LEEP - Indications and Complications

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Learning Objectives

- Review the indications for LEEP
- Review other treatment modalities for cervical dysplasia
- Review the risks associated with LEEP

Treatment Options for Cervical Dysplasia

- Close Observation
- Cryoablation/Laser Ablation (out of favor)
- Excision

Indications for Treatment

- HSIL (CIN2, CIN3) on colposcopic biopsy or endocervical curretage
- HSIL/ASC-H (HPV positive) pap (expedited treatment preferred when immediate risk of CIN3+ ≥60%, acceptable when risk is between 25% and 60%)
- LSIL (CIN1) on colposcopic biopsy
    - If persistent for 2 years (observation is preferable based on 2019 guidelines)
    - If preceded by ASC-H, or HSIL pap (cotesting at 12/24 months, or review of cytology/histology/colposcopy also acceptable)

When is Observation Acceptable?

- Patient's concerns about pregnancy outweigh concerns about cancer

- Biopsies show CIN2 rather than CIN3

When is Observation Not Acceptable?

- CIN3 specified
- Upper limit of lesion is not visualized
- ECC with CIN2 or greater
- Concern for cancer

When is Cryotherapy Acceptable?

- Satisfactory colposcopy
- Lesions do not extend into endocervical canal
- No concern for invasion
- New guidelines recommend excision over ablation

Cryotherapy Risks

- Bleeding
- Infection
- Vaginal freeze burns
- Cervical stenosis
- Incomplete removal of dysplastic tissue
- Potential for missing a cancer diagnosis

When is Cold Knife Cone Acceptable?

- Same indications as LEEP
- Suspected microinvasive squamous cell carcinoma
- Concern for adenocarcinoma in situ
- Distorted anatomy
- Lesion extends deep into canal (LEEP with top hat also acceptable)

LEEP vs CKC

- El-Nashar, S. Et al, Journal of Lower Genital Tract Disease. Vol 21, Number 2, April 2017
- Meta-analysis of 26 studies comparing LEEP with CKC
- Recurrence risk 15.6% vs 7.38% (RR - 1.35, 95% CI - 1.00-1.81)
- LEEP was faster, with less bleeding
- LEEP produced specimens that were shallower with less volume and weight

Principles of Treatment

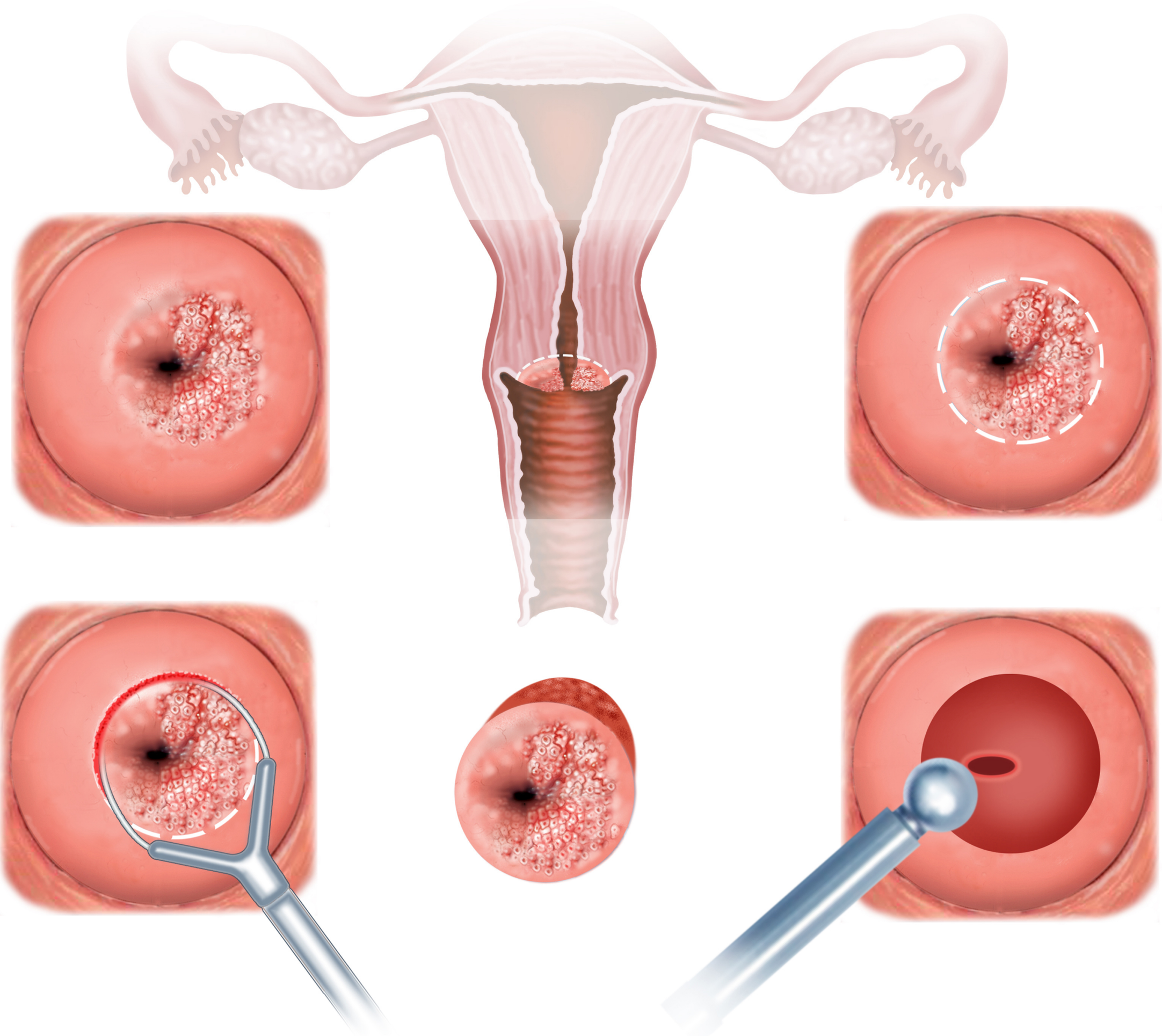
- Dysplasia begins at squamocolumnar junction
- If colposcopy is adequate, lesions do not begin de novo within endocervical canal
- Most severe area of lesion is usually central
- Treat the entire transformation zone, with at least a 2-3mm lateral margin beyond lesion
- Attempt to obtain intact specimens if at all possible

Intact Specimens

- Grubman, J. et al, Journal of Lower Genital Tract Disease Vol 24, Number 1, Jan 2020
- Retrospective review of 896 cases from 2010-2013
- Fragmented specimens have higher incidence of any positive margin ($p=0.01$), multiple positive margins ($p< 0.001$), and indeterminate margins ($p< 0.001$)
- Fragmented specimens haver higher risk of recurrence of high grade lesions in following 3 years ($p=0.04$)

Contraindications to LEEP

- Severe cervicitis
- Pregnancy
- Allergy to anesthetic
- Bleeding disorder
- Demand type cardiac pacemaker
- Suspected invasion or adenocarcinoma



The Top Hat

- Adds a deeper 1 x 1 cm extension after the initial excision

- Indicated if suspected disease in canal above initial specimen (ie. positive ECC)

- Increased risk of thermal artifact

Complications

- Bleeding
- Cervical stenosis (more likely with deep excision)
- Thermal artifact
- Adverse pregnancy outcomes
- Unintentional burns
- Recurrence

Delayed Bleeding After LEEP

- Lee, YJ, et al, Obstet Gynecol Sci 2017 Jan: 60(1):87-91
- 369 patients over 2 year period
- 27.9% in OR with GETA; 72.1% in office with local anesthesia
- 6.2% returned to hospital with delayed bleeding
- Patients receiving local anesthesia had significantly less delayed bleeding (P=0.001)

Cervical Stenosis after LEEP

- Occurs in 6-10% of LEEP procedures
- Can cause amenorrhea with hematometra
- Can also cause infertility
- Can make assessing the endocervical canal difficult in subsequent exams

Risk Factors for Cervical Stenosis

- Suh-Burgmann, E., et al, Obstetrics & Gynecology, December 2000, 657-60.
- Study of 164 women after LEEP
- Rate of stenosis 6%
- Multivariate analysis showed 2 independent risk factors: history of prior LEEP, and large volume of excision

Thermal Artifact - How Big of an Issue?

- Khunamornpong, S., et al. J Med Assoc Thai. 2001 April: 507-14.
- 163 patients from 1995 to 1997
- Thermal artifact present in all cases (mild 51.5%, moderate 36.2%, severe 12.3%)
- 1 case histologic diagnosis not possible due to thermal artifact (0.7%)
- 6 cases of non-evaluable margins due to thermal artifact (3.6%)
- Residual disease in 19% with negative margins, 48.4% with positive margins, and 80% with non-evaluable margins

- Miroshnichenko, G., et al, J Low Genit Tract Dis. 2009 Jan: 10-2.
- Retrospective review comparing margins of CKC vs LEEP specimens.
- Margins more likely to be interpretable after CKC (95%) than LEEP (85%), but not statistically significant (p = .1)
- Margins less likely to be involved with CKC (16%) than LEEP (38%) (p = 0.005)
- LEEP specimens less likely to yield a single unfragmented specimen (1.1 vs 1.9, p = .001)
- Logistic regression showed inverse correlation between specimen number and interpretability (p = .04)

Adverse Pregnancy Outcomes

- Liu, Y., et al. Gynecol Obstet Invest. 2014; 240-4

- Study of 269 patients randomized to LEEP vs CKC

- Prospectively looked at several variables

- PPROM (16 vs 8%; p = 0.03)
- Preterm delivery (11 vs 5%; p = 0.04)
- Low birth weight infant (< 2,500 gm) (10 vs 6%, p = 0.04)
- No differences in mean birth weight, cesarean delivery, labor induction, NICU admissions.
- No cases of neonatal mortality.

Preventing Burn Injury

- LEEP procedure uses monopolar energy
- Avoid any flammable substances in operative field
- Use coated instruments
- Sidewall retractors may help prevent vaginal injury
- Make sure the patient is an appropriate candidate!

An Interesting Case

- Cho, A., et al, Obstet Gynecol Sci, 2019 Mar: 138-141
- Case report of hemoperitoneum caused by uterine perforation following LEEP.
- Presented with upper abdominal pain 1 hour after procedure
- CT abd/pelvis showed moderate amount of blood in pelvic cavity
- Diagnostic laparoscopy confirmed hemoperitoneum with 2 defects above both ureterosacral ligaments
- Other (rare) complications that have been reported are peritonitis, ureteral injury, vesicovaginal fistula, and even vaginal evisceration

Risk of Recurrence After Treatment

- Melnikow, et al J Natl Cancer Inst 2009; 101: 721-728
- Retrospective study of 37,142 women treated for CIN (cryo, laser, cone, LEEP with neg margins)
- Recurrence of CIN2,3 in first 6 years after treatment
  - Higher with older age
  - Higher with more severe disease at initial treatment
  - Recurrence risk depends on modality (cryo > laser > LEEP > cone)
    - Rate of CIN2/3 recurrence after treatment for CIN3
      - Age 30-39: CKC 6.3% LEEP 9.6%
      - Age 40-49: CKC 8.5% LEEP 12.9%

Risk of Recurrence with Positive Margins

- Ghaem-Maghami et al Lancet-oncol 2007;8:895-93
- Meta analysis of 25 studies
- Relative risk of CIN2+ after incomplete excision 6.09 (CI 3.87-9.60) compared with complete excision
- Frequency of post treatment CIN2+
  - Negative margins 3%
  - Positive margins 18%

Summary

- Excision is widely used for the treatment of dysplasia
- It is preferred over ablation, and recommended for AIS
- LEEP is usually performed as an office procedure under local anesthesia
- Cold Knife Cone (CKC) is performed in the operating room under general or regional anesthesia

Summary, Part 2

- Success rates high with both LEEP and CKC, but risk of recurrence is slightly lower with CKC
- Perinatal risks in subsequent pregnancy higher with CKC
- Excision provides tissue for histologic examination
    - Reduces risk of missing occult invasion
    - Allows for assessment of surgical margins

Questions?