

ROBOTIC UROLOGIC SURGERY



Robert I. Carey MD PhD

Urology Treatment Center

Florida State University School of Medicine

Sarasota Memorial Hospital

State of the Art Robotic Surgery

Topics for prostate cancer:

PSA screening

Diet and prevention

The “trifecta” for prostate cancer treatment:

Cancer cure

Continence

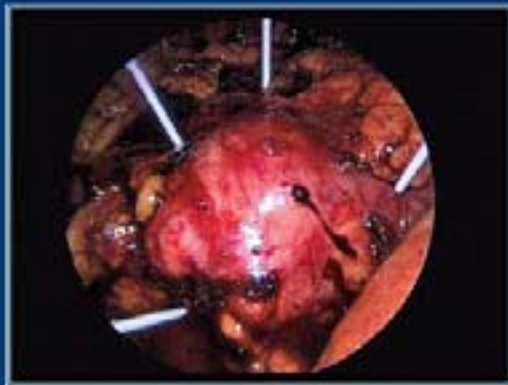
Preservation of potency

JOURNAL OF ENDUROLOGY



EDITORS:

Ralph V. Clayman, M.D.
Arthur D. Smith, M.D.



Mary Ann Liebert, Inc.  publishers

**Direct, real-time
temperature monitoring
during radiofrequency
and microwave ablation
of renal tumors greater
than 3 cm**

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Miller School of Medicine

An inspiring physical, emotional, and spiritual guide for prostate cancer patients, survivors, and their loved ones

Conquer Prostate Cancer empowers patients to face diagnosis with dignity, explore their options realistically, and tackle recovery with optimism and determination.

The first book to emphasize robotic surgery for prostate cancer from an informed layman's perspective, *Conquer Prostate Cancer* discusses the latest research and advances in treatment, and profiles twenty patients who chose various treatment options.

As the author and his wife share the most intimate details of their prostate cancer journey, you'll learn how to:

- Become an active member of your medical team
- Reduce pain and stress and renew your vitality
- Overcome impotence and incontinence
- Enhance your intimate relationships
- Draw strength from your faith, family, and friends

With its low-keyed humor, positive and hopeful tone, and well-researched facts, this book is a powerful tool for surviving prostate cancer.

"Rabbi Weinsberg draws on his own medical ordeal to bring guidance and comfort to others."

—Rabbi Harold Kushner, author of *When Bad Things Happen to Good People*

"Experience the joys of sex again . . . brilliant, inspiring, and gutsy."

—Dr. Ellen Kresidman, psychologist and relationship expert appearing on *Oprah*, *The Today Show* and *The View*, featured in *The New York Times*

"I applaud the author for recognizing that wives, in their own way, get prostate cancer too."

—Leah Cohen, prostate cancer survivor's wife and prostate cancer blog editor

Edgar Weinsberg is a prostate cancer survivor and rabbi with a doctorate in gerontology from Columbia University. Robert Carey, M.D. is a prominent urologist and robotic surgeon with a Ph.D. from MIT. David Kauder, M.D., the book's medical advisor, has been a urologist for 30 years and is a former president of the Massachusetts Association of Practicing Urologists.



Health
Success
Media



\$18.95 U.S.

CONQUER PROSTATE CANCER

Weinsberg / Carey



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Rabbi Ed Weinsberg
with Dr. Robert Carey

CONQUER PROSTATE CANCER

How Medicine, Faith, Love and Sex
Can Renew Your Life

A PORTION OF THIS BOOK'S PROCEEDS WILL BENEFIT
PROSTATE CANCER SUPPORT AND EDUCATION

2008 Chinese Medical Society, Shanghai

**2008 Royal College of Surgeons Ireland –
Irish Society of Urology**

**2008 World Urology Robotic Surgery
Symposium**

**2006&2007 &2008 Society of Engineering and
Urology**

**2006 World Congress of Endourology – First
Prize Lecture**

2006 American College of Surgeons

2006 American Urological Association

Prostate Cancer

“Conquer Prostate Cancer”

by Rabbi Ed Weinsberg and Robert I. Carey

J. Robotic Surgery Editorial Staff

Publications and Presentations

Kidney Cancer

First prize lecture and publication for the nephron-sparing surgery using ablation technology

Urothelial Cancer

Patent for Drug delivery to treat urothelial cancer in the Upper Urinary Tract

Review article “Upper tract urothelial carcinoma”

Journal of Expert Reviews in Anti-cancer therapy

Evolution of Robotic Technology

- ◆ AESOP
- ◆ Zeus
- ◆ da Vinci
(Intuitive Surgical)
- ◆ Original concept
(military purposes)



da Vinci S Surgical System

- ◆ **da Vinci® system (Intuitive Surgical)**
 - Computer integration
 - Intra-abdominal articulation of the microinstruments
 - True 3D binocular vision
 - Remotely controlled robotic arms on surgical cart
 - Magnification, tremor filtration, motion scaling



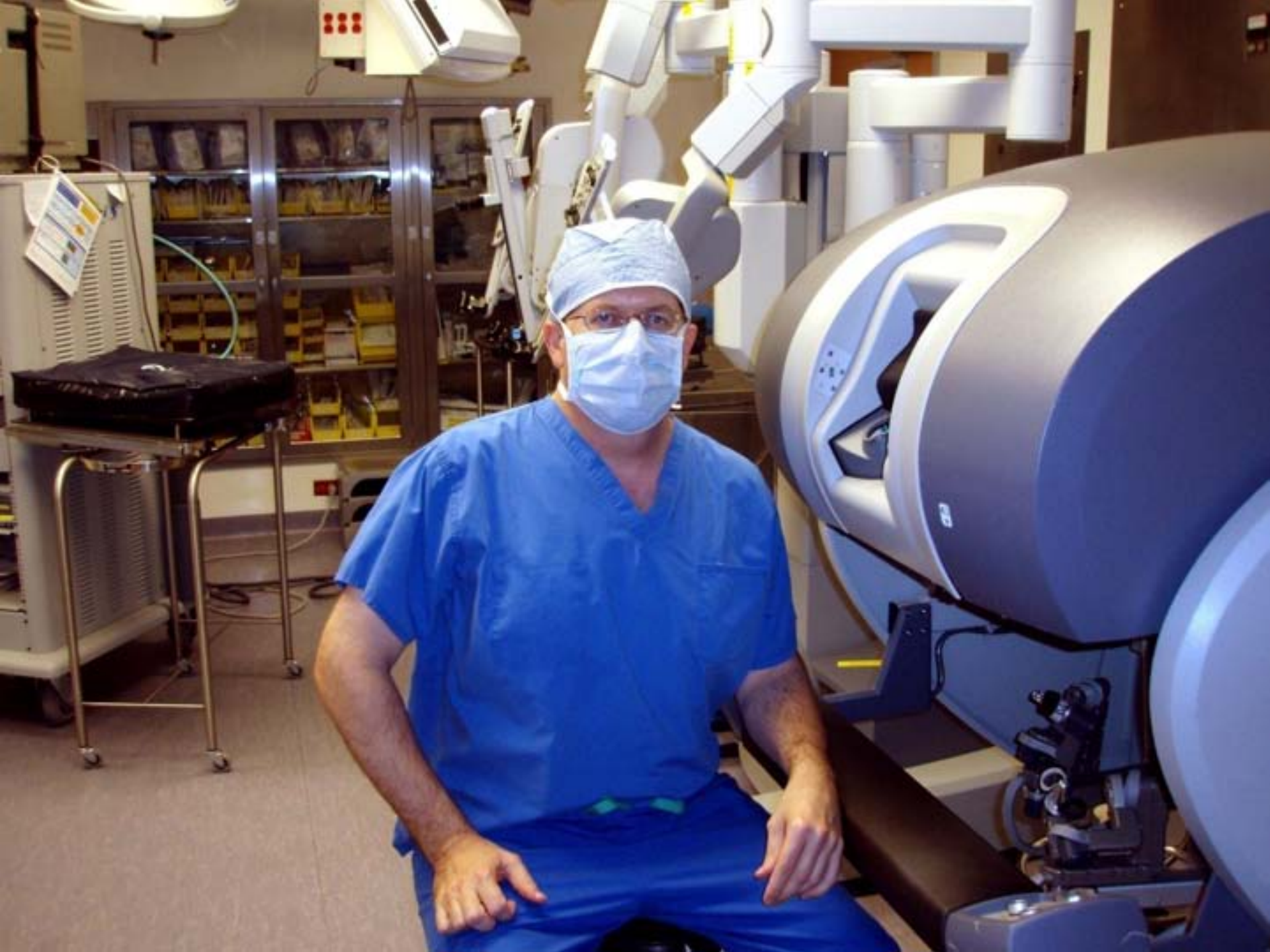
Console

Surgeon Console

- Hand to eye alignment
- Natural intuitive movements
- Ergonomic surgeon position
- Navigator™ camera control







da Vinci™ provides true 3-D vision

InSite™ 3-D Vision System

- Superior 3-D image
- Stereoscopic design with two 3-chip cameras
- 75% better resolution than any imaging system



Advantages of the daVinci Robot

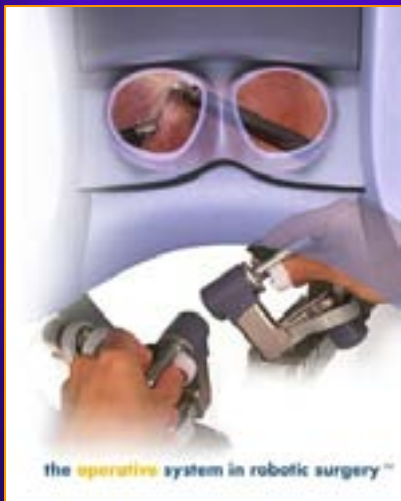
Stereoscopic 3-D vision

Robotic wrist

Six degrees of freedom

Tremor filtering

Movement scaling







Robotic Utilization

◆ Cardiac Surgery

- Atrial septal defect closure
- Totally endoscopic coronary bypass
- Mitral valve repair
- Internal thoracic artery take-down
- LV bipolar pacing lead placement
- Patent ductus arteriosus closure

◆ General Surgery

- Cholecystectomy
- Nissen fundoplication
- Gastric bypass
- Colectomy
- Adrenalectomy
- Splenectomy
- Gastrectomy
- Donor nephrectomy

◆ Thoracic Surgery

- Esophagectomy
- Heller myotomy
- Pulmonary resection

◆ Urologic Surgery

- Prostatectomy
- Cystopexy
- Pyeloplasty
- Ureteral Reimplantation

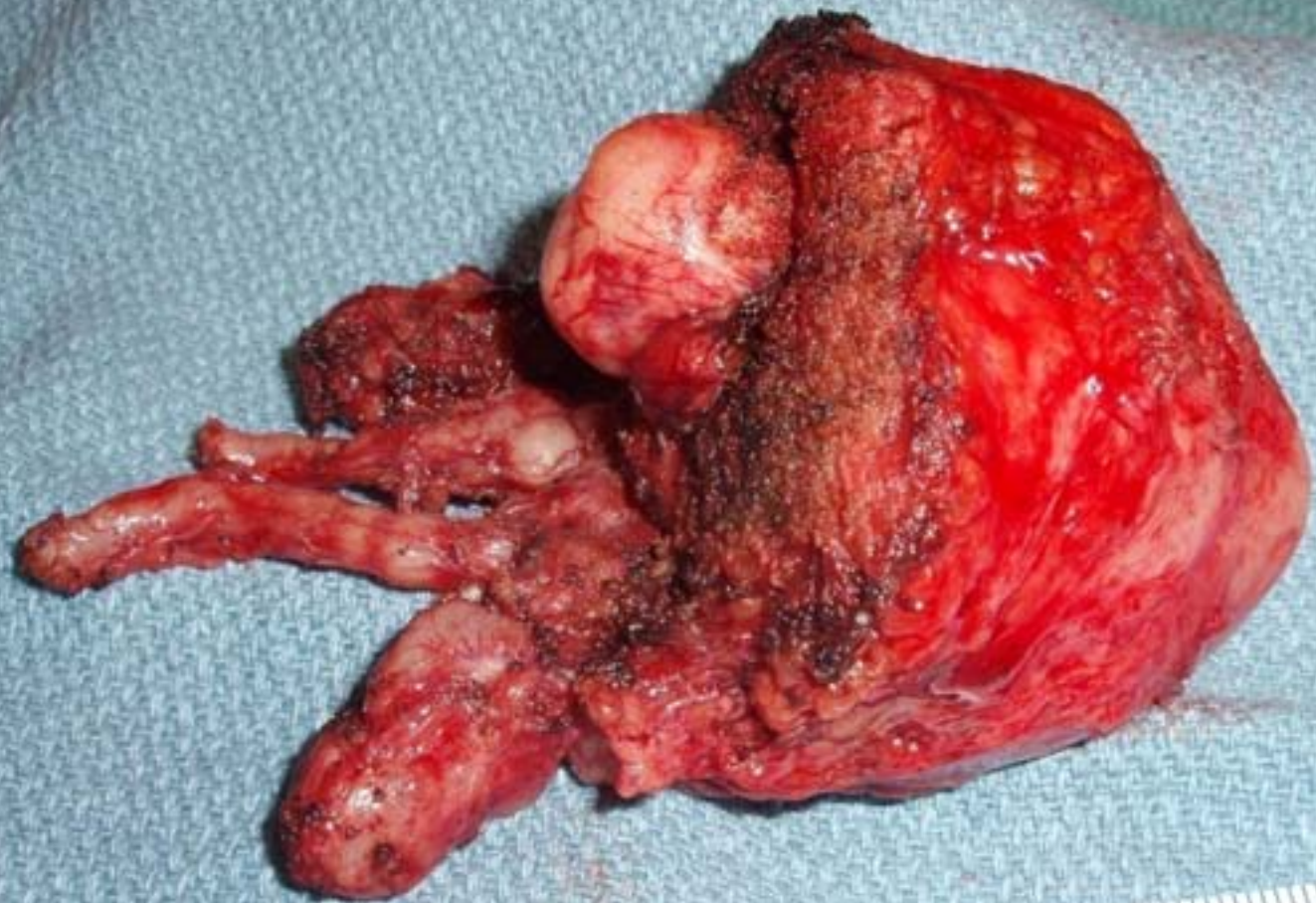
◆ Gynecologic Surgery

- Salpingectomy
- Oophorectomy
- Tubal reanastomoses
- Hysterectomy
- Myomectomy

Urologic Robotic Procedures

- ◆ Radical prostatectomy
- ◆ Pyeloplasty
- ◆ Psoas hitch, Boari flap
- ◆ Ureteral reimplantation
- ◆ Bladder diverticulectomy
- ◆ Cystectomy, neobladder
- ◆ Renal transplantation
- ◆ Adrenalectomy
- ◆ Nephrectomy

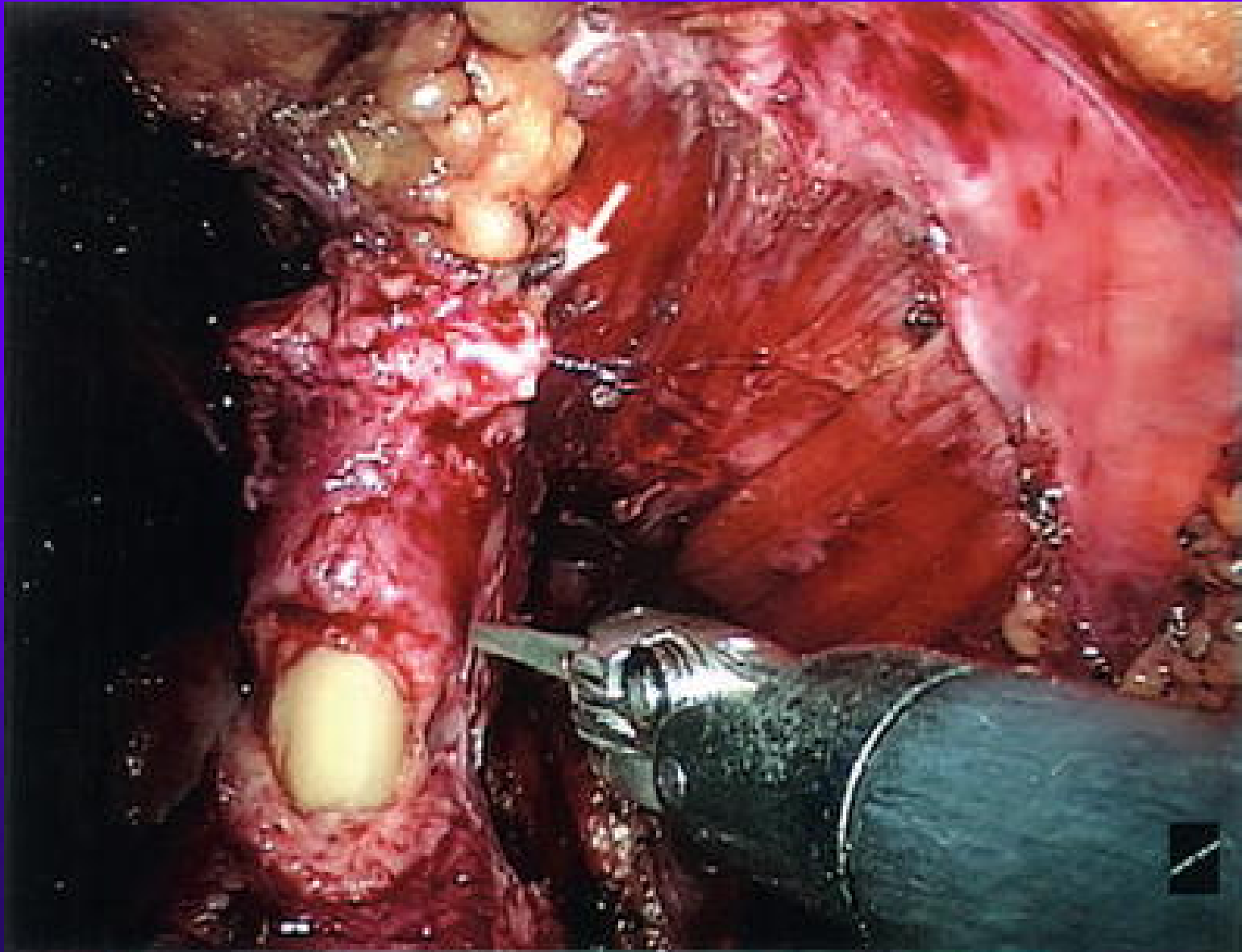


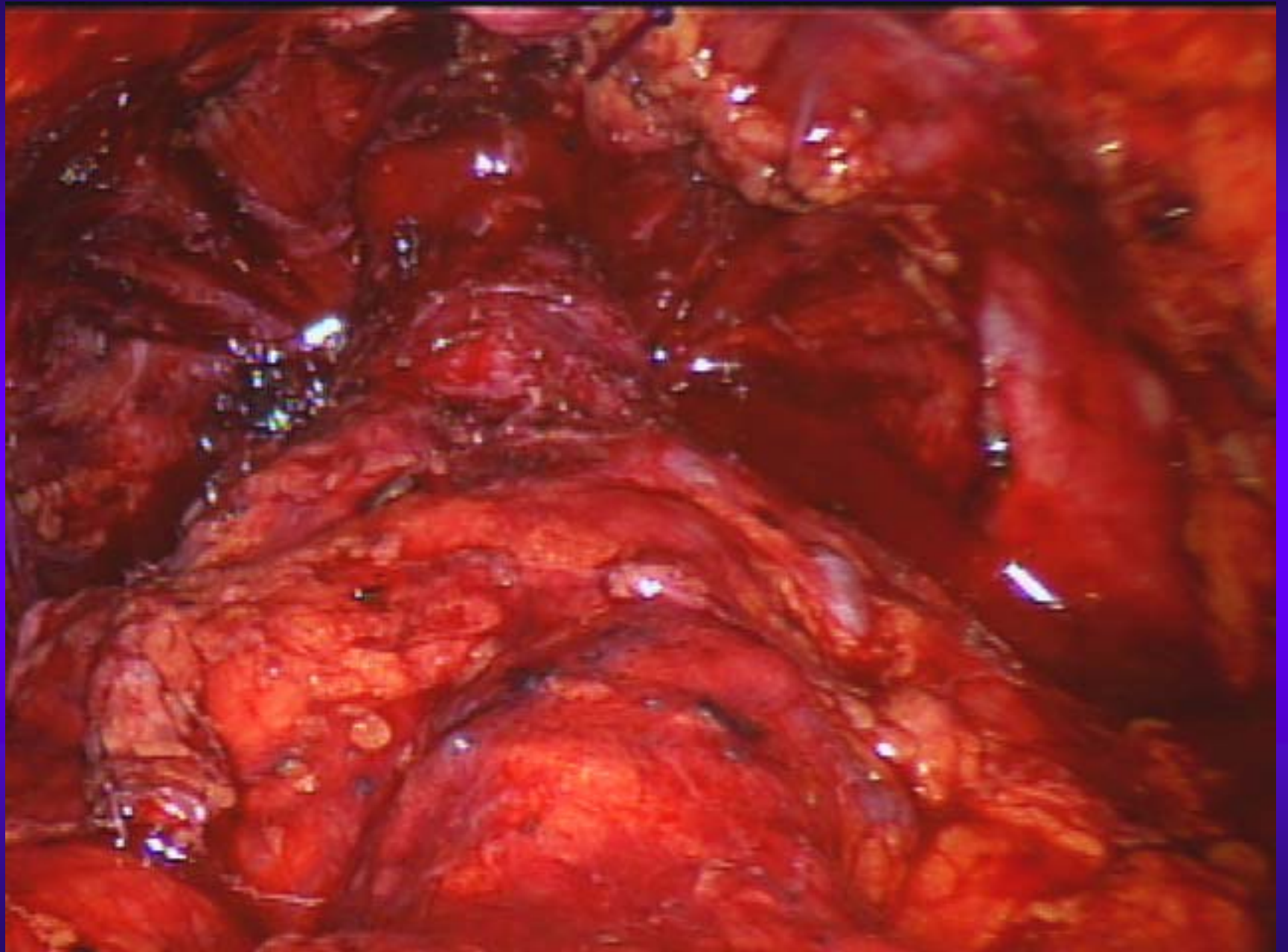


Aspen Surgical 1-888-364-7004

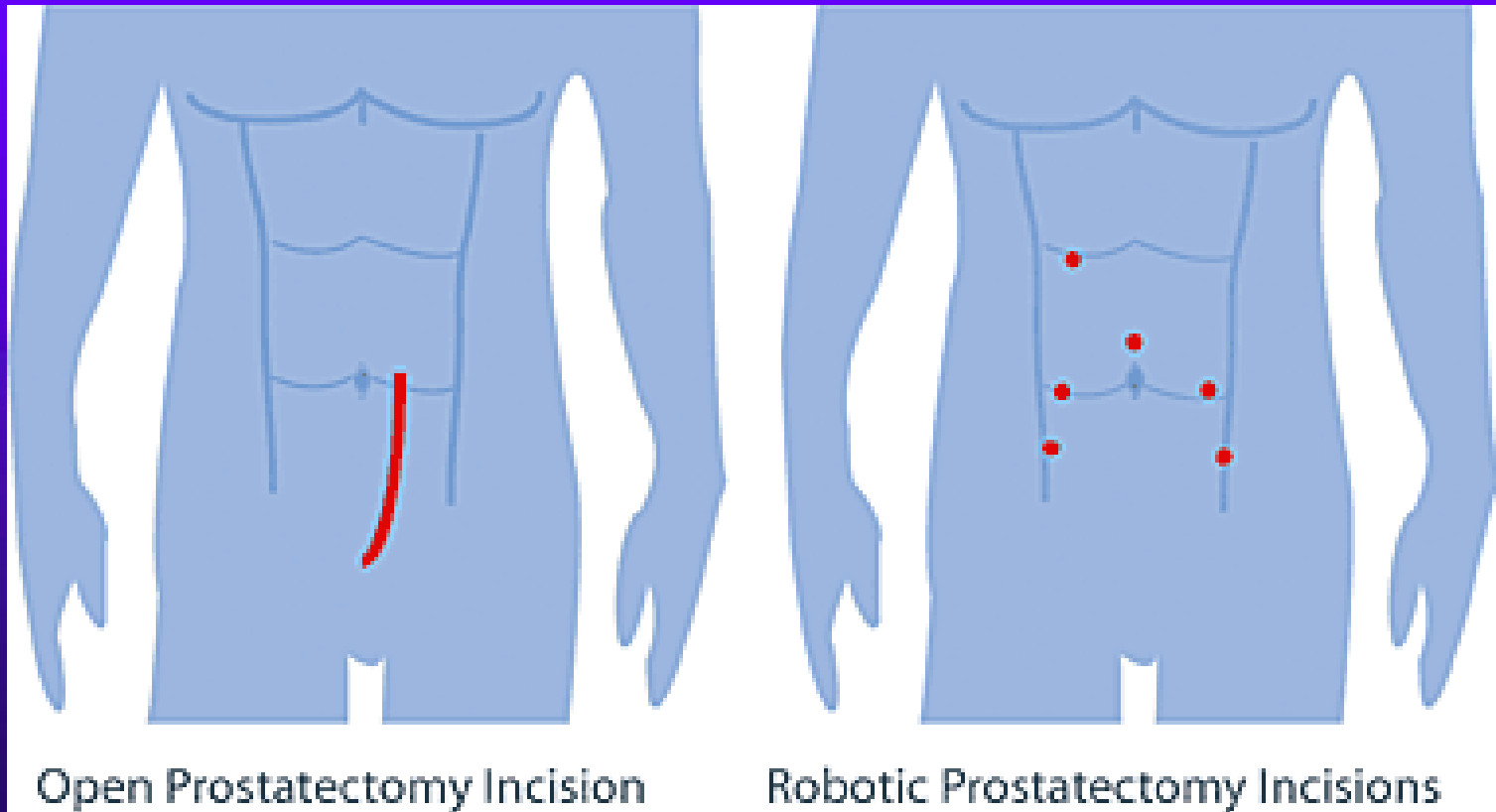


Urethral Length





Cosmesis and Recovery



Do Scars Matter? Cosmesis? Function?



Diagnosis of Prostate Cancer

◆ PSA

- Absolute value
- Velocity
- Total/Free (ratio)

◆ TRUS Biopsy

- Gleason grade
- Clinical Stage
- Prostate size

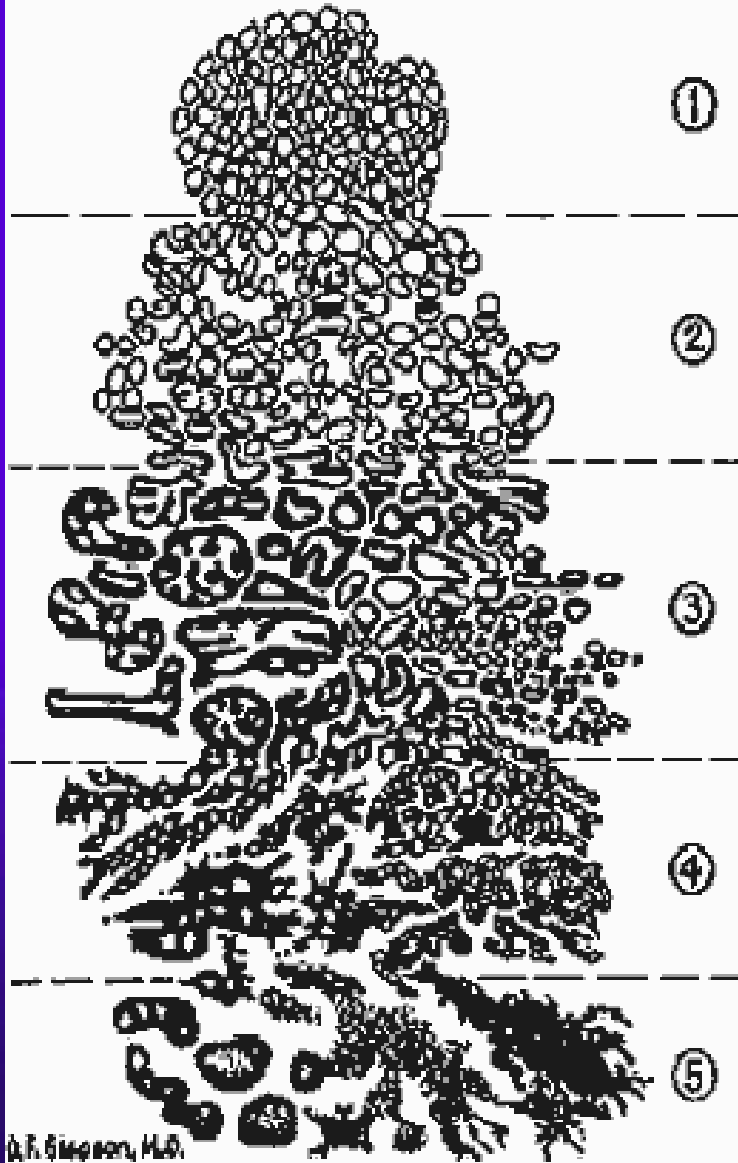
◆ Staging

- Digital Rectal Exam
- Bone Scan, MRI, CT

◆ Performance Status

- Medical Comorbidities
- Previous surgery
- LUTS
- Erectile function

PROSTATIC ADENOCARCINOMA
(Histologic Grades)



Gleason grade 1

Gleason grade 2

Gleason grade 3

Gleason grade 4

Gleason grade 5

Multimodality Treatment Options

◆ Watchful Waiting

- Comparisons head to head with surgery in RCT

◆ Radiation Therapy

- Technique du jour
- Brachy, HDR, IMRT
- Cyberknife
- Proton Beam

◆ Ablation Therapy

- Cryotherapy
- 3D-Mapping

◆ Androgen Deprivation

- Neoadjuvant for radiation therapy

◆ Radical Prostatectomy

- Robotic vs Open

Honesty and Integrity in Staging

What is the test really observing?

What are the limits of detection?

What is the validation?

Does the test help you make a decision
(is the test clinically relevant)?

Are you being overstaged?

Will these tests be useful to me?

Nuclear Medicine Bone Scan?

Computed Tomography (CT) Scan?

Magnetic Resonance Imaging (MRI) Scan?

Color Doppler Flow Ultrasound?

Are you being overstaged?

The number of cases of prostate cancer per year is large

230,000 new cases (2005)

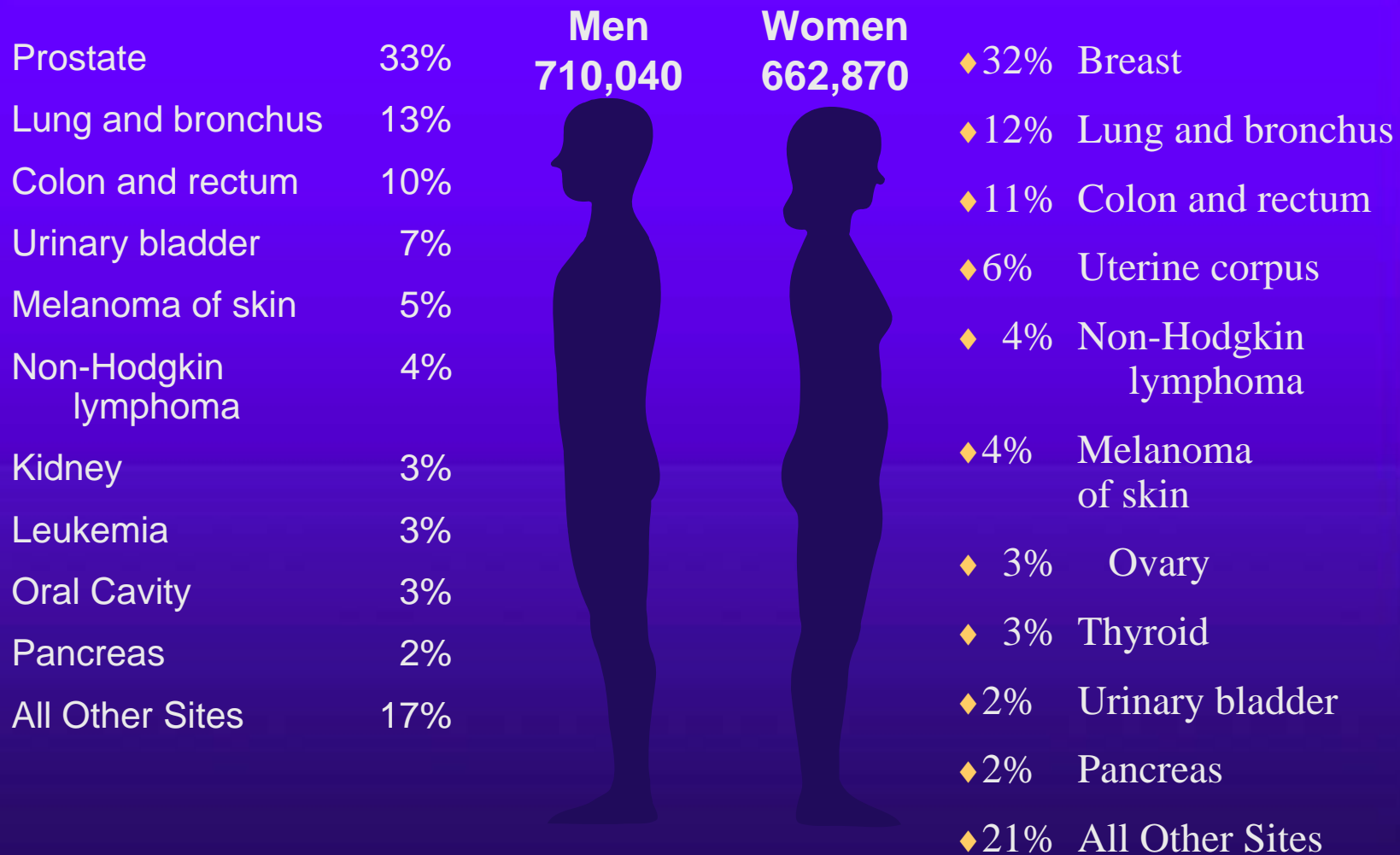
30,350 deaths (2005)

1 man in 6 (16.7%) lifetime risk of diagnosis of prostate cancer in US

1 man in 33 (3%) chance of death by prostate cancer

American Cancer Society: Facts and figures

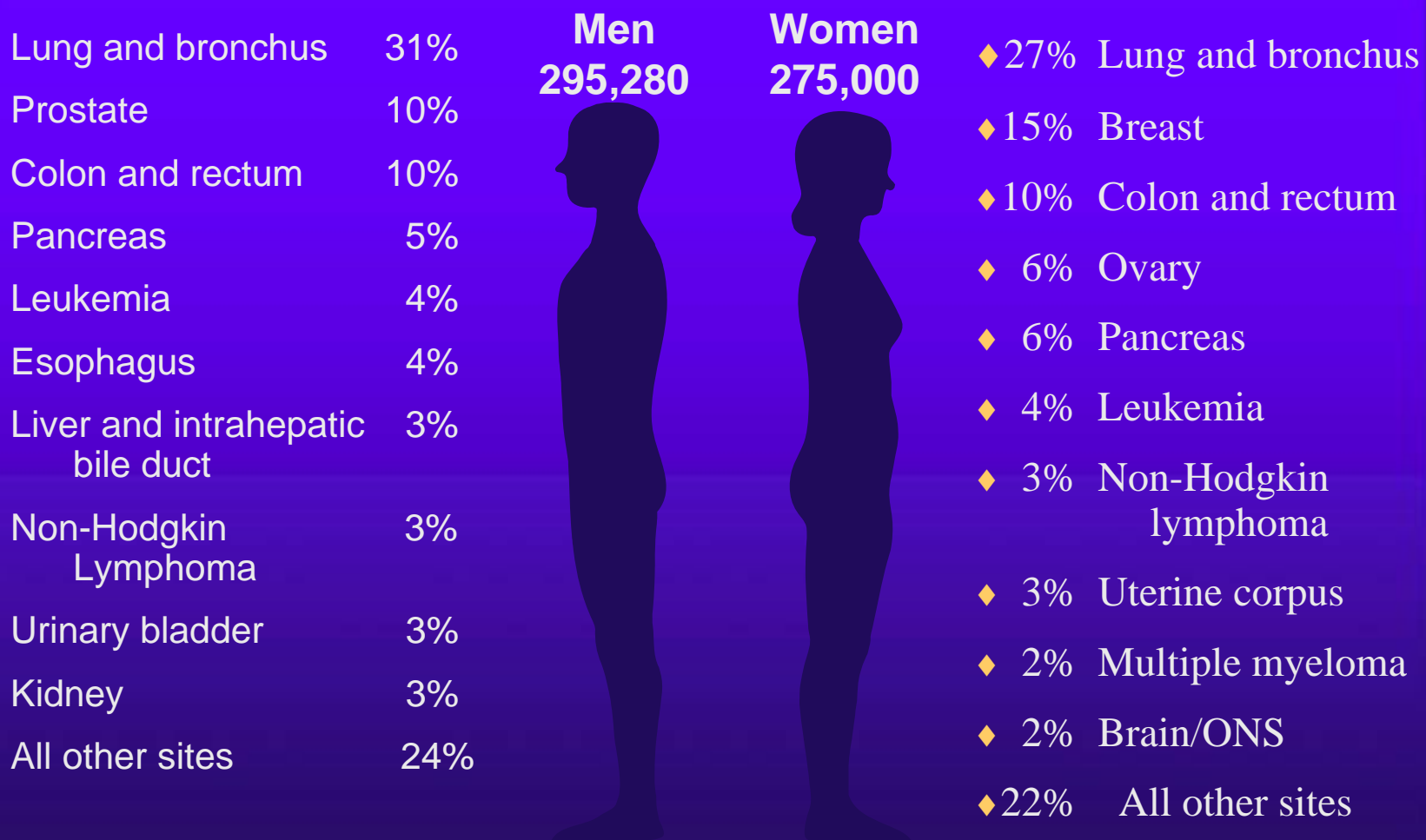
2005 Estimated US Cancer Cases*



*Excludes basal and squamous cell skin cancers and in situ carcinomas except urinary bladder.

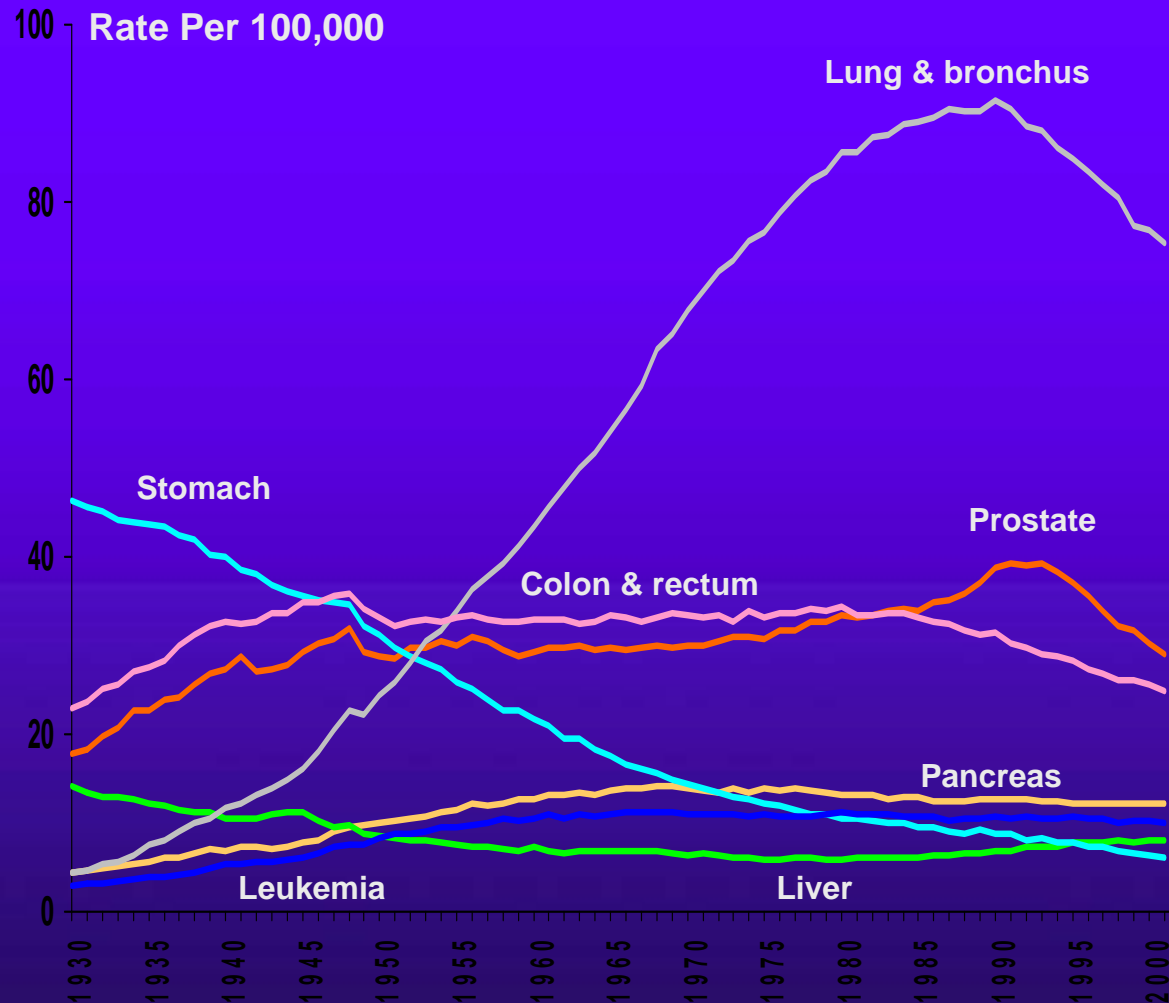
Source: American Cancer Society, 2005.

2005 Estimated US Cancer Deaths*



ONS=Other nervous system.
Source: American Cancer Society, 2005.

Cancer Death Rates*, for Men, US, 1930-2001



*Age-adjusted to the 2000 US standard population.

Source: US Mortality Public Use Data Tapes 1960-2001, US Mortality Volumes 1930-1959, National Center for Health Statistics, Centers for Disease Control and Prevention, 2004.

Lifetime Probability of Developing Cancer, By Site, Men, US, 1999-2001

Site	Risk
All sites	1 in 2
Prostate	1 in 6
Lung and bronchus	1 in 13
Colon and rectum	1 in 17
Urinary bladder	1 in 28
Non-Hodgkin lymphoma	1 in 46
Melanoma	1 in 53
Kidney	1 in 67
Leukemia	1 in 68
Oral Cavity	1 in 73
Stomach	1 in 81

Men diagnosed with prostate cancer

99% survive at least 5 years

92% survive at least 10 years

61% survive at least 15 years.

These figures include all stages and grades of prostate cancer but do not account for men who die from other causes.

About **86%** of all prostate cancers are found in the local and regional stages (no spread to distant organs).

The 5-year relative survival rate for all of these men is nearly 100%.

Of the men whose prostate cancers have already spread to distant parts of the body at the time of diagnosis, about **34%** will survive at least **5 years**.

Become Well Informed Prior to Making Treatment Decisions

Establish trust between provider and patient

Understand the expected follow-up after treatment

Understand the risks/benefits/side effects associated with treatment options

Low grade, Low stage Prostate Cancer is not an emergency. Take the time you need.

Honesty and Integrity in Staging

What is the test really observing?

What are the limits of detection?

What is the validation?

Does the test help you make a decision
(is the test clinically relevant)?

Are you being overstaged?

Robotic Radical Prostatectomy

Advantages

Less pain

Decreased hospital stay (<24 hrs)

Lower blood loss (<100 cc)

Early catheter removal

Early continence

&

Consistently achieved
nerve sparing



Robotic Procedures by Dr. Carey at Sarasota Memorial

- ◆ **330 cases. Robotic-assisted laparoscopic radical prostatectomy (27 different states and Canada)**
- ◆ **155 cases. Laparoscopic or robotic kidney cancer cases**
- ◆ **12 cases. Robotic –assisted bladder diverticulectomy, ureteral reimplant, pyeloplasty, and partial cystectomy**

- ◆ **RALRP – n = 330 cases**

- ◆ **Mean Age 63.3 (46-79)**

- ◆ **BMI 28.18 (20.9 – 43.9)**

- ◆ **Mean serum PSA 6.0 (0.77 – 26.1)**

- ◆ **Mean prostate Weight 55.1 (22 – 131 grams)**

- ◆ **87 % Either T2c or greater or PSA = 10 or greater**

◆ Clinical Stage

◆ T1c	1.5%
◆ T2a	17%
◆ T2b	4.5%
◆ T2c	60%
◆ T3a	9%
◆ T3b	5%
◆ Lymph node positive	3%

Carey 2009

87% of patients are high risk

PSA > 10

T2c or higher stage

Gleason score 7 or higher

**The 13% lower risk patients?
urinary retention, LUTS,
very large prostates (>100 grams)**

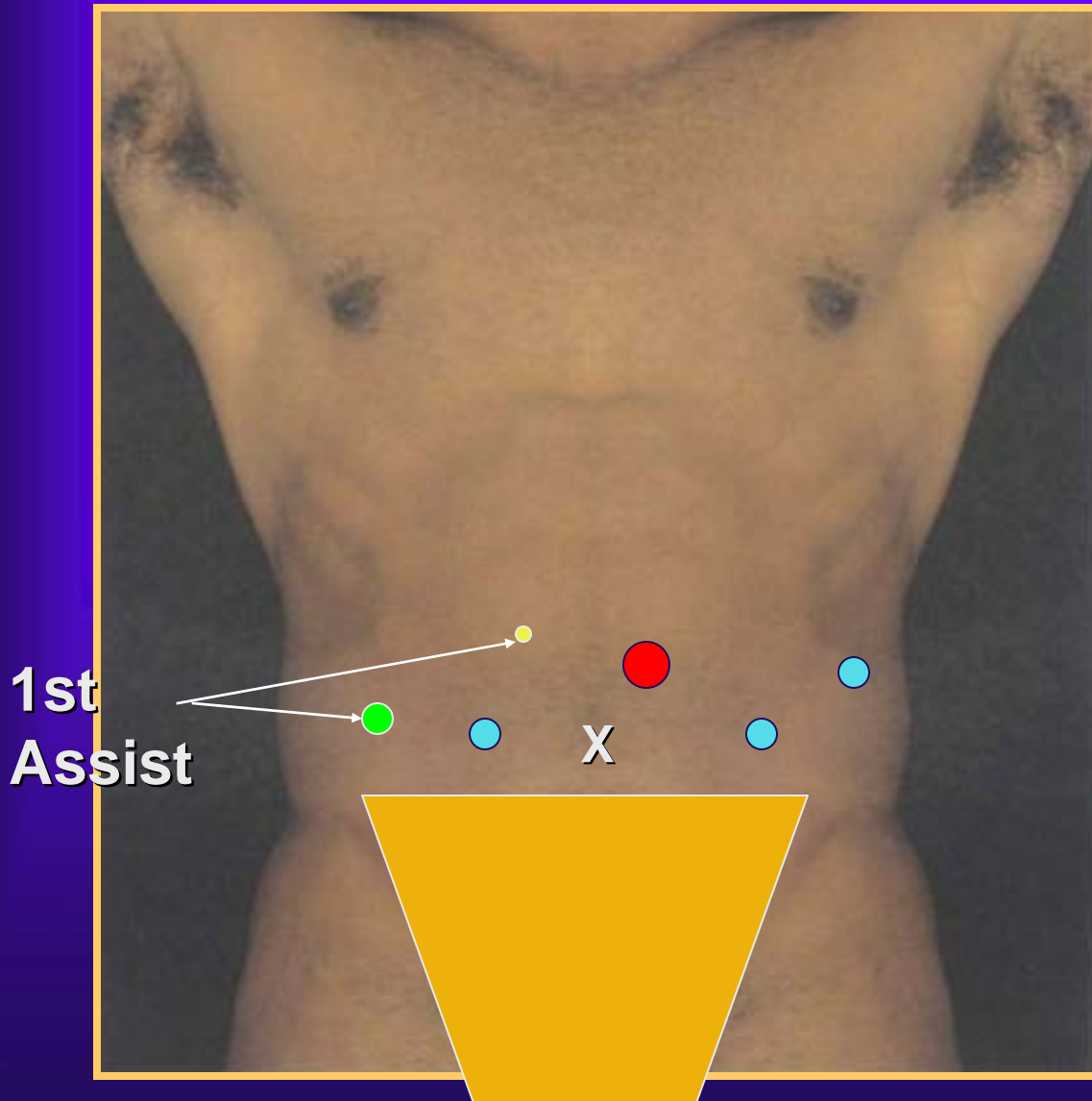
Body Habitus

BMI 20 - BMI 44

The robot does not discriminate

Obese patients are much more suitable for robotic prostatectomy than for open procedures

Trocar Placement



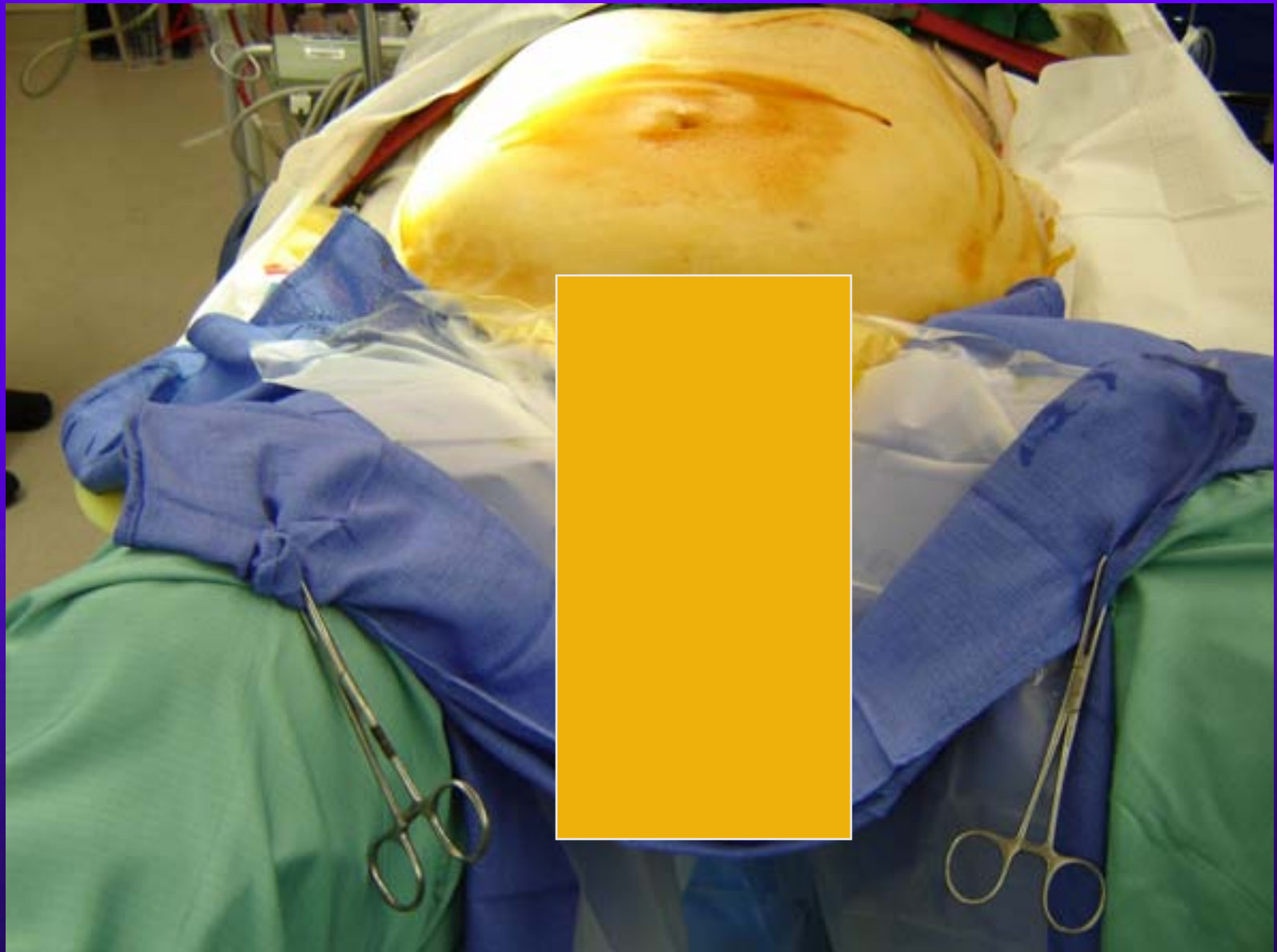
● Camera port
(12-mm)

● da Vinci ports
(8-mm)

● Assistant ports
(12mm)

● Assistant ports
(5mm)

300 + pounds – the da Vinci system does not discriminate



Cancer cure –

Positive margins

PSA recurrence

Adjuvant therapy

Continence –

Immediate, Early, Delayed

Details of surgery: technique matters

Coitus -

Preservation of potency

Cautery free nerve sparing procedure

Precise dissection with no thermal gadgetry

Rates of Positive Surgical Margins

<u>Surgeon</u>	<u>% pos</u>	<u>Tech</u>	<u>#cases</u>	<u>Source</u>
Walsh	1.8 %	Open		J. Urol (2007)
Soloway	29%	Open	800	J. Urol (2002)
Scardino	28%	Open	478	Eur Urol (2007)
Guilloneau	19%	Lap	550	Eur Urol (2006)
Patel	9.3%	Robotic	1500	J. Endourol (2008)
Menon	13%	Robotic	2652	Eur Urol (2007)
Carey	12%	Robotic	330	WRUS 2009 (5.7% after 150 cases done at new hospital)

Carey 2009

87% high risk patients
5.7% positive surgical margins
over last 180 cases

PSA > 10

T2c or higher stage

Gleason score 7 or higher

**Why are the surgical margins rates
better?**

Anatomically precise dissection



Extended, high quality lymph node dissection

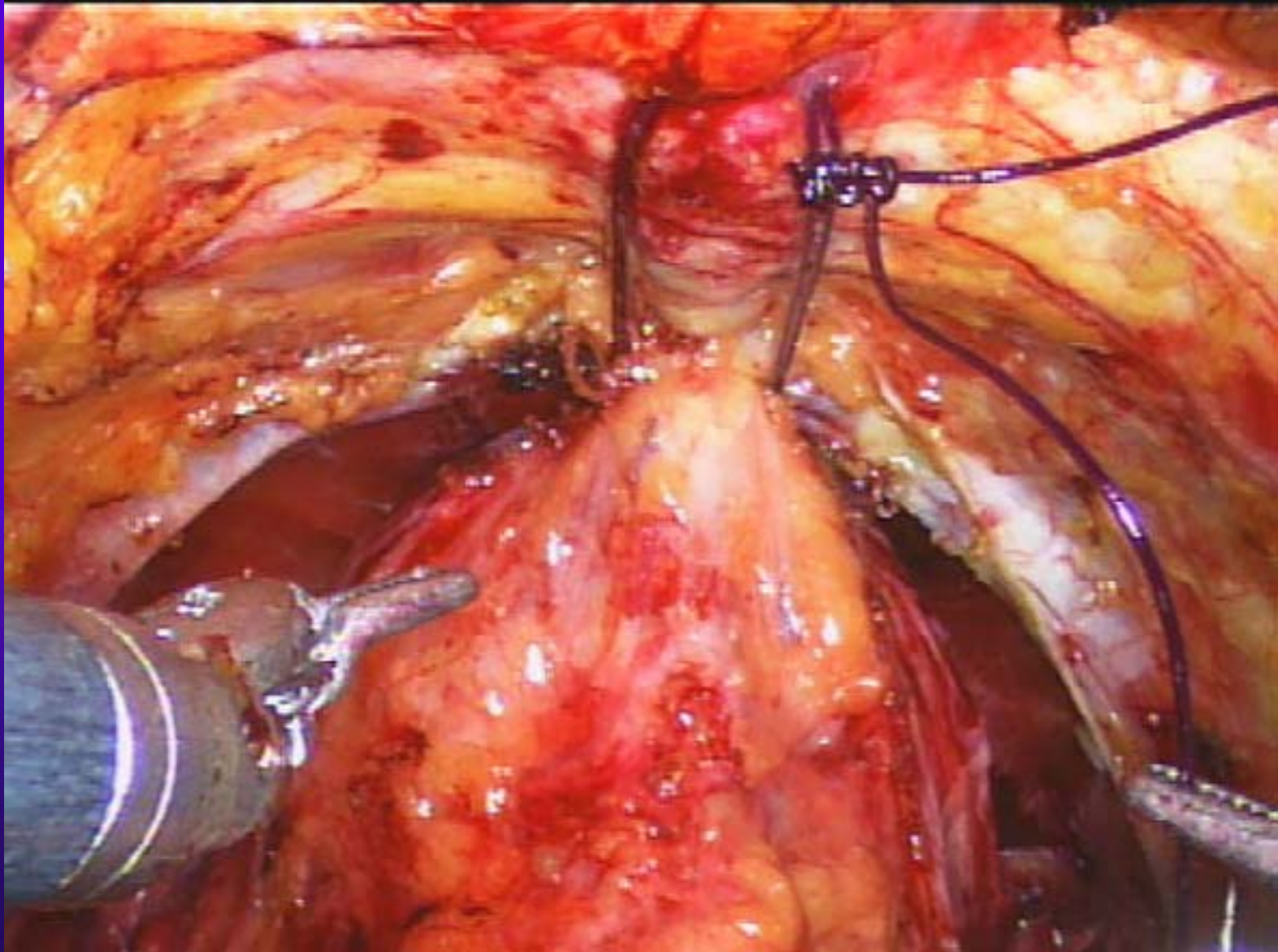


◆ **Continence (no pads)**

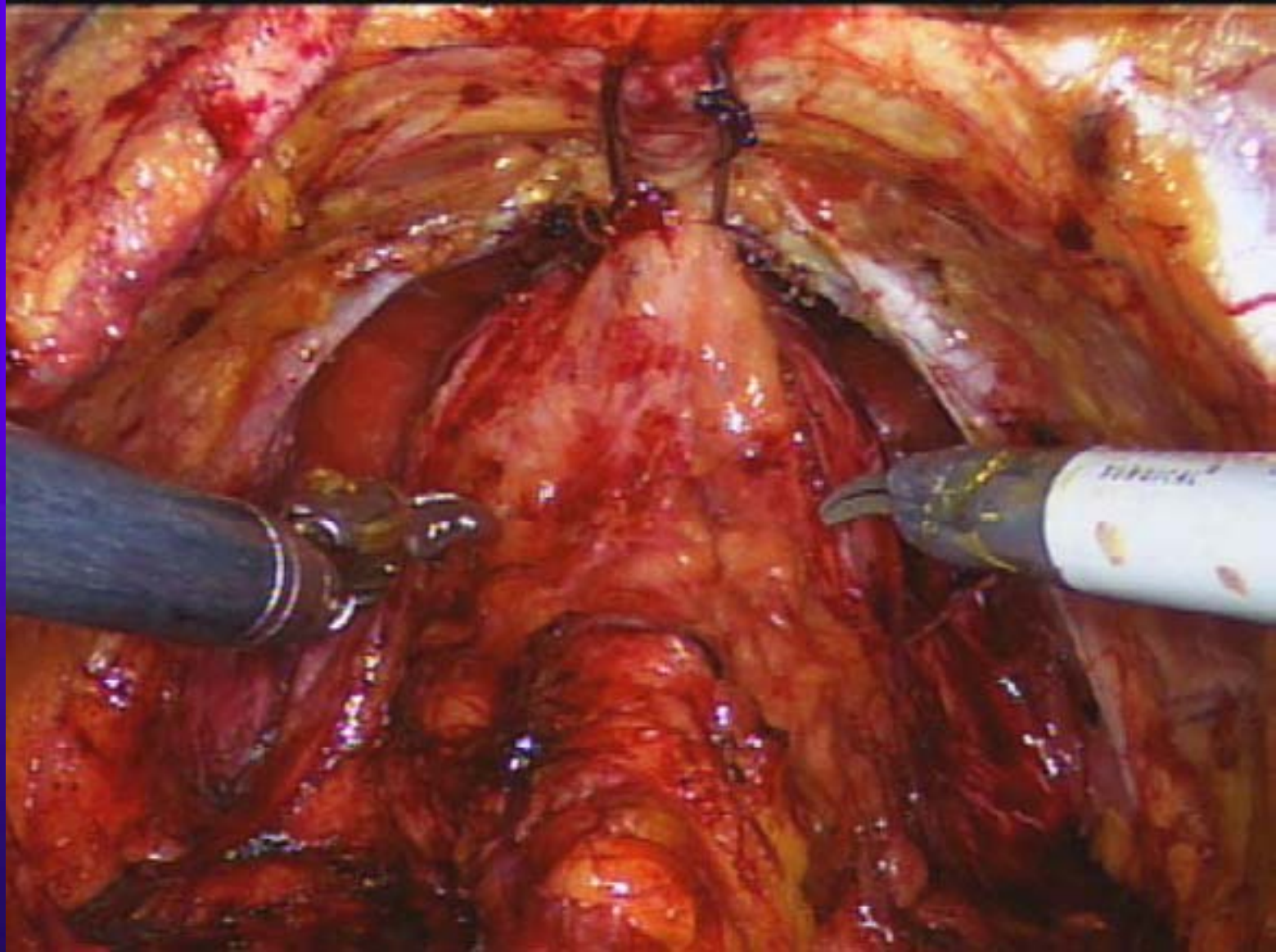
◆ Immediate	33%
◆ 1 month	64%
◆ 3 month	95%
◆ 6 month	96%
◆ 9 month	97%
◆ 12 month	98%
◆ AUS	0%

Continence Center at SMH closed within one year of my arrival at SMH.

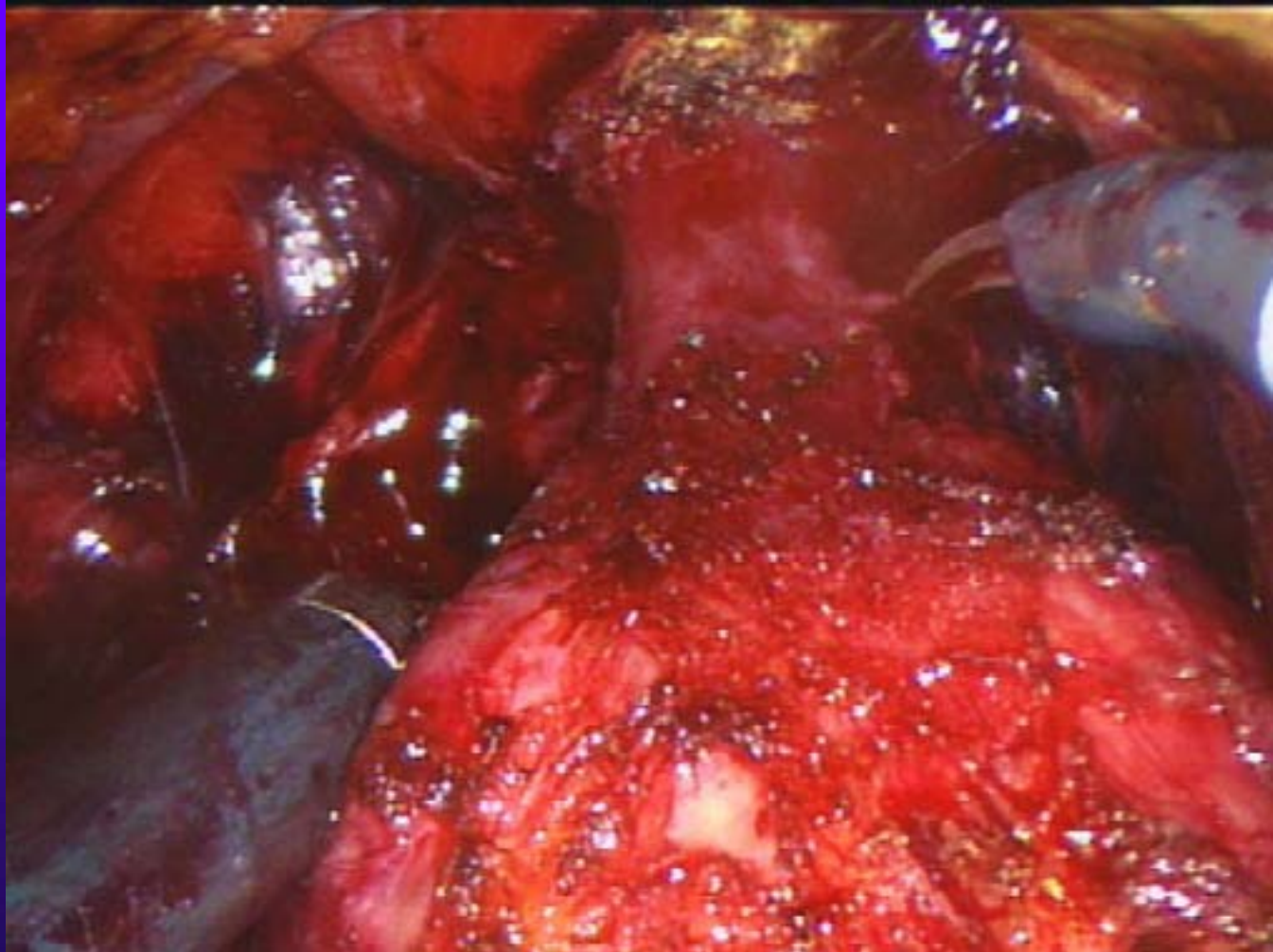
Anterior urethral tissue supported to the periosteum of the pubic arch



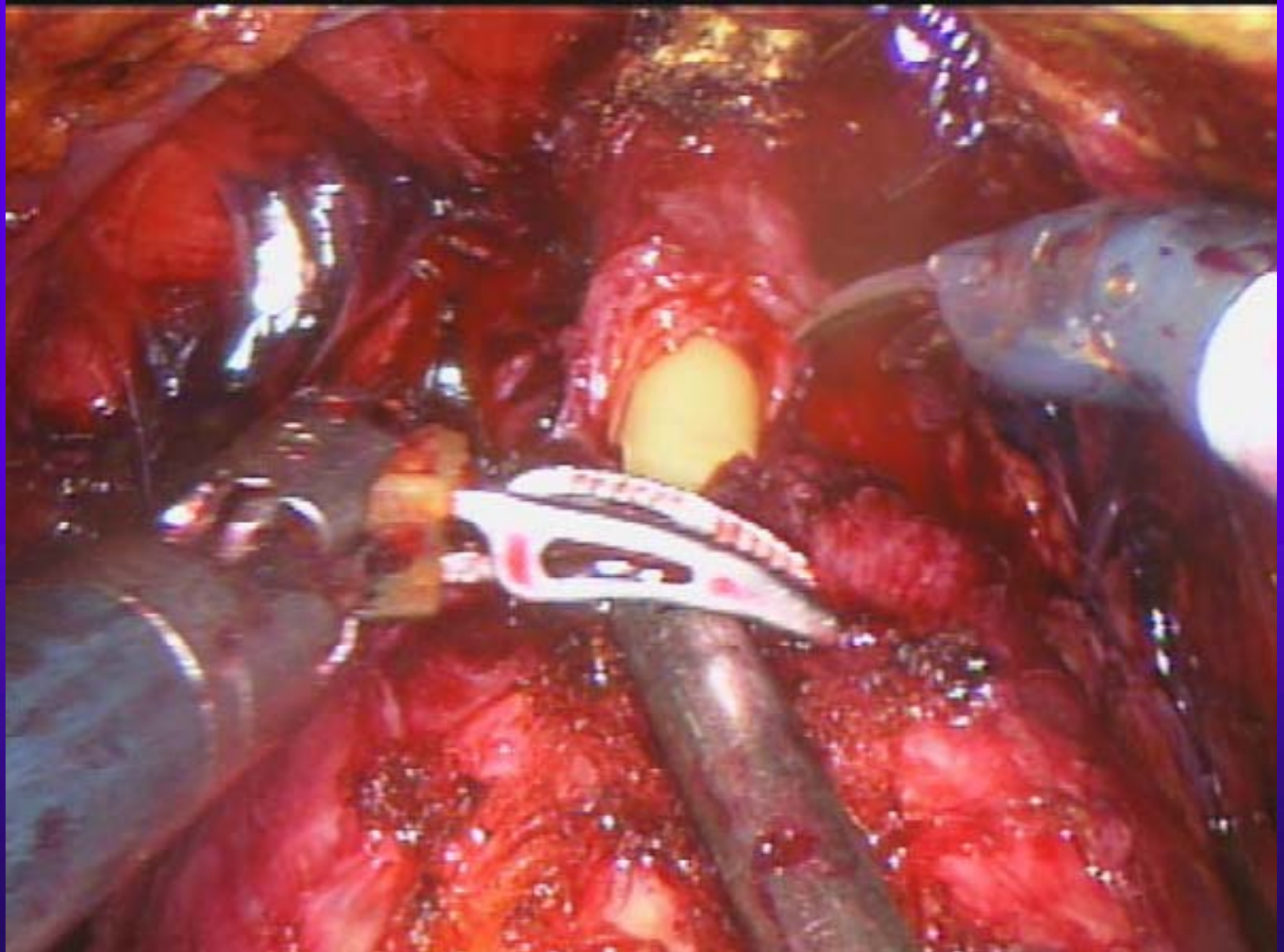
Anterior urethral tissue supported to the periosteum of the pubic arch



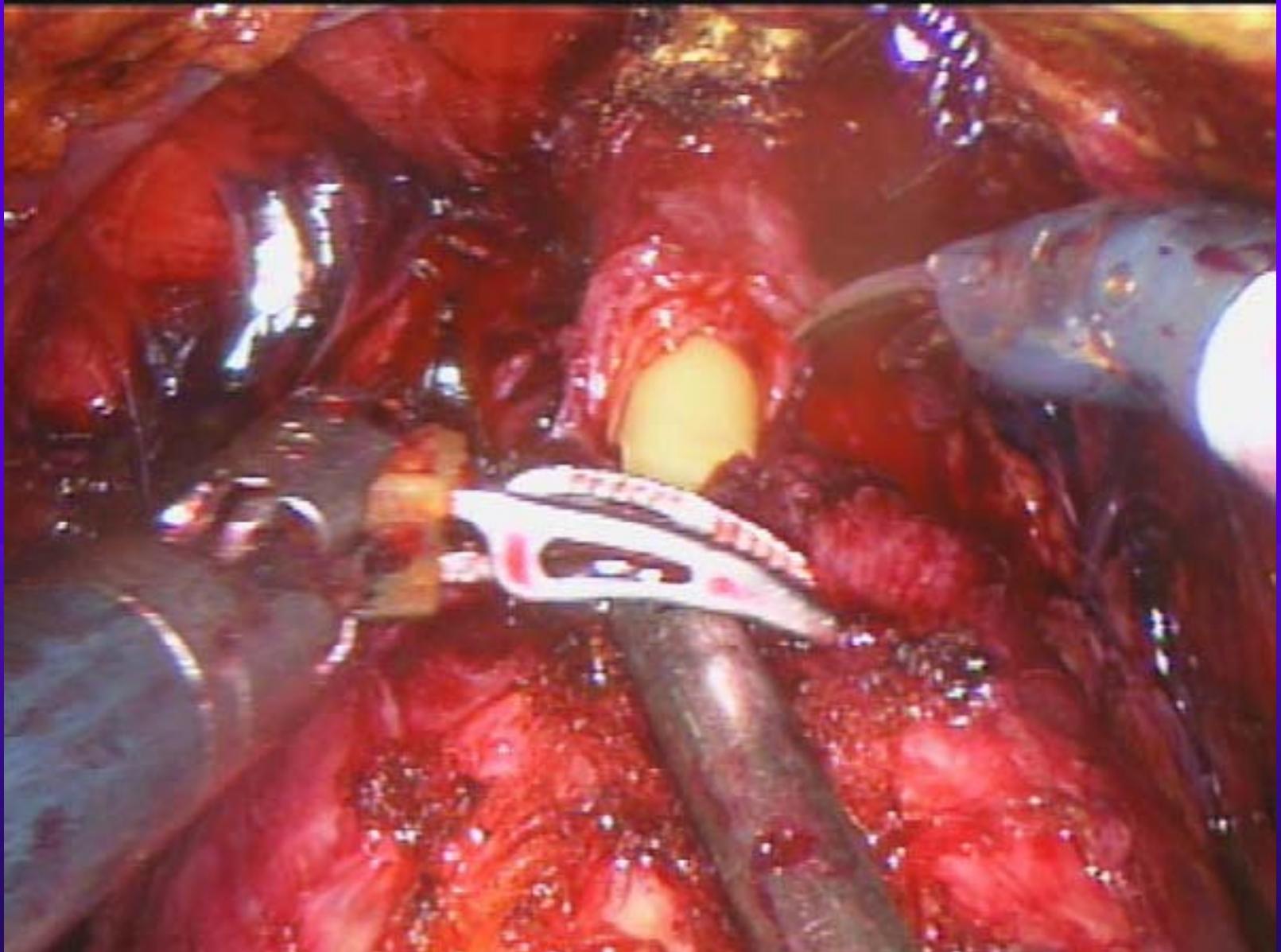
Dissection to achieve the maximum urethral length: preservation of external sphincter with negative apex margin



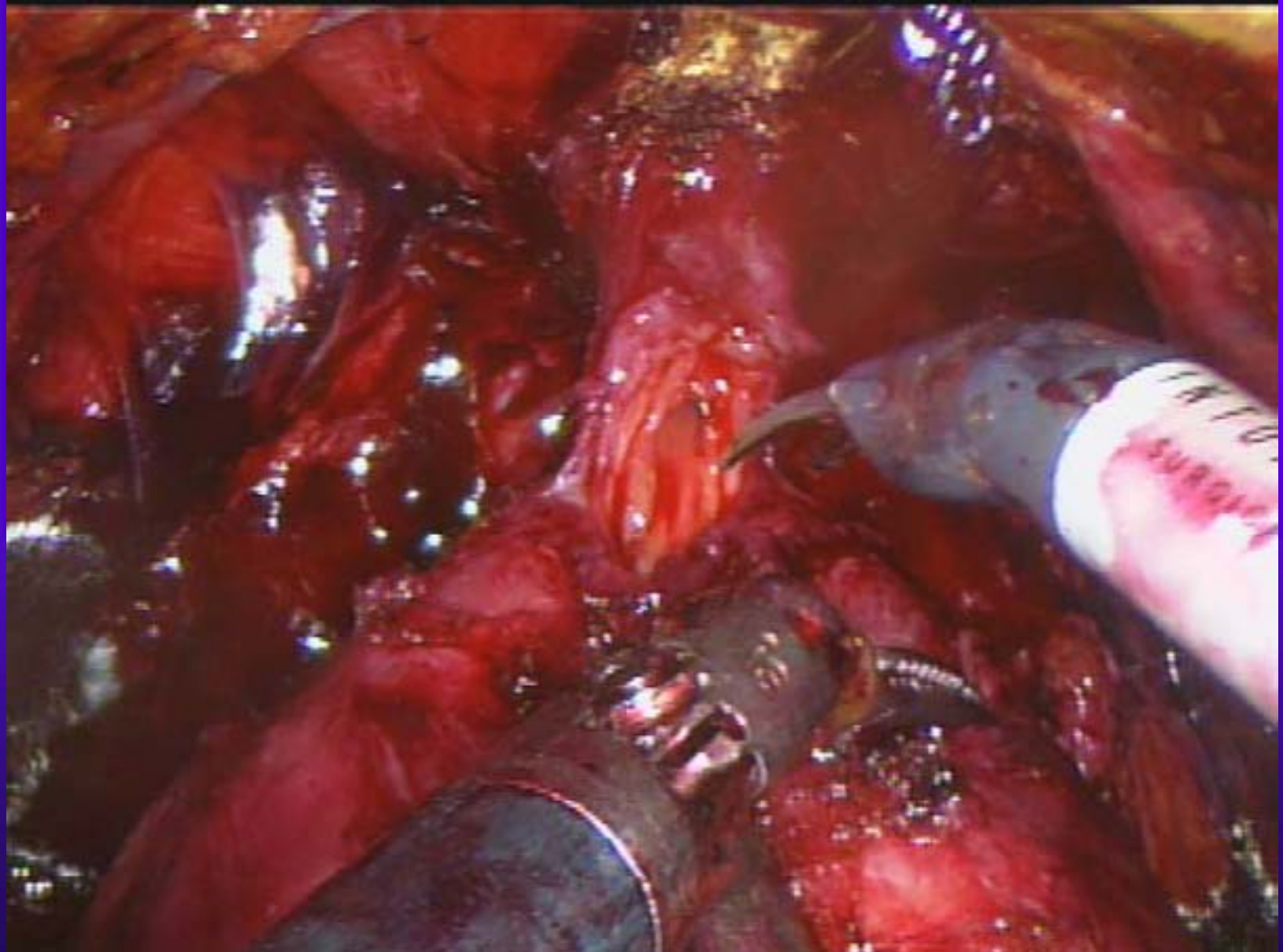
Dissection of urethra



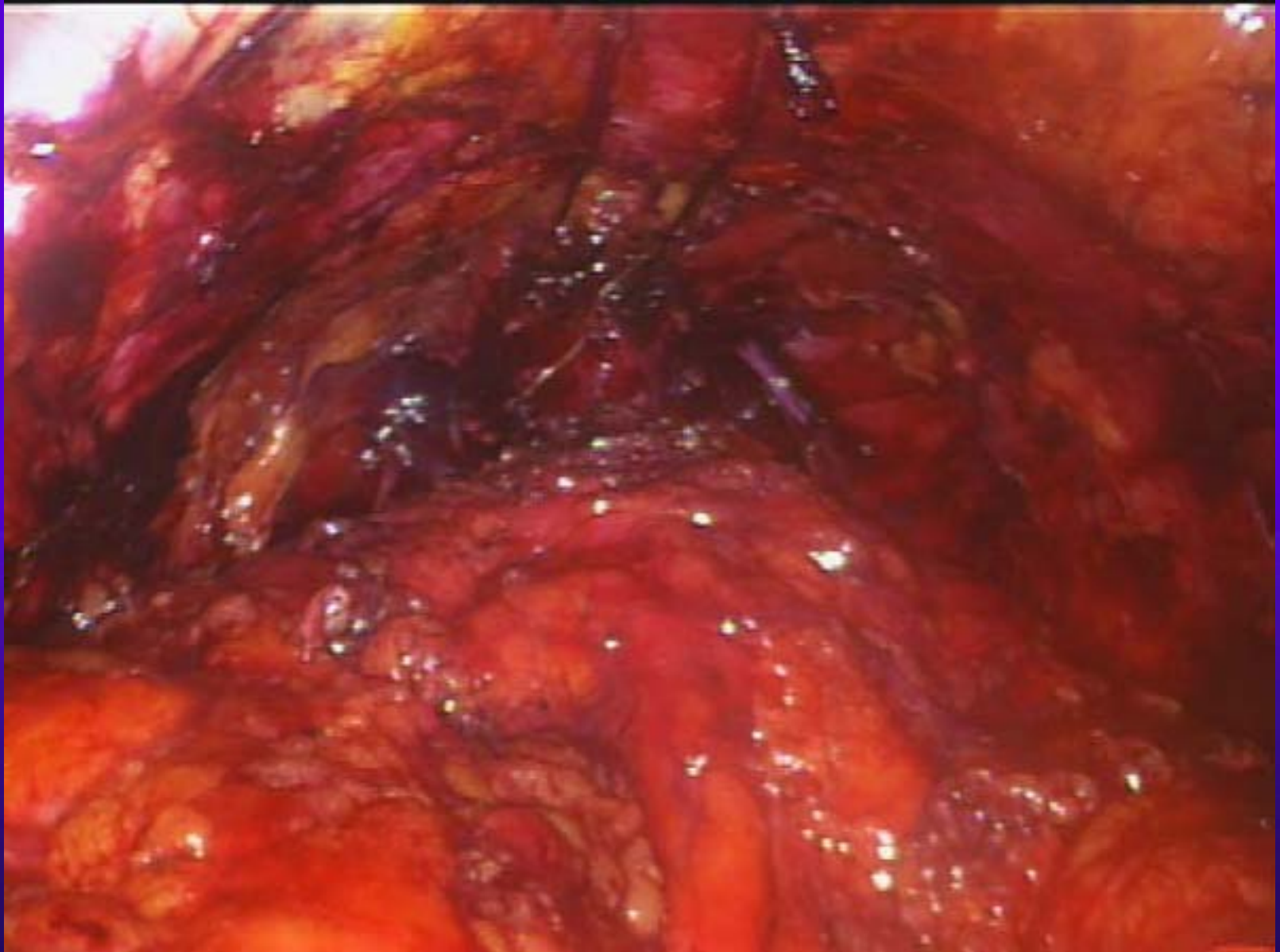
Dissection of urethra



Dissection of urethra



Anastomosis of bladder neck to urethra



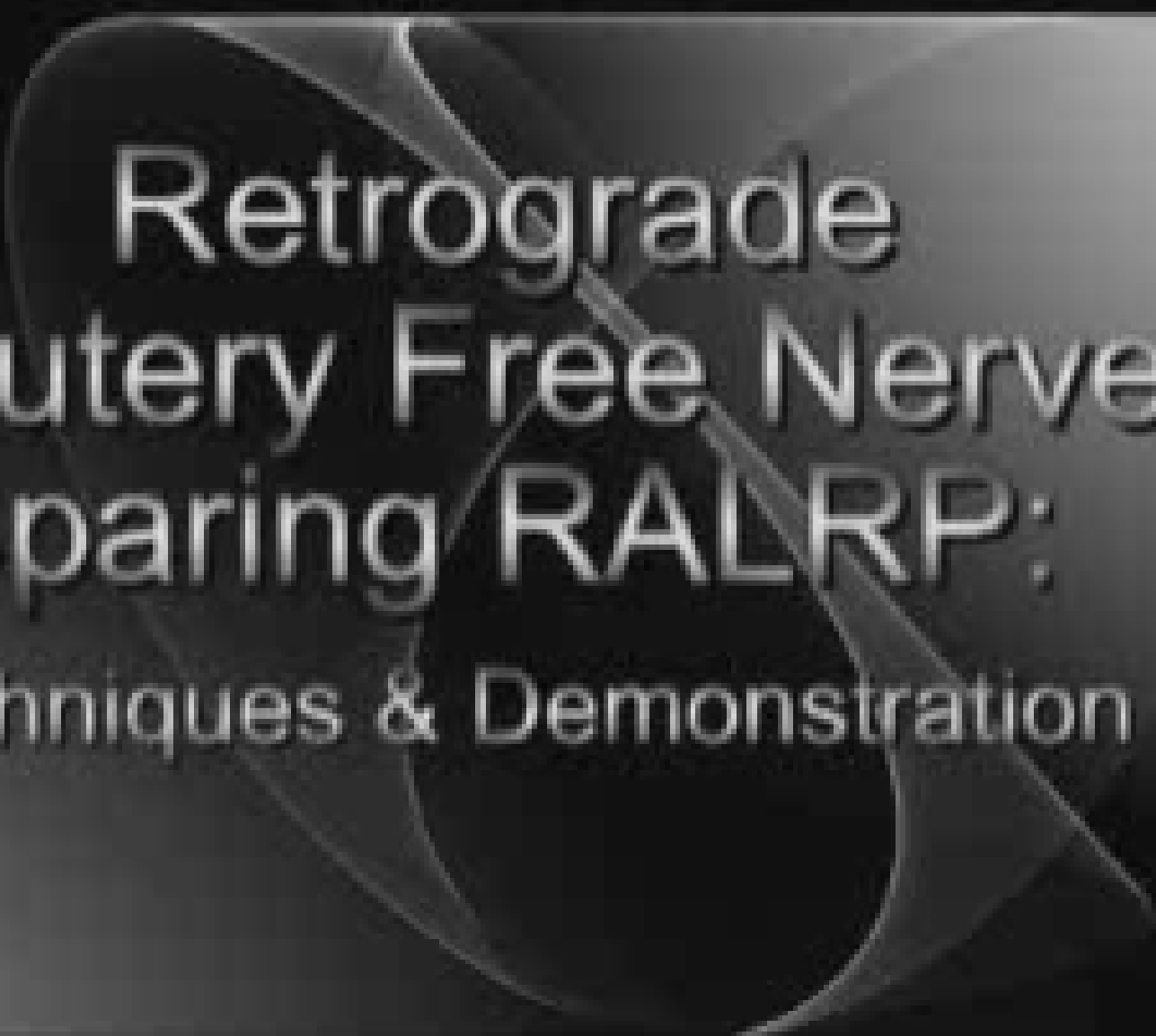
Preservation of Potency

Cautery-free neurovascular bundle sparing procedure

Use no thermal gadgetry near NVB's

Hemo-lock clips on the vascular pedicles

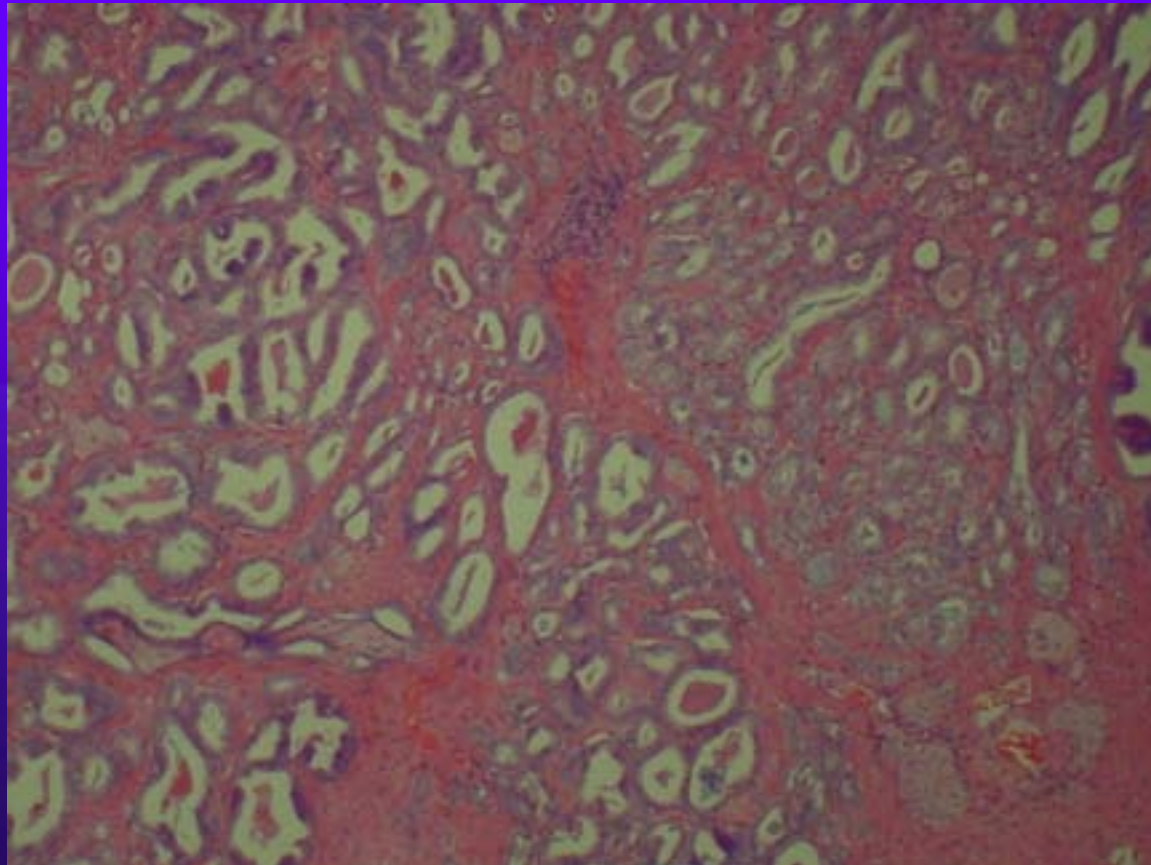
Cautery-free separation of prostatic fascia containing the NVB's from prostatic capsule with no capsular incisions



Retrograde
Cautery Free Nerve
Sparing RALRP:
Techniques & Demonstration

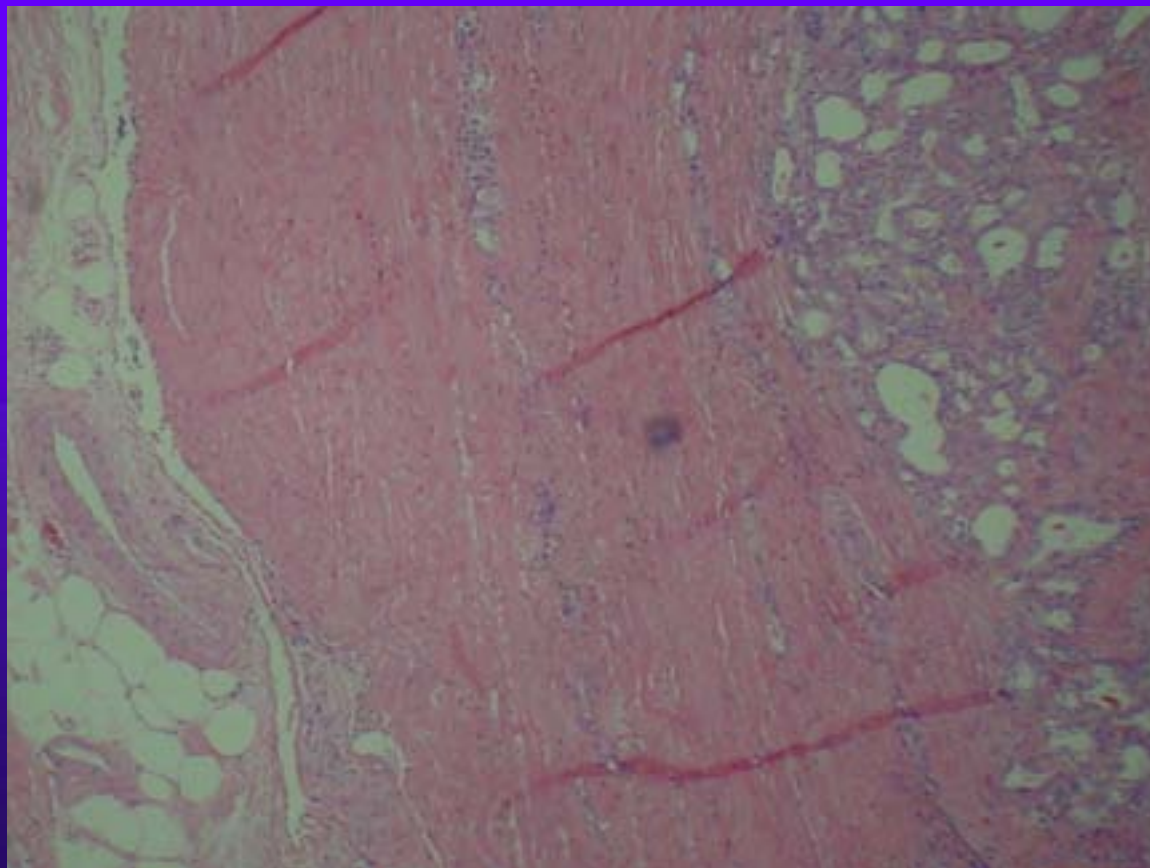
Salvage Therapy

61 year old male 2 years after HIFU therapy

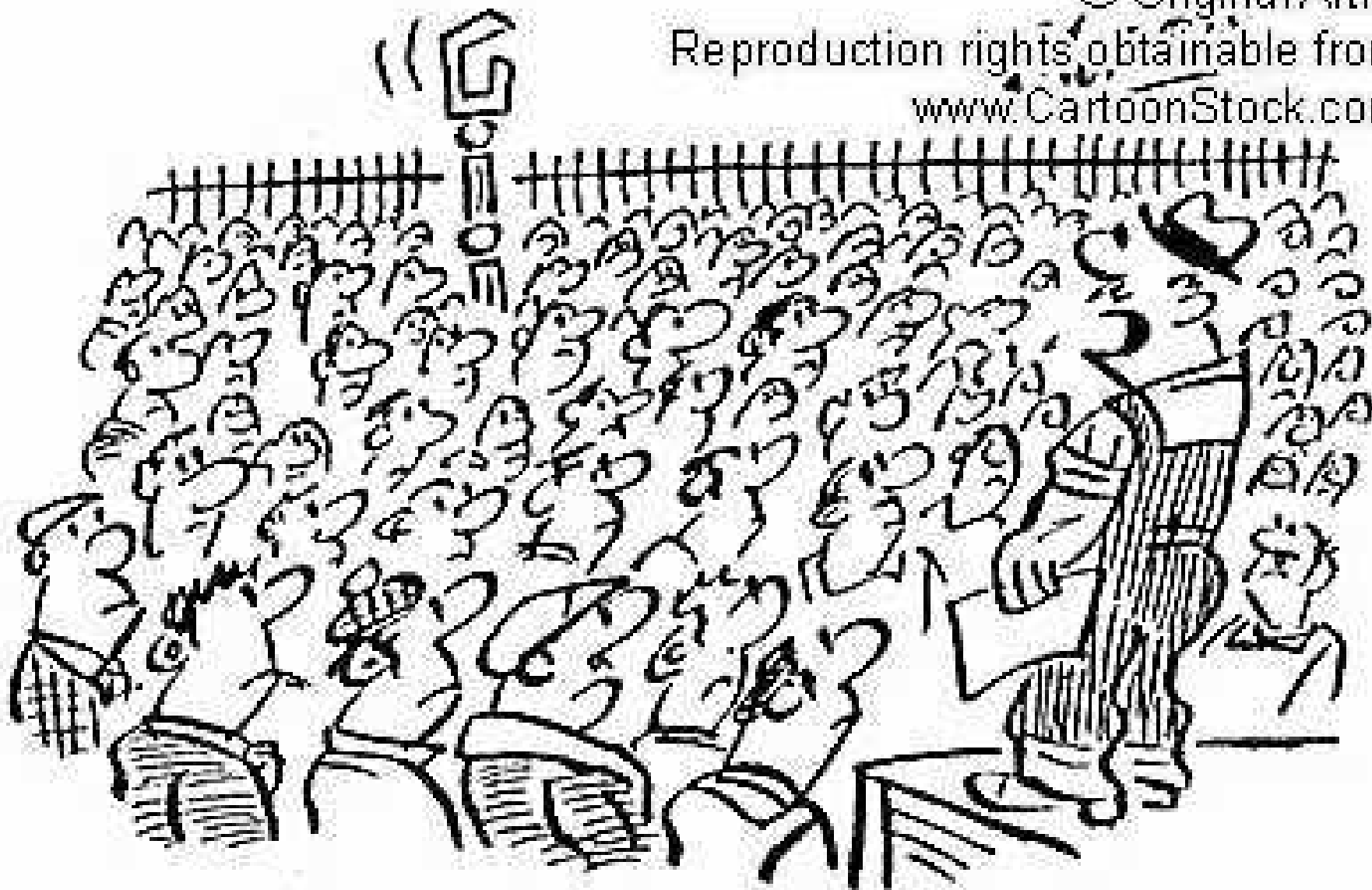


Salvage Therapy

63year old male 1 year after IMRT therapy



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"All those in favour of accepting more robots?"

Economic Comparison - Health Care Costs

Robotic Surgery

\$1800 surgeon fee
\$9000 facility DRG

Cost of Robot
\$1.5 million

Low cost follow up
PSA

Proton Beam Therapy

\$120,000 per case

Cost of PBT facility
\$60 - 100 million

High cost follow up
CT, PET, NM bone

Diet

No Level 1 evidence for prevention or treatment of prostate cancer with diet

Recommend Heart Healthy diet

avoid high glycemic index foods

avoid trans fats and decrease obesity

Include tomato sauces and cruciferous
vegetables

Failure of the Select Trial (Vit E and selenium)

AUA practice guidelines regarding PSA screening

www.auanet.org

Age for initial screening dropped to age 40

**Use of DRE, free/total PSA, PSA velocity
Family history, ethnicity**

Conclusions

Robotic-assisted laparoscopic surgery is mainstream for urologic oncologic and reconstructive surgery

Robotic-assistance makes surgeons better.
Surgeons need to be trained in its use

Better outcomes for Quality of Life
and Cancer Cure on a consistent basis across all
body shapes and sizes.

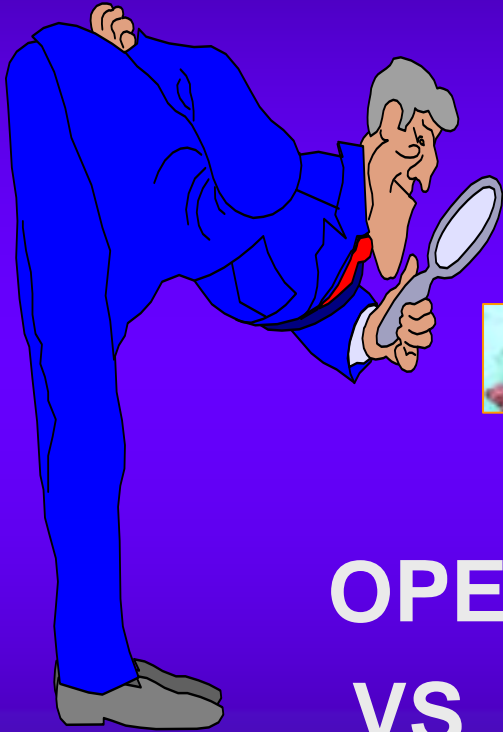
Conclusions

Control healthcare costs through more judicious spending.

Wise use of technology saves money.

Healthcare professionals who have no financial or other considerations need to be involved in policy decisions

THE GREAT DEBATE



OPEN

VS

ROBOTIC

RADICAL PROSTATECTOMY



■ RALRP studies show reduced blood loss of 43-109 cc

■ Two prospective series comparing RRP and RALP:

–Farnham et al

- 76 RALP and 103 RRP patients

- Discharge HCT was significantly better in RALP patients (36.8 vs 32.8)

–Tewari et al

- 200 RALP and 100 RRP

- Discharge HGB was significantly better in RALP patients (13.0 vs 10.1)

Cautery-free neurovascular bundle sparing procedure

Use no thermal gadgetry near NVB's

Hemo-lock clips on the vascular pedicles
(or Bulldog clamp and suture ligature)

Cautery-free dissection of NVB from prostate

Improved early return to potency (3 months)

Ahlering et al, J. Endourology 2005; 19: 715

Robotic vs. Open

- ◆ Ahlering et al. UC Irvine
- ◆ Urology: 63:2004
- ◆ Robotic experience of an open surgeon

PARAMETERS	OPEN	ROBOTIC
# PATIENTS	60	60
OR TIME (min)	214	231
EBL (cc)	418	103
LOS (hrs)	52	25
COMPLICATIONS %	20	4
CATHETER (days)	9	7
MARGIN + RATE	12	10

Conclusions: Ahlering et al.

- ◆ Fewer positive margins in high risk patients with high Gleason score or increased volume
- ◆ pT2: + margin rate: 4.6%
- ◆ More precise dissection
- ◆ Benefits of laparoscopy without compromising functional or oncological results

Robotic vs Open

- ◆ Tewari et al. Henry Ford
- ◆ British Journal of Urology:92:2003

PARAMETERS	OPEN	ROBOTIC
# PATIENTS	100	200
OR TIME (min)	163	160
EBL (cc)	910	153
LOS (hrs)	3.5	1.2
COMPLICATIONS %	20	5
CATHETER (days)	15	7
MARGIN + RATE	23	9

Conclusions: Tewari et al.

- ◆ No transfusions
- ◆ Less pain
- ◆ Faster recovery
- ◆ Lower margin + rate
- ◆ Faster continence
 - 44 vs 160 days
- ◆ Earlier return of potency
 - 180 vs 440 days

Open vs. Lap vs. Robotic

◆ Menon et al. Henry Ford

VARIABLE	OPEN	LAP	ROBOTIC
# PATIENTS	100	50	100
OR TIME (min)	164	248	140
EBL (cc)	900	380	<100
POS MARGINS (%)	24	24	5
COMPLICATIONS %	15	10	5
CATHETER (days)	15	8	7
LOS (days)	3.5	1.3	1.2

Thank You

