



Multidisciplinary Approaches to Cancer Symposium

Testicular Cancer - Surgical Management

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Disclosures

I do not have any relevant financial relationships.

This presentation and/or comments will provide a balanced, non-promotional, and evidence-based approach to all diagnostic, therapeutic and/or research related content.



Cultural Linguistic Competency (CLC) & Implicit Bias (IB)

STATE LAW:

The California legislature has passed Assembly Bill (AB) 1195, which states that as of July 1, 2006, all Category 1 CME activities that relate to patient care must include a cultural diversity/linguistics component. It has also passed AB 241, which states that as of January 1, 2022, all continuing education courses for a physician and surgeon **must** contain curriculum that includes specified instruction in the understanding of implicit bias in medical treatment.

The cultural and linguistic competency (CLC) and implicit bias (IB) definitions reiterate how patients' diverse backgrounds may impact their access to care.

EXEMPTION:

Business and Professions Code 2190.1 exempts activities which are dedicated solely to research or other issues that do not contain a direct patient care component.

The following CLC & IB components will be addressed in this presentation:

- *Differences among individuals in this population*
- *Are fertility concerns addressed with all patients?*

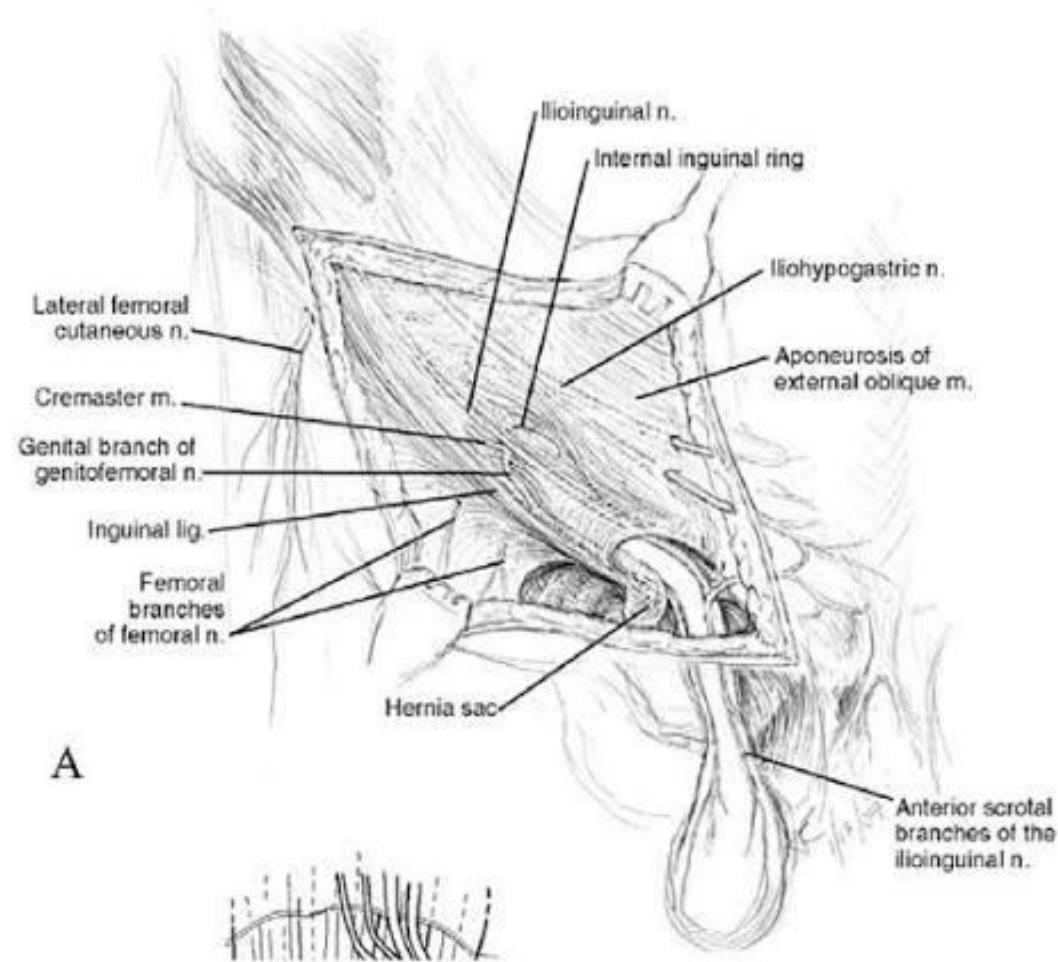


Agenda

- **Radical orchiectomy**
 - Inguinal anatomy
 - Surgical procedure
 - Complications / recovery
 - Prosthesis placement
- **Retroperitoneal management of non-seminoma**
 - Retroperitoneal anatomy
 - Primary RPLND
 - Post-chemotherapy RPLND
- **Retroperitoneal management of seminoma**
 - Primary RPLND
 - Post-chemotherapy mass resection
- **Emerging technologies / techniques**
 - Extra-peritoneal approach
 - Robot assisted surgery



Radical orchiectomy



Haroon UM, Bhatt NR, Akram CM, Flood HD, Giri SK. Significance of spermatic cord invasion in radical inguinal orchidectomy: Will a modified subinguinal orchidectomy suffice? *Urologia Journal*. 2020;87(2):70-74. doi:[10.1177/0391560319840529](https://doi.org/10.1177/0391560319840529)



Radical orchiectomy

- **Curative in >80% of stage 1 seminoma and >70% of stage 1 non-seminoma**
- **Procedure**
 - Inguinal incision (similar to inguinal hernia repair)
 - Between anterior superior iliac spine and pubic tubercle, can be extended into scrotum for large tumors
 - Spermatic cord isolated and ilioinguinal nerve preserved
 - Spermatic cord clamped to prevent lymphatic backflow
 - Testis delivered from scrotum and gubernaculum divided
 - Spermatic cord divided at internal ring with permanent sutures
- **Partial orchiectomy**
 - Cord clamped and tunica vaginalis / albuginea incised. Tumor enucleated and tunica albuginea closed.
 - Done in smaller tumors to prevent anorchia
- **Complications**
 - Long term pain – 1.8%
 - Hematoma – 1-2%
 - Ilioinguinal nerve injury – rare
 - Phantom pain – 25%
 - Infection – 1%
 - Infertility – 20-25%



Radical orchiectomy – Implant placement

- **Saline filled silicone shell**
- **Cosmetic in nature**
- **Usually placed at the time of orchiectomy**
 - Delayed placement is more difficult
- **Satisfaction**
 - Patients with an implant felt less regret those without had increased body shame
- **Only 15.7% of men are given an implant at the time of orchiectomy**
- **Complication rates are low**



Retroperitoneal management of non-seminoma

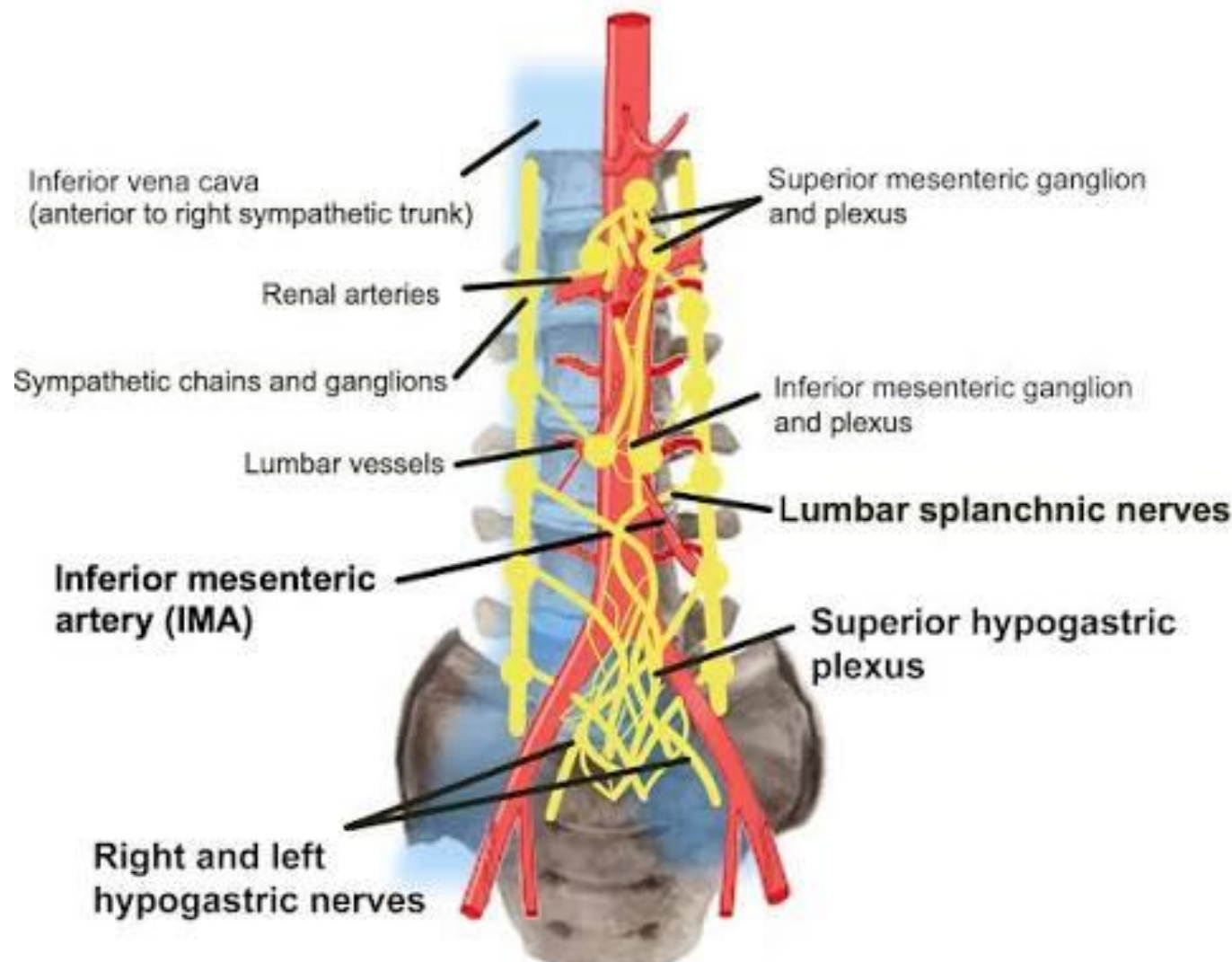
- **Why the Retroperitoneum Matters**
 - First metastatic landing site for most testicular GCTs.
 - Predictable lymphatic drainage patterns
 - Right sided tumors – pre/paracaval and inter-aortocaval nodal basins
 - Left sided tumors – pre/para-aortic nodal basins
 - Crossover can happen, typically right to left crossover
- **Left sided modified**
 - Removal of pre-aortic, peri-aortic, and L common iliac
- **Left sided full modified**
 - Includes inter-aortocaval lymph nodes above IMA



Retroperitoneal management of non-seminoma

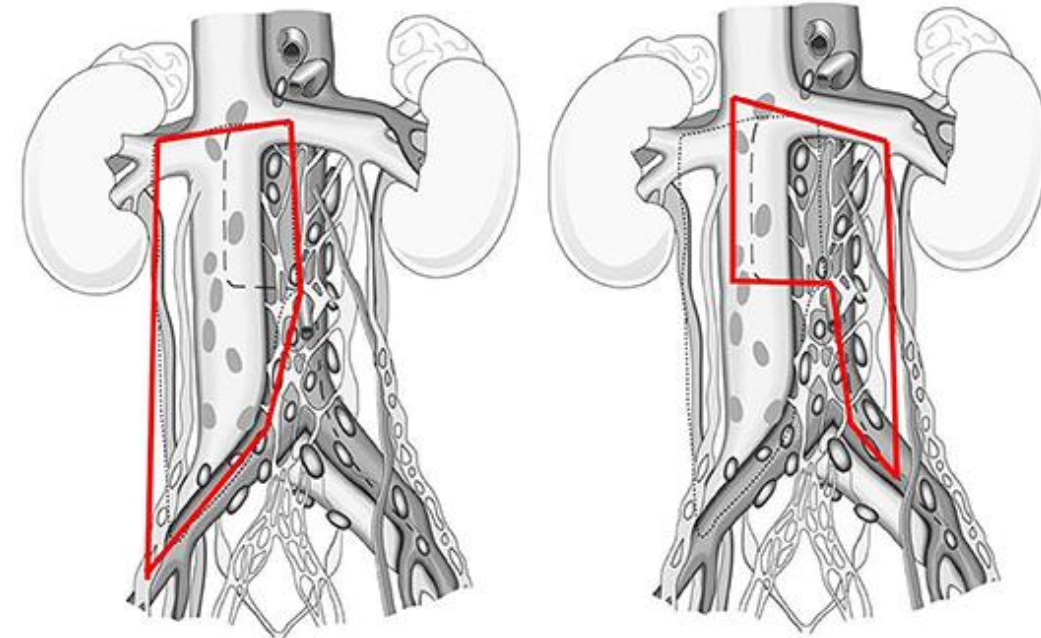
- **Anatomic landmarks**

- Great vessels (aorta / inferior vena cava)
- Renal hilum bilaterally
- Ureters
- Lumbar vessels
- Sympathetic chain and post-ganglionic nerve fibers



Templates

- **Fertility**
 - preserve post-ganglionic sympathetic nerve fibers responsible for seminal emission
- **Right sided modified**
 - Removal of R common iliac (medial to the ureter), pre/para-caval, inter-aortocaval
- **Left sided modified**
 - Removal of pre/para-aortic and L common iliac
- **Left sided full modified**
 - Includes inter-aortocaval above inferior mesenteric artery
- **Full bilateral template**
 - Traditionally, the gold standard for post-chemotherapy RPLND
 - Nerve sparing still feasible



Primary RPLND for non-seminoma

- **Indications**

- Stage I
 - poor surveillance candidates
 - risk factors (lymphovascular invasion, invasion of spermatic cord/scrotum, predominance of embryonal)
 - Somatic type malignancy (transformed teratoma)
- Stage II
 - Marker negative
 - Stage IIA and select IIB

- **Rationale**

- 5 year recurrence free survival after primary RPLND for stage II ~ 79%
 - High rate of salvageability if a recurrence occurs
- Avoid long term toxicity associated with cisplatin based chemotherapy
 - 2.59 relative risk of cardiovascular events in testicular cancer patients treated with chemotherapy

- Tachibana I, Kern SQ, Douglawi A, Tong Y, Mahmoud M, Masterson TA, Adra N, Foster RS, Einhorn LH, Cary C. Primary Retroperitoneal Lymph Node Dissection for Patients With Pathologic Stage II Nonseminomatous Germ Cell Tumor-N1, N2, and N3 Disease: Is Adjuvant Chemotherapy Necessary? J Clin Oncol. 2022 Nov 10;40(32):3762-3769.
- Huddart RA, Norman A, Shahidi M, Horwich A, Coward D, Nicholls J, Dearnaley DP. Cardiovascular disease as a long-term complication of treatment for testicular cancer. J Clin Oncol. 2003 Apr



Post-chemotherapy RPLND

- **Indications**

- Residual retroperitoneal mass over 1 cm
- Negative markers (AFP <20 is acceptable)
- Can be considered in mildly elevated tumor markers or elevated but stable tumor markers

- **Full bilateral template**

- Nerve sparing if feasible

- **Surgery should be limited to high-volume centers**

- Extensive fibrosis post-chemotherapy makes surgery more difficult
- High likelihood of adjunctive procedures (bowel resection, nephrectomy, vascular resection/reconstruction, ureteral reconstruction)

- **Pathologic findings**

- Viable GCT – 10-20%
- Teratoma – 40-50%
- Necrosis / scar – 40-50%

- **Long-term outcomes**

- Excellent disease-specific survival
- Critical for teratoma management
- Integral component of multimodal care
- Take-away: Surgery is often the final curative step.

Evmonfopoulos K, Vlachostergios PJ, Chasiotis G, Karatzas A, Zachos I, Koukoulis G, Dimitropoulos K, Pisters LL, Tzortzis V. Post-Chemotherapy Retroperitoneal Lymph Node Dissection for Metastatic Testicular Cancer at a National Referral Centre. *Cancers (Basel)*. 2025 Feb 11;17(4):608. doi: 10.3390/cancers17040608. PMID: 40002203; PMCID: PMC11853486.



Retroperitoneal management of seminoma

- **Traditionally:**
 - Highly radiosensitive
 - Highly chemosensitive
- **Historical management:**
 - Radiation therapy
 - Systemic chemotherapy
- **Primary RPLND in Seminoma**
 - Emerging option for:
 - Clinical Stage IIA/IIB
 - Marker negative
 - Low-volume retroperitoneal disease
- **Advantages:**
 - Avoid chemotherapy
 - Avoid radiation
 - Accurate staging

Retroperitoneal management of seminoma

- **Recent studies:**

- SEMS trial
 - 55 patients across 12 sites
 - Stage II (masses all less than 3 cm)
 - Recurrence rate – 22%, all recurrences salvaged
- PRIMETEST trial
 - 33 patients
 - Stage IIA/B
 - Recurrence rate – 30%
- COTRIMS trial
 - 34 patients
 - Stage IIA/B
 - Recurrence rate – 12%, all recurrences salvaged
 - 88% retained antegrade ejaculation
- [Siamak Daneshmand et al.](#) Surgery in Early Metastatic Seminoma: A Phase II Trial of Retroperitoneal Lymph Node Dissection for Testicular Seminoma With Limited Retroperitoneal Lymphadenopathy. *J Clin Oncol* **41**, 3009-3018(2023). DOI:[10.1200/JCO.22.00624](#)
- Hiester A, Che Y, Lusch A, Kuß O, Niegisch G, Lorch A, Arsov C, Albers P. Phase 2 Single-arm Trial of Primary Retroperitoneal Lymph Node Dissection in Patients with Seminomatous Testicular Germ Cell Tumors with Clinical Stage IIA/B (PRIMETEST). *Eur Urol*. 2023 Jul;84(1):25-31. doi: 10.1016/j.eururo.2022.10.021. Epub 2022 Nov 10.
- [Axel Heidenreich et al.](#) Prospective COTRIMS (Cologne trial of retroperitoneal lymphadectomy in metastatic seminoma) trial: Final results.. *J Clin Oncol* **43**, 618-618(2025). DOI:[10.1200/JCO.2025.43.5_suppl.618](#)

Post-chemotherapy RP management in seminoma

- Differs from non-seminoma
- Observe most masses < 3 cm
- > 3 cm masses – consider PET or biopsy
- Resection in select cases
- Typically more extensive fibrosis than in non-seminoma
- Pathology in PET avid masses > 3 cm
 - 30% viable seminoma
- 5 year relapse rate – 15% overall
- If viable seminoma found in retroperitoneum at post-chemo RPLND
 - 5 year survival – 54%

- Heidenreich et al. Post chemotherapy retroperitoneal lymph node dissection (PC-RPLND) for metastatic pure seminoma. J Clin Oncol 43, 2025 (suppl 5; abstr 639) DOI: 10.1200/JCO.2025.43.5_suppl.639
- Rice KR, Beck SD, Bihrlé R, Cary KC, Einhorn LH, Foster RS. Survival analysis of pure seminoma at post-chemotherapy retroperitoneal lymph node dissection. J Urol. 2014 Nov;192(5):1397-402. doi: 10.1016/j.juro.2014.04.097. Epub 2014 May 9. PMID: 24813309.



Emerging technologies / techniques

- **Extra-peritoneal RPLND**
 - Midline incision
 - Mobilize peritoneal cavity, accessing retroperitoneum
 - Minimizes bowel exposure and manipulation
 - Daneshmand series
 - 69 patients
 - Hospital stay – 3 days
 - Return of bowel function – 2 days
 - Clavien Dindo grade 3 complications in 1 patient
 - >90% preservation of antegrade ejaculation
 - No comparative trials between extraperitoneal and transperitoneal

Syan-Bhanvadia S, Bazargani ST, Clifford TG, Cai J, Miranda G, Daneshmand S. Midline Extraperitoneal Approach to Retroperitoneal Lymph Node Dissection in Testicular Cancer: Minimizing Surgical Morbidity. Eur Urol. 2017 Nov;72(5):814-820. doi: 10.1016/j.eururo.2017.02.024. Epub 2017 Mar 18. PMID: 28325537.

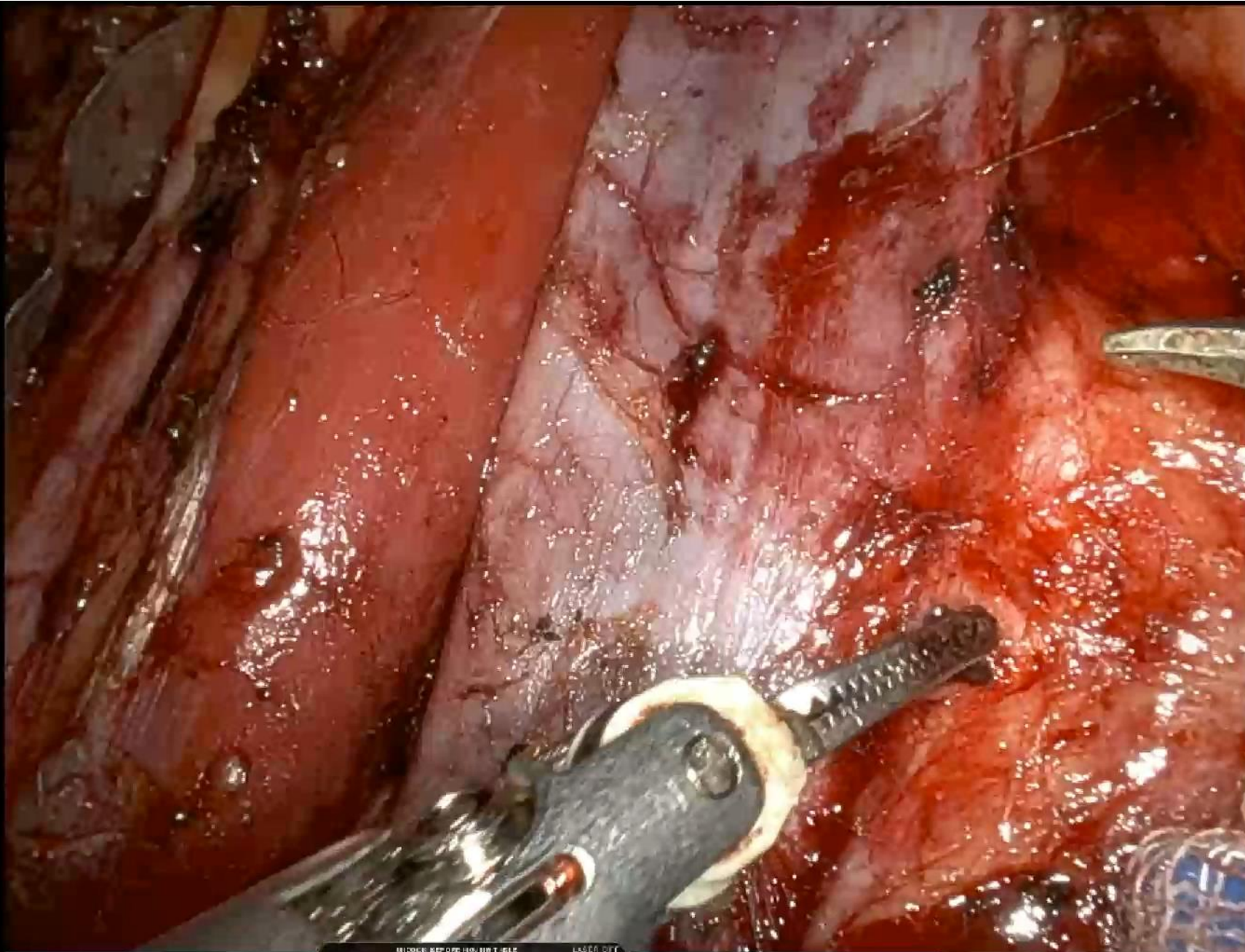


Emerging technologies / techniques

- **Robot assisted laparoscopic RPLND**
 - Primary or post-chemotherapy
 - Template or full bilateral template
 - Mimic open procedure
 - Hospital stay of 0-1 days can be achieved
 - Improved cosmetic outcome
 - Recent data is promising
 - Multicenter analysis of 173 patients
 - 8 recurrences, 3 in field, 1 port site

Ghoreifi A, Sheybaee Moghaddam F, Mitra AP, Khanna A, Singh A, Chavarriaga J, Moon SC, Goolam AS, Chuang R, Rich JM, Baky FJ, Ho M, Roberts J, Gill IS, Porter JR, Ahmadi N, Mehrazin R, Sfakianos JP, Rais-Bahrami S, Bagrodia A, Hamilton RJ, Eggener S, Rawal S, Ward JF, Djaladat H. Oncological Outcomes Following Robotic Postchemotherapy Retroperitoneal Lymph Node Dissection for Testicular Cancer: A Worldwide Multicenter Study. Eur Urol Focus. 2025 Mar;11(2):266-272. doi: 10.1016/j.euf.2024.11.001. Epub 2024 Nov 16. PMID: 39551650.





1 FENESTRATED BIPOLAR FORCEPS L COAG

2 MIDDLE BEFORE 110V BBT HOLE LASER OFF 1x 20W

3 MONOPOLAR CURVED SCISSORS R CUT R COAG

4 TIP-UP FENESTRATED GRASPER



CLC and IB

- **Racial and ethnic differences are present in testicular cancer**
 - Cancer specific mortality is higher in non-Caucasians than Caucasians
 - Race/ethnicity is an independent predictor of CSM
 - Black men are less likely to receive RPLNDs and have higher risk of CSM
- **Fertility preservation**
 - Only 8.4% of men undergo sperm cryopreservation prior to orchiectomy
 - Sperm cryopreservation is more common in white men

- Escobar D, Daneshmand S. Disparities in Testicular Cancer: A Review of the Literature. *Cancers (Basel)*. 2024 Oct 10;16(20):3433. doi: 10.3390/cancers16203433. PMID: 39456529; PMCID: PMC11505726.
- Ryan Davis, Jeffrey Loh-Doyle, Anne Schuckman, Hooman Djaladat, Siamak Daneshmand, Mary Samplaski, Kian Asanad. Prevalence of Fertility Preservation Counseling and Sperm Cryopreservation Amongst Males With Testicular Cancer, *Urology*, Volume 208, 2026, Pages 83-87,



Thank You

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