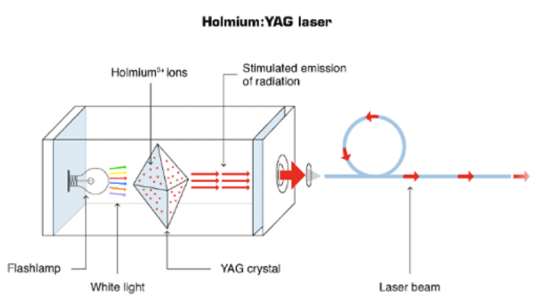
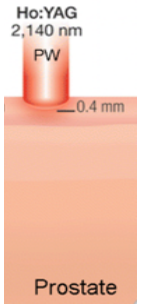
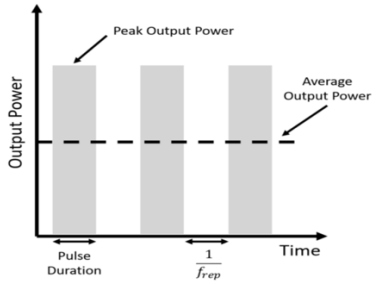
Urology CHEAT SHEETS

HOLMIUM LASER ENUCLEATION OF THE PROSTATE (HOLEP)

PHYSICAL AND TECHNICAL CHARACTERISTICS







Holmium (Ho):Yttrium-Aluminium-Garnet (YAG) is a solid-state laser using the doping element Holmium as an active medium in a YAG crystal. It is a **pulsed laser** designed for emitting light at **2,140 nm**, which is invisible to the human eye. It is absorbed by **water and water-containing tissues**. Its depth of penetration is limited to **0.4 mm.**

SURGICAL, FUNCTIONAL AND SAFETY OUTCOMES

HoLEP compared to **Open Prostatectomy** for large prostates

- SIMILAR Qmax, PVR, IPSS, Re-operation rate
- LONGER Operative time but SHORTER Catheterization and Hospitalization times
- SIMILAR Complications but REDUCED Blood loss and LOWER Blood transfusions rate

Lin et al. World J Urol. 2016 Sep;34(9):1207-19.

HoLEP compared to **TURP** for medium prostates

- SIMILAR Qmax, PVR, IPSS, Re-operation rate
- LONGER Operative time (SIMILAR in other studies) but SHORTER Catheterization and Hospitalization times
- SIMILAR Complications but REDUCED Blood loss with SIMILAR Blood transfusions rate

Zhang et al. Prostate Cancer Prostatic Dis. 2019 Dec;22(4):493-508.
Chen et al. J Urol. 2013 Jan;189(1):217-22.

HoLEP compared to **Other laser energies/techniques (e.g., ThuLEP, PVP)**: limited evidence

Specific potential intraoperative complications: perforation of the prostate capsule, resection of the ureteral meatus, damage or perforation of the bladder wall.

Notable potential postoperative complications: retrograde ejaculation, transient or permanent urinary stress incontinence, urethral strictures. No evidence of the impact on the erectile function.

The **experience of the surgeon** is the most important factor affecting the overall occurrence of complications.

SURGICAL TECHNIQUE

Surgical steps

1) Enucleation of hyperplastic prostatic tissue
2) Coagulation (with laser and/or electric energy)
3) Morcellation of the enucleated tissue

Learning curve

HoLEP requires experience and relevant **endoscopic skills.** Experience level achievement in **roughly 30-40 (min 20; max 60)** cases.

Enikev et al. World J Urol . 2021 Jul;39(7):2427-2438

En-bloc vs. Two-lobe vs. Three-lobe enucleation

Similar functional outcomes (Qmax, PVR, IPSS) and **postoperative complications** (urinary stress incontinence, re-catheterization, re-intervention for bleeding, hemoglobin drop). En-bloc and two-lobe techniques were significantly faster (enucleation time, operative time, enucleation efficiency).

Rucker et al. World J Urol. 2021 Jul;39(7):2337-2345

EAU GUIDELINES RECOMMENDATIONS

Gold standard for prostate size > 80 mL, reliable alternative to TURP for prostate < 80 mL.

Laser enucleation can be performed in patients using **anticoagulant and/or antiplatelet medications** (alternative to laser vaporization which remains the first choice).

Recommendation	Strength rating
Offer open prostatectomy in the absence of bipolar transurethral enucleation of the prostate and holmium laser enucleation of the prostate to treat moderate-to-severe LUTS in men with prostate size > 80 mL.	Strong

Recommendation	Strength rating
Offer laser enucleation of the prostate using Ho:YAG laser (HoLEP) to men with moderate-to-severe LUTS as an alternative to transurethral resection of the prostate or open prostatectomy.	Strong

Long duration modulated pulse technology improves the energy delivery to the tissue compared to traditional technology.

- **SHORTER** Enucleation and Hemostasis times
- **HIGHER** Enucleation efficiency and Hemostasis rate

Kavoussi et al. J Urol. 2021 Jul;206(1):104-108
Nottingham et al. J Endourol. 2021 Sep;35(9):1393-1399
Nevo et al. BJU Int. 2021 May;127(5):553-559
Large et al. Urology. 2020 Feb;136:196-201