

- These techniques may be performed in ambulatory surgery or even office settings with moderate sedation or monitored anesthesia.
- Surgical intervention:
 - Most common procedure for a herniated or ruptured intervertebral disc is a microdiscectomy.
- Lumbar discectomy is the most commonly performed spinal surgery in USA, with over 300,000 discectomies performed annually.
- Cauda equina syndrome or a high degree of motor dysfunction is a surgical emergency.
- Most recently a randomized controlled trial comparing surgery with prolonged conservative treatment at 5 y demonstrated no significant differences in either disability scores and VAS for leg and back pain.

Assessment Points				
System	Effect	Assessment by Hx	PE	Test
MS	Decreased ROM, pain	Lumbar sprain: Stiffness, decreased ROM	Muscle tenderness	MRI
		Annular tear: Axial pain, difficulties sitting	Decreased ROM referred dermatomal pain	MRI/CT MRI/CT EMG/NCS
		HNP: Numbness, weakness or simply pain Cauda equina	Decreased reflexes, sensory loss "Saddle anesthesia"	Surgical emergency
NEURO	Decreased reflexes or increased reflexes with severe spinal stenosis			
PSYCH	Anxiety, chronic opioid intake, litigation issues	Medications preop	If opioid abruptly stopped, may present with withdrawal	Need for multimodal analgesia

Key References: Ropper AH, Zafonte RD: Sciatica, *N Engl J Med* 372(13):1240-1248, 2015; Dunn LK, Durieux ME, Nemergut EC: Non-opioid analgesics: novel approaches to perioperative analgesia for major spine surgery, *Best Pract Res Clin Anaesthesiol* 30(1):79-89, 2016.

Perioperative Implications

- Pts may present on high-dose opioids, which may present a challenge intraop and postop.
- Nonopioid therapies have been increasingly used as part of a multimodal analgesic regimen to provide improved pain control while minimizing opioid-related side effects.
 - A single dose of preoperative gabapentin at 1200 mg versus placebo in pts undergoing elective lumbar surgery was associated with a significant reduction in pain up to 4 h after the procedure ($P < 0.01$).
 - Periop pregabalin (300 mg before surgery as well as 150 mg for two postop doses 12 h apart) was

associated with decreased VAS scores in addition to improved functional outcome at 3 mo postop.

- IV acetaminophen administered at 1 g intraop followed by another dose of 1 g every 6 h throughout the first postop day resulted in significantly improved pain scores at 24 h in the treatment group versus the placebo group.
- Dexamethasone versus placebo given intraop in a randomized controlled study involving pts undergoing lumbar discectomy led to a significant improvement in mean pain scores on postop day 1.
- Ketamine administered IV before surgery resulted in reduced postop opioid demands and

24-h postop pain scores. Studies examining continuous IV infusion of ketamine demonstrated decreased opioid demands in 9 of 13 trials, with pts in 2 trials maintaining reduced pain scores for 48 h postop.

- There have been some reports of epidural catheter placement by the surgeon intraop (at the end of the procedure but prior to wound closure) leading to reduced VAS pain scores and morphine PCA consumptions after lumbar microdiscectomy.

Herpes, Type 1

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Risk

- 500,000 new cases of HSV-1 each year in USA (prevalence approximately 68%); 58% of people worldwide are seropositive.
- Symptoms are typically minor (malaise, myalgias, and painful vesicular oral lesions) or absent, except in immunocompromised pts.

Perioperative Risks

- Theoretical risk that spinal anesthesia can spread HSV-1 infection to new dermatomes.
- Association of intrathecal morphine and reactivation of HSV-1 infections in obstetric population.

Worry About

- Transmission of infection to healthcare workers or other pts
- Reactivation after organ transplantation and initiation of immunosuppression
- Secondary infection of herpetic lesions with bacteria or fungi

Overview

- Transmission occurs after contact with secretions or mucus.
- Primary infection associated with fever/malaise, with a mean duration of 19 d. Recurrences are milder, with a mean duration of 10 d.
- Lesions recur about once per y (in contrast with four times per y for HSV-2) in immunocompetent pts.
- 27% of the population is seropositive by age 4.
- Oral symptoms include gingivostomatitis/oral ulcers. Genital, ocular, pneumonitis, and additional dermatologic infections may occur.
- Symptoms may last 1–4 wk.
- Can be diagnosed via a viral culture (titer 1000 times nml while active lesions exist) or HSV antibodies.

Etiology

- Transmission occurs after contact with lesions or body fluids such as saliva or genital secretions. Fifty-eight percent of the world population is seropositive. Transmission can be vertical (transmission to infant

via vaginal tract), which is a TORCH pathogen associated with greater risk of infant death or blindness. Vertical transmission (8-60:100,000 live births) and postpartum transmission is exceedingly rare.

- No animal/insect reservoir or vectors exist for HSV-1.
- Infection is usually mild in pts with an intact immune system.
- Dx is by viral culture, PCR, fluorescent antibody testing, or serology.

Usual Treatment

- Acyclovir, valacyclovir, and famciclovir are effective as episodic therapy when initiated within 72 h of appearance of symptoms reducing viral shedding, lesion healing time, and symptoms.
- Suppressive therapy (lower dose initiated while asymptomatic) is effective in reducing frequency and severity of recurrences, as well as transmission to an uninfected partner.
- Foscarnet or vidarabine may be used in acyclovir-resistant herpes infections.

Assessment Points

System	Effect	Assessment by Hx	PE	Test
RESP	Pneumonitis	Aspiration of oral secretions; previous HSV esophagitis	Bilateral crackles	CXR (bilateral interstitial infiltrates)
GI	Esophagitis	Odynophagia, dysphagia, substernal pain	Multiple shallow mucosal ulcers	
GU	Cystitis			
CNS	Encephalitis, meningitis	Headache, confusion, lethargy	Anosmia, memory loss, expressive aphasia, focal seizures	Brain biopsy
DERM	Cutaneous ulcers	Recurrent painful skin or mucosal ulcers	Multiple vesicular lesions on an erythematous base with subsequent ulceration	
	Stevens-Johnson syndrome	Extensive painful skin lesions	Deep bullous erosive lesions	

Key References: Chayavichitsilp P, Buckwalter JV, Krakowski AC, et al.: Herpes simplex, *Pediatr Rev* 30(4):119–129, 2009; Davies PW, Vallejo MC, Shannon KT, et al.: Oral herpes simplex reactivation after intrathecal morphine: a prospective randomized trial in an obstetric population, *Anesth Analg* 100(5):1472–1476, 2005.

Perioperative Implications

Preoperative Preparation

- Cover exposed herpetic lesions.
- Strict adherence to universal precautions.

Monitoring

- Avoid disturbing active lesions.

Regional Anesthesia

- Needle should not be inserted through lesion. There is a theoretical risk of spreading herpes from one

infected ganglion to another, but regional anesthesia is not contraindicated.

- Neuraxial morphine remains a common practice, as rare occurrence of vertical transmission from mother to neonate does not support withholding this technique.

Postoperative Period

- Thoroughly disinfect any surface area that might have been in contact with oral secretions or herpetic lesions. Most disinfectants are effective, including chlorine and alcohol.

Anticipated Problems/Concerns

- No effective preexposure or postexposure prophylaxis.
- Acyclovir may reduce effectiveness of phenytoin.
- C-section should be offered for pregnant women with active HSV.
- Vaginal delivery is acceptable for women in remission; acyclovir is often used.

Herpes, Type II

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Risk

- Incidence within USA of HSV-2 is estimated at 40–60 million (20% of sexually active adults).
- Approximately 536 million people (16% of population) infected worldwide, most unaware of the disease.
- Highest prevalence in women, African Americans, and lower socioeconomic groups.
- Frequency and severity of infection increases in immunocompromised pts, including HSV encephalitis.
- Incidence of neonatal HSV infection is estimated at 1:2000–5000 deliveries.

Perioperative Risks

- Vertical transmission from infected mother to fetus during vaginal birth
- Intrauterine fetal infection after rupture of membranes

Worry About

- Transmission of infection to health care personnel resulting in herpetic whitlow via inoculation of virus into digits is very well described and completely preventable with universal precautions (e.g., gloves at all times).
- Neonatal herpetic infection during vaginal births.
- Viremia secondary to needle placement within infected area during regional anesthesia with possible extension of infection to adjacent areas.
- Secondary bacterial or fungal infection of herpetic lesions.

Overview

- Primarily caused by infections below the waist transmitted by sexual contact.

- Maternal primary HSV-2 infection is associated with spontaneous abortion.
- Newborns can be infected with HSV-2 during vaginal delivery from the mother's genital infection (high neonatal mortality).
- Primary genital HSV-2 infection has the highest incidence of systemic symptoms (malaise, fever, headache, myalgias).
- Latent infection remains dormant in sensory ganglia, innervating the infected area until reactivation.
- Recurrent infection involves clusters of genital sores (papules and vesicles) on outer surface of genitals, usually appearing 4–7 d post HSV exposure.
- No increased risk of reactivation of HSV-2 is associated with neuraxial anesthesia.
- Chronic recurrent HSV-2 infection is associated with development of cervical and vulvar cancer.
- Reactivation is known to occur with exposure to UV light, immunosuppression, trauma, and fever.
- Dx by viral culture (gold standard) is the most sensitive and specific (rapid Dx by Tzanck smear).
- Genital herpes increases the risk of transmission and acquisition of HIV-1 infection threefold to fourfold.

Etiology

- Double-stranded DNA virus in the family of Herpesviridae.
- Acquired via genital infection primarily by sexual transmission of HSV-2.
- Immunosuppression and increased number of sexual partners are risk factors for acquisition.
- Diagnosed by multinucleated giant epithelial cells (polykaryocytes) with intranuclear (Cowdry type A) inclusion bodies on Giemsa stain smears (Tzanck preparation) taken from vesicle or tissue biopsy.

Usual Treatment

- Administer IV acyclovir for neonatal HSV-2 infection.
- Oral acyclovir and topical cream shorten duration of lesions for recurrent infections.
- Most recommend that full-term parturients with visible genital lesions (especially primary infection) undergo cesarean delivery to decrease incidence of neonatal HSV infection. Neonates exposed to asymptomatic shedding of HSV during parturition (fourfold increase in HIV seropositive women) may also rarely acquire neonatal HSV.
- Active genital herpes lesions are indications for cesarean delivery for prevention of neonatal herpes infection. This significantly reduces risk of transmission. Use of third trimester oral suppression for outbreak prophylaxis is effective at reducing risk of needing cesarean delivery.

Novel Therapies

- Pericoital application of tenofovir gel showed reduction in HSV-2 acquisition, decreased shedding, decreased lesion rate, and decreased quantity of viral shedding.
- Administer imiquimod for acyclovir-resistant HSV-2.
- The combination of imiquimod immunomodulator, imiquimod, and acyclovir appears to provide effective therapy for acute genital HSV-2 infection, even when begun after lesion development.