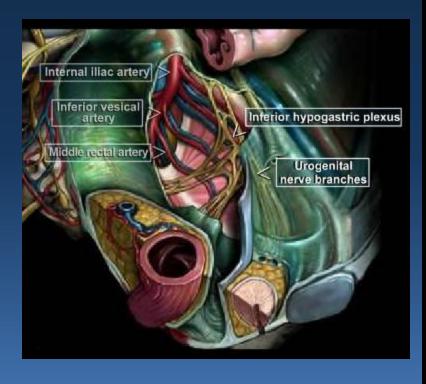


Κινητοποίηση της αριστερής καμπής για αναστόμωση χωρίς τάση στη χαμηλή πρόσθια κολεκτομή

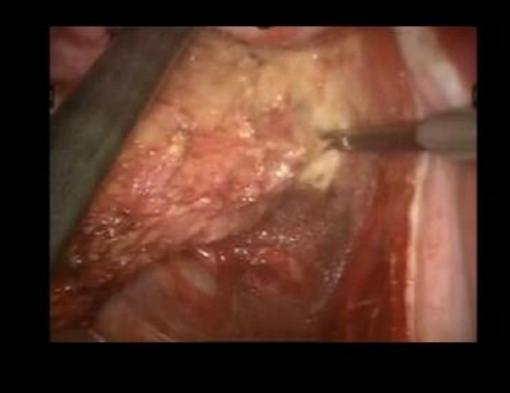




ΤΜΕ/ΡΜΕ στο πλάνο της περιορθικής περιτονίας με διαφύλαξη του υπογαστρίου πλέγματος και των πυελικών αυτόνομων νεύρων







## Stapler "spike" introduced through staple line





### Robotic Colorectal Surgery Studies

 ...rectal procedures in which enhanced maneuverability in the confined space of the pelvis is needed are the most likely beneficiaries

### **Studies**

- Early studies were very promising, finding
  - lower conversion to open rates
  - and faster return of bowel function <sup>22</sup>.
- Studies of total mesorectal excision found that robotic surgeries had
  - fewer genitourinary complications
  - and lower rates of positive circumferential margins,
  - But other outcomes were equal to those of traditional laparoscopic surgery <sup>22</sup>.

### ROLARR study

- Robotic versus Laparoscopic Resection for Rectal Cancer trial, the first multicenter trial comparing robotic versus laparoscopic rectal cancer excisions <sup>24</sup>.
- represented the work of 40 surgeons from 10 countries and 29 hospitals randomly assigning 471 patients with rectal cancer to laparoscopic versus a robotic approach.

### ROLARR

- early data failed to prove superiority of robotics with regard to a number of variables, including
  - circumferential margin positivity,
  - 30-day complication rates,
  - and mortality.
- There was some evidence of
  - lower conversion to open rates,
  - and possible benefits in males and the obese.
- Some of these results are supported by other studies, suggesting that male gender and obesity may be strong indicators for robotic surgery moving forward <sup>25, 26</sup>.
- For proponents, these data represented equivalent outcomes between both approaches.

## Εκπαιδεύσεις: 2005 Laparoscopic Colon Surgery

- Kapodistrian University of Athens
- 1<sup>st</sup> Propedeutic Dpt of Surgery and European Association for Endoscopic Surgery and other interventional

- . ·

Techniques.



## 2010 Μεταπτυχιακό Ελάχιστα Τραυματικής και Ρομποτικής Χειρουργικής

Minimally Invasive Surgical Oncology



## Milan Cancer Institute (Prof.F.Luca)



# Διαπρωκτική ενδοσκοπική μικροχειρουργική 2011 Νίκαια, Γαλλία





### PAROS – MD Anderson, Texas



### 2010 January – 5<sup>th</sup> MIRA – UC San Diego – Robotic TME on a Cadaver





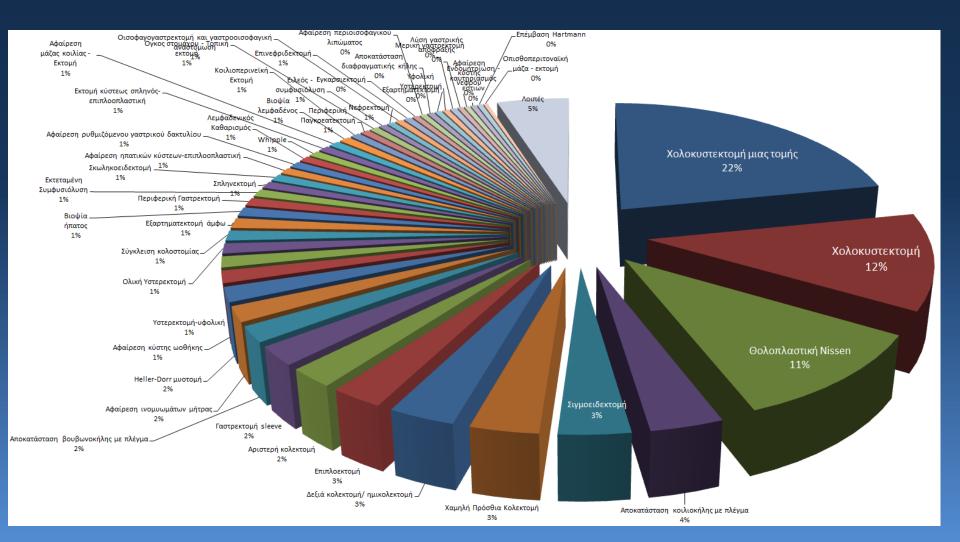
**Course and Laboratory Session in Robotic TME** 

### Ως επιμελητής στο Ιατρικό Αθηνών



# 1014 Ρομποτικές Επεμβάσεις με την Ομάδα του Ιατρικού Κέντρου Αθηνών

Κλινική Γενικής, Λαπαροσκοπικής και Ρομποτικής Χειρουργικής 2007-2017

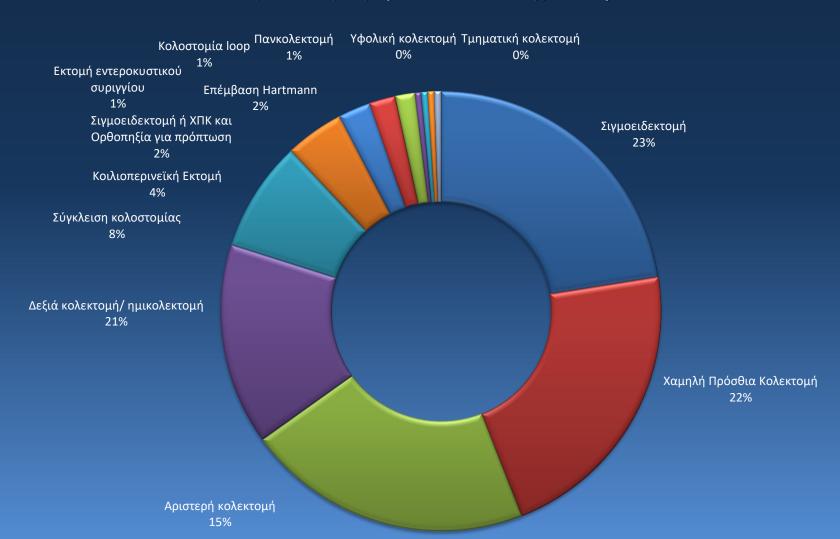


### Ομάδα Ρομποτικής Χειρουργικής Ιατρικού Κέντρου Αθηνών



Τμήμα Γενικής Χειρουργικής Σεπ 2006 – Αυγ 2017

#### 225 (15,66%) αφορούσαν στο παχύ έντερο



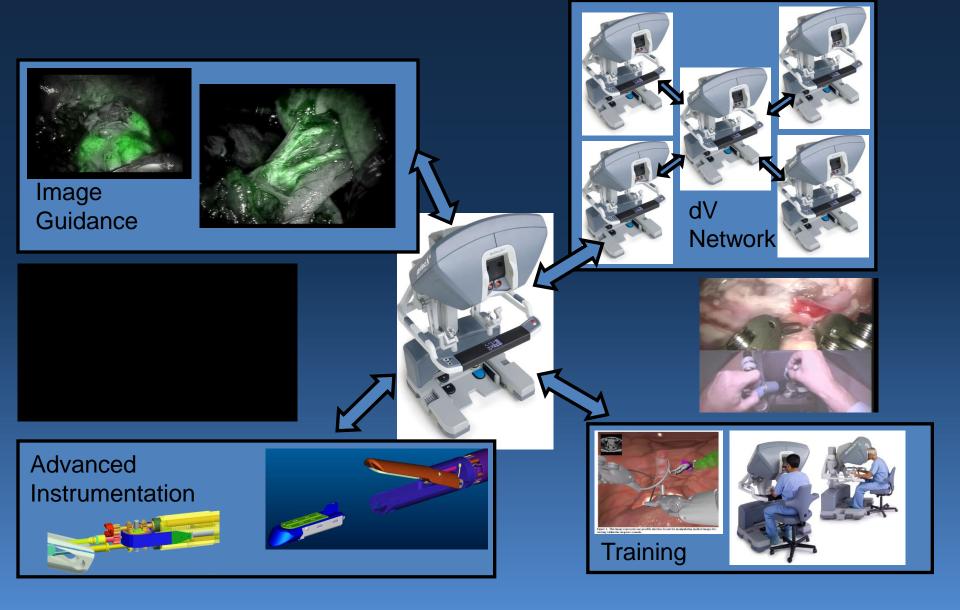


### Αποτελέσματα στο Ca ορθού (n=54)

Επιπλοκές	Περιστατικά / Ποσοστό %
Διαφυγές	2 (3.7 %)
Αναστομωτικές στενώσεις	1 (1,85%)
Μετεγχειρητική αιμορραγία	0
Περινεϊκή ή άλλη λοίμωξη τραύματος	4 (1.85%)

Ογκολογική Ριζικότητα	
Όρια εκτομής	3.2 +/- 1.6 cm
Μέσος αριθμός εξαιρεθέντων λεμφαδένων	17.684 (μέγιστη τιμή: 36)

### Ρομποτική Τηλεχειρουργική Τεχνολογία





### Ρομποτική Χειρουργική - Υπερ

### Για τον ασθενή:

- Καλύτερη διαφύλαξη του υπογαστρίου και αυτόνομου πυελικού νευρικού πλέγματος – καλύτερη ποιότητα ζωής
- Υψηλός αριθμός λεμφαδένων κατά τον λεμφαδενικό καθαρισμό
- Χαμηλά ποσοστά μετατροπής
- Χαμηλή απώλεια αίματος
- Χαμηλή νοσηρότητα



### Ρομποτική Χειρουργική - Υπερ

#### Για τον χειρουργό

• Εργονομία

- Καλύτερη παρασκευή ιστών και βέλτιστη πρόσβαση σε στενούς χώρους όπως η ανδρική πύελος
- Βοηθά τον χειρουργό να χρησιμοποιεί άνετα και τα δυο του χέρια (ambidexterity)

 Μικρότερη καμπύλη εκμάθησης από την λαπαροσκόπηση Nέες Τεχνολογίες / Tips & Tricks Fluorescence Imaging on da Vinci

New camera head can pass fluorescence signal

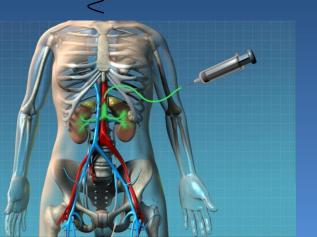


Fluorescing signal overlaid with green hue in surgeon console



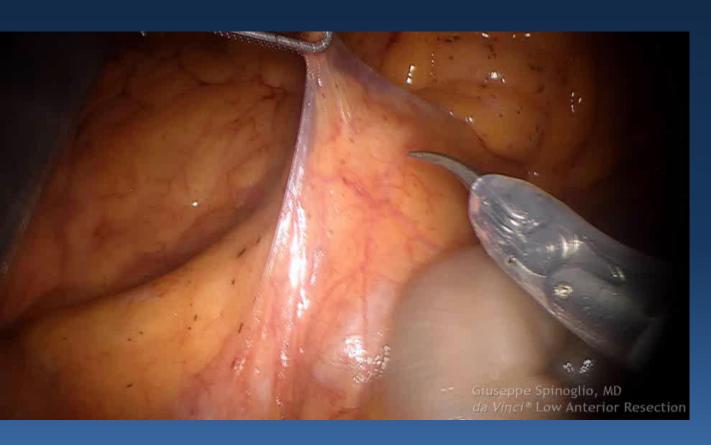
Renal arteries - fluorescence mode (NIR)







#### dVLAR: Identification of IMA



#### **ICG Dose**

■ 5mg (2mL) – fast bolus

#### When / Why

- During dissection of the mesentery
- Identify IMA

#### Time to See

- 30 seconds after peripheral IV injection
- Will last for 30 seconds
- Can inject multiple doses

## dVLAR: Perfusion Assessment of the Proximal Colon



#### **ICG** Dose

■ 10mg (4mL) – fast bolus

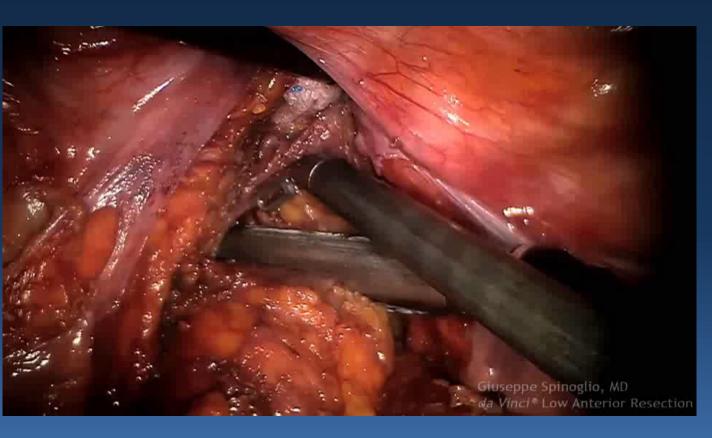
#### When / Why

- Before transection of the proximal bowel
- Perfusion assessment to identify the ischemic boundary

#### **Time to See**

- 30-45 seconds after peripheral IV injection
- Will last for 3-5 minutes.
- Can inject multiple doses

# dVLAR: Perfusion Assessment of the Distal Colon



#### **ICG** Dose

■ 10mg (4mL) – fast bolus

#### When / Why

- Before transection of the sigmoid or rectum
- Perfusion assessment to identify the ischemic boundary

#### **Time to See**

- 30-45 seconds after peripheral IV injection
- Will last for 3-5 minutes
- Can inject multiple doses

# N 875383 Rev B 3/12

### Fluorescence Imaging for Colorectal Surgery Reduces Postoperative Anastomotic Leaks

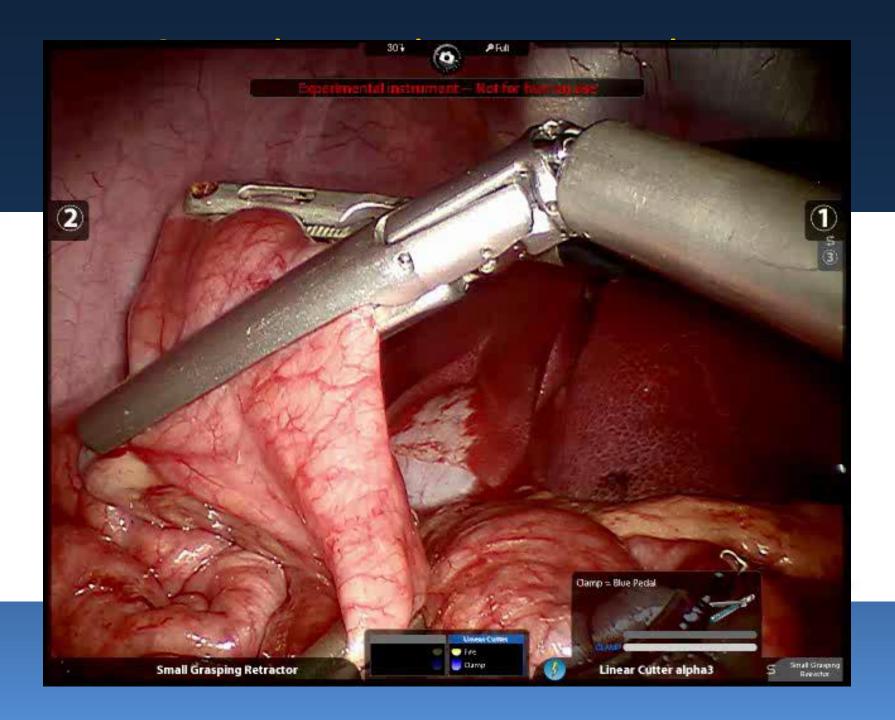
	Fluorescence arm n=201	Control arm (no fluoro) n=201	<i>p</i> -value
Leaks in patients age ≤ 70	3% (3/107)	3.7% (4/107)	NS
Leaks in patients age ≥ 70	4.3% (4/94)	11.9% (11/94)	<i>p</i> =0.04
Overall Leak Rate	3.5% (7/201)	7.5% (15/201)	NS

Postoperative results: Anastomosis leak rate by age group and cohort<sup>1</sup>
\*Note: This study did not utilize the da Vinci Surgical System or Firefly fluorescence imaging

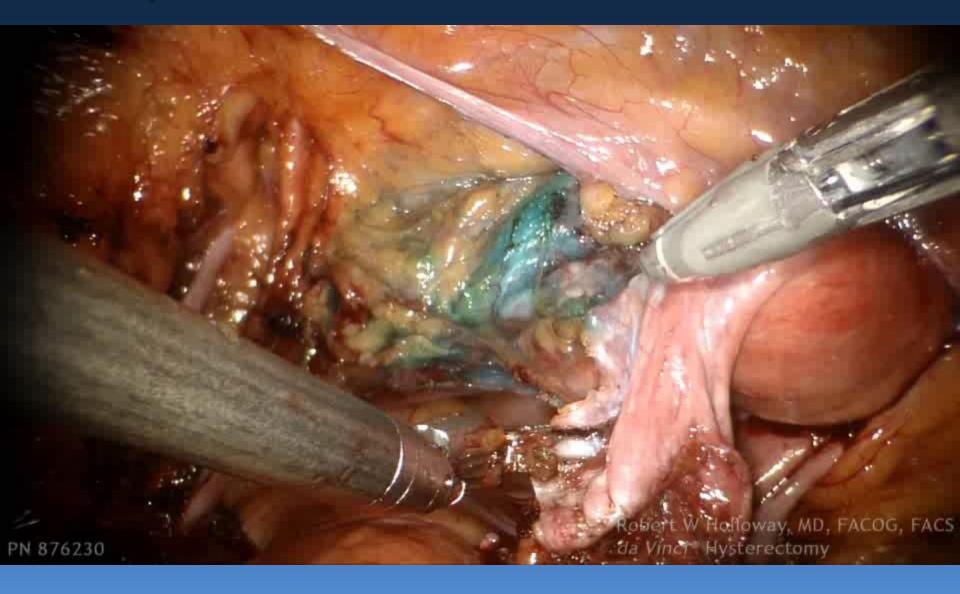
The cost to treat a post-operative leak after colon surgery is high: ~\$100K<sup>2</sup>

<sup>1.</sup> S Kudszus, C Roesel, A Schachtrupp, JJ Höer. Intraoperative laser fluorescence angiography in colorectal surgery: a noninvasive analysis to reduce the rate of anastomotic leakage. Langenbecks Arch Surg (2010) 395:1025-1030.

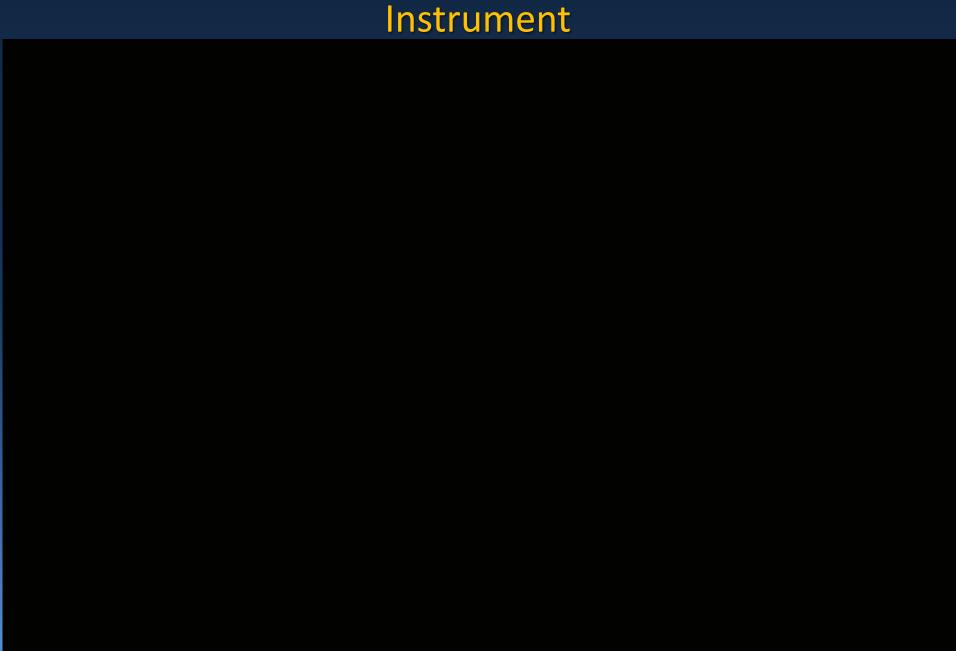
<sup>2.</sup> R. Vonlanthen, K. Slankamenac, S. Breitenstein, M Puhan, M Muller, D Hahnloser, DHauri, R Graf, P Clavien. The Impact of Complications on Costs of Major Surgical Procedures: A Cost Analysis of 1200 Patients. Published ahead of print. Annals of Surgery, 2011.



### Tips& Tricks: Wristed Cut & Seal



# Tips& Tricks: Wristed Suction-Irrigation Instrument



### Robotic-controlled Vascular Clamp

#### Features:

- Dedicated connection for EndoWrist Instruments
- Increased autonomy from the surgeon console



- Target Procedures:
  - Partial Nephrectomy
  - Lobectomy
  - Revascularization

### Ρομποτική Χαμηλή Πρόσθια Κολεκτομή 💯







### Ρομποτική σύγκλειση κολοστομίας, Χαμηλή Πρόσθια Κολεκτομή και Αναστόμωση

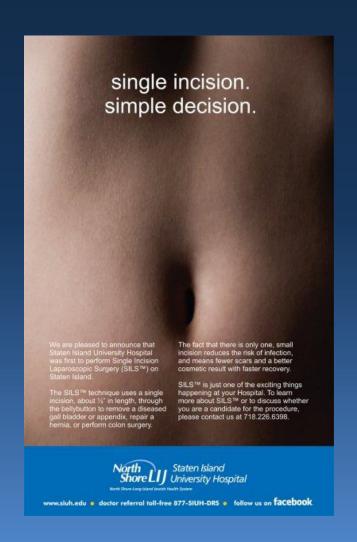








# Marketing: new technology = selection criterion for patients

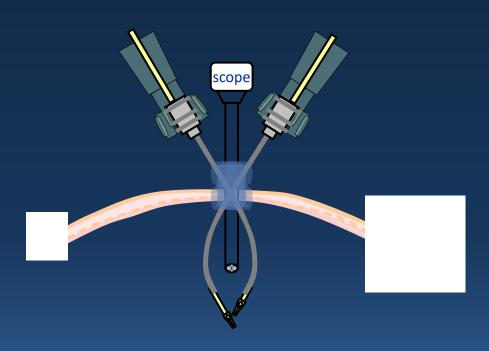


### Single – Site Robotic Surgery

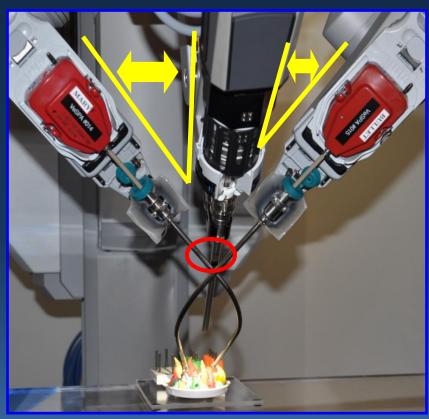


### da Vinci Single-Site



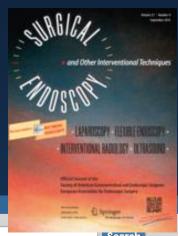


- Using da Vinci Si system with 8.5mm3D HD endoscope
- Curved Instrument Cannulae
- 5mm, non-wristed, semi-rigid instruments



(da Vinci Single Site prototype)

### Robotic Single Site Cholecystectomy (Published Work)





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PubMed

Surg Endosc. 2012 Sep;26(9):2687-94. doi: 10.1007/s00464-012-2227-2. Epub 2012 Apr 5.

Advanced

Abstract -

Send to: -

Cholecystectomy using a novel Single-Site(®) robotic platform: early experience from 45 consecutive cases.

Konstantinidis KM<sup>1</sup>, Hirides P, Hirides S, Chrysocheris P, Georgiou M.

Author information

#### Abstract

BACKGROUND: The aim of this work was to study the feasibility, safety, and efficacy of single-incision robotic cholecystectomy using a novel platform from Intuitive Surgical.

METHODS: All operations were performed by the same surgeon. Parameters assessed included patient history, indication for surgery, operation time, complication rate, conversion rate, robot-related issues, length of hospital stay, postoperative pain, and time to return to work. All patients were followed for a 2-month period postoperatively.

RESULTS: Forty-five patients (22 women, 23 men) underwent single-incision robotic cholecystectomy from March 1 to July 15, 2011. There were no conversions to either conventional laparoscopy or laparotomy, although in three cases a second trocar was used. There were no major complications apart from a single case of postoperative hemorrhage. Average patient age was 47 ± 12 years (range = 27-80 years) and average BMI was 30 kg/m(2) (mean = 28.8 ± 4 kg/m(2), range = 18.4-46.7 kg/m(2)). The primary indication for surgery was gallstones. The mean operation time (skinto-skin) was 84.5 ± 25.5 min (range = 51-175 min), docking time was 5.8 ± 1.5 min (range = 4-11 min), and console time (net surgical time) was 43 ± 21.9 min (range = 21-121 min). Intraoperative blood loss was negligible. There were no collisions between the robotic arms and no other robot-related problems. Average postoperative length of stay was less than 24 h. The mean Visual Analog Pain Scale Score 6 h after the operation was 2.2 ± 1.51 (range = 0-6) and patients returned to normal activities in 4.48 ± 2.3 days (range = 1-9 days).

CONCLUSIONS: Single-Site(®) is a new platform offering a potentially more stable and reliable environment to perform single-port cholecystectomy. Both simple and complicated cholecystectomies can be performed with safety. The technique is possible in patients with a high BMI. The induction of pneumoperitoneum using the new port and the docking process require additional training.

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Robotic coloanal anastomosis with or without intersphincteric resection [Ann Surg Oncol. 2012]

Review Single-site robotic cholecystectomy (SSRC): an initial review of s [Minerva Chir. 2013]

Review Single-incision laparoscopic cholecystectomy: a su [J Gastrointest Surg. 2010]

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Review Single-incision laparoscopic surgery for

PMID: 22476831 [PubMed - indexed for MEDLINE]







# Robotic single site Right Colectomy (Published Work)





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Abstract   I Robot Surg. 2015 Jun;9(2):157-61. doi: 10.1007/s11701-015-0499-y. Epub 2015 Feb 7.  R-LESS right colectomy with the single-site® robotic platform.  Konstantinidis K¹, Hirides S², Chrysoheris P¹, Antonakopoulos F¹, Hirides P¹.  Author information  Abstract  BACKGROUND: Use of robotics has exemplified single-site procedures by restoring the correct hand-instrument alignment and providing stable, stereoscopic visual field. Technique was initially introduced by the manufacturers for cholecystectomy, but experienced teams quickly extended the indications to more complex procedures. We hereby present a case of a patient that underwent robotic right colectomy and omentectomy through the single-site(®) platform.  METHODS: A single-site procedure was offered to our 58-year-old male patient with carcinoma of the ascending colon and he gave written consent for it. The VESPA(®) single-site platform was used according to the standards of the manufacturing company. The single-site port(®) was placed at the umbilicus. Rest of setup and procedure steps were based on the multiport technique. An extended omentectomy accompanying the right colectomy has not previously reported to our knowledge. After sufficient mobilization specimen was exteriorized through the umbilicus, excised and the anastomosis was performed using linear staplers.  RESULTS: Console time was 164 min and total operation time was 221 min. Intraoperatively, there was no need for conversion, additional ports or	Full text links  SpringerLink  TOUSTITE PARTICUS  Save items  Add to Favorites  Similar articles  Robotic total thyroidectomy with modified radical neck dissection via unilat [Ann Surg Oncol. 2014]  Robot-assisted Sistrunk's operation, total thyroidectomy, and neck [Ann Surg Oncol. 2012]  Review Robotic right colectomy using the Da Vinci Single-Site® platfor [Int J Med Robot. 2013]  Robotic-assisted single-incision right colectomy:
blood transfusions. Total console time was 164 min. Lacking of wristed instruments and bipolar energy were regarded as serious limitations. No drains were used. Patient did not require ICU stay and had no postoperative complaints. He was given liquid diet on PO day #2 and he was discharged on PO day #4.  CONCLUSIONS: Robotic single-site right colectomy is safe and feasible in selected cases. Experience from single-site robotic cholecystectomy is a useful basis to expand the indications to more complex procedures. Further development of the instruments and large number of cases may justify the indications for using this technique in the future.  KEYWORDS: Robotic Surgery; Single-incision colorectal surgery; Single-site platform; Single-site surgery; VESPA	early experience. [Int J Med Robot. 2009]  Review Current status and future directions of robotic single-site surgery: a sys: [Eur Urol. 2013]  See reviews  See all
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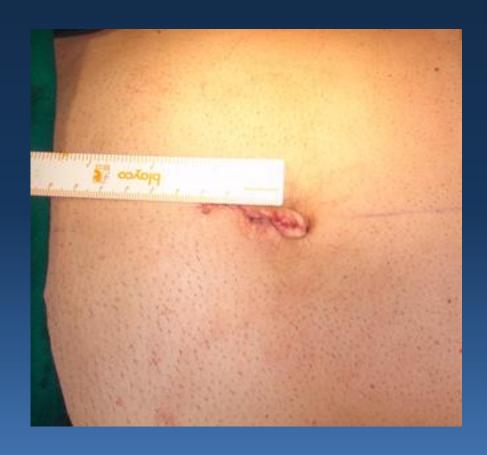


### FINAL INCISION TO CLOSE





### Final result



### dV Sp? Transanal LAR? The future?

### ΣΥΜΠΕΡΑΣΜΑΤΑ

- Απαιτείται σεβασμός στη χειρουργική του ορθού: προς το παρόν η ρομποτική δεν χρησιμοποιεί τεχνητή νοημοσύνη και δεν παρεμβαίνει στις αποφάσεις του χειρουργου. Είναι απλά ένα εξελιγμένο λαπαροσκοπικό εργαλείο.
- Η ρομποτική χειρουργική ίσως αποτελέσει τεχνική εκλογής για όγκους πυέλου:
  - Προστατεκτομή
  - Γυναικολογικός καρκίνος
  - Καρκίνος ορθού
- Διευκολύνει την παρασκευή των ιστών βαθιά μέσα στη στενή πύελο, ιδίως σε μεγάλους όγκους και
- Μικρότερη καμπύλη εκμάθησης
- Υποσχόμενη στον λεμφαδενικό καθαρισμό για εκτομή RO
- Μικρότερα ποσοστά μετατροπής σε ανοικτή επέμβαση

### Ευχαριστώ για την προσοχή σας

