What’s “Bugging” Your Patients?
An Overview of Infectious Diseases of the Mouth

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Outline:
Infectious Diseases of the Mouth
Pretest - Treat or Defer

Types of Infections
Acute - severe and short duration (URI)
Chronic - long duration, possibly lifetime, may be asymptomatic (TB)
Latent - may resurface after initial infection (HSV, Herpes Zoster)
Opportunistic - normally nonpathogenic, in a diminished host infection occurs (Candidiasis)

Types of Infections
Autogenous - transient bacteremia
Hospital Acquired - nosocomial; iatrogenic
Opportunistic
Vector - transferred by an insect

Routes of Infection
Direct - contact with infectious lesion or body fluid
Indirect - cross contamination;
Vehicle - substance or object that carries infectious material
Splash/spatter
Airborne transmission - droplet infection, aerosols, mist, splatter
Parenteral - via skin
Bloodborne - saliva, improperly sterilized instruments, shared needles, unprotected sex

Pericoronitis - an inflammatory response of the mucosa around the crown of a partially erupted, often impacted tooth; soft tissue around the mandibular 3rd molar is most common site of infection

Etiology - a-hemolytic streptococcus; genera Prevotella, Veillonella, Bacteroides, Capnocytophaga; B-Lactamaste-producing strains
Risk Factors - biofilm accumulation on and around the tooth; food impaction; trauma from opposing molar; compromised host defenses

Clinical Features - intense pain, fever, fatigue, infection can spread into surrounding tissues causing cellulitis

Treatment - mechanical debridement, irrigation of pocket, culture, antibiotics

**Bacterial Sialadenitis** - infection usually associated with a microbial overgrowth in association with reduced salivary flow due to dehydration, post-op state and debilitation; parotid gland involvement is more common than submandibular gland sialadenitis

Etiology - Staph aureus, Strept viridians, Strep pneumonia, E. Coli, H. influenza, B. melaninogenicus

Clinical - painful facial swelling, fever, malaise, headache, extreme tenderness of involved gland

Differential DX - mumps, Sjögren's Syndrome

Treatment - eliminate causative organism, rehydration, drainage of suppuration if present, culture, regimen of penicillinase-resistant antibiotic, warm compresses, analgesics, rest

**Impetigo** - an acute, contagious, infection of the skin that occurs most commonly in children living in hot, humid climates

Bullous form - caused by Staph aureus, has vesicles that enlarge into bullae usually 1-2 cm in diameter, bullae contain clear yellow fluid that turns cloudy and darker in color; after 1-3 days lesions rupture leaving a thin crust, may involve the buccal mucous membranes

Nonbullous - caused by S. aureus group A, Strept pyogenes or combination; scratching the skin and disrupting it provides the vehicle for causative organisms to enter the epidermis, organisms infect nose, throat and skin, lesions begin as
vesicles or pustules with an erythematous base, rupture, and form a light brown crust, multiple lesions may occur at the same site often coalescing resembling HSV

Differential DX - HSV

Treatment - topical and systemic therapy, infected crusts are removed and area is cleansed with soap and water, topical mupirocin, systemic antibiotics used when infection is mod to severe or lymphadenopathy is present - penicillin, clindamycin, cephalexin or cephalosporin depending on the organism involved

**Tonsillitis/Pharyngitis** - inflammatory condition caused by a variety of bacteria and viruses - *Strept, Adenovirus, Influenza viruses, EBV*

Clinical - sore throat, fever, tonsillary hyperplasia, erythema of the oropharyngeal mucosa and tonsils

Laboratory Testing - rapid antigen detection test for strept infections

Differential DX - scarlet fever, rheumatic fever

Treatment - antibiotics for strept infections

Tuberculosis - infectious chronic granulomatous disease caused by *M. tuberculosis*; chief form is infection of lung, transmission is by inhaled droplets, disseminated in bloodstream; symptoms= fever, chills, fatigue, weight loss, persistent cough, coughing blood

Types - primary infection of lung; military = widespread areas of the body including kidneys and liver; scrofula = submandibular and cervical nodes; oral- tongue and palate are common sites; any mucosa may be infected; typical lesion is indurated, chronic, nonhealing, painful ulcer; may have bony involvement with tb osteomyelitis

Diagnosis - oral sputum, skin test (PPD, Mantoux), chest x-ray

Differential DX - primary syphilis, deep fungal diseases, *SCC*, chronic traumatic ulcer, Major aphthae
Treatment - INH, rifampin, pyrazinamide, ethambutol; 6 months to 2 years; highly contagious - when active must defer oral tx, usually non-infective shortly after tx has begun; wait 3 weeks after tx begins, must have repeat tests with no evidence of disease in sputum

**Actinomycosis** - a chronic, bacterial infection presenting with localized swelling, suppuration, abscess formation, tissue fibrosis, and draining sinuses of the oral and cervicofacial regions; periostitis or osteomyelitis can develop if the infection extends to the facial and maxillary bones; thoracic region, abdominopelvic area and CNS may be involved

Etiology - A. israelii; N. asteroids, not regarded as contagious disease, usually appears after trauma, surgery or previous infection, may occur in osteoradionecrosis of jaw and in patients with serious systemic illness

Clinical - usually occurs in cervicofacial area, presents as a swelling of the mandible that may stimulate a pyogenic infection, lesion becomes indurated and forms one or more draining sinuses leading from the medullary spaces of the mandible to the skin of the neck; lesions are "woody hard" consistency; pus draining from the chronic lesion may contain small yellow granules known as sulfur granules

Radiographic - lucency with irregular and ill-defined margins

Differential DX - osteomyelitis, fungal infections, scrofula, requires direct examination of exudates through microscopic evaluation of tissue or microbiologic culture for definitive diagnosis

Treatment - long term high-dose penicillin; iv penicillin G may be needed for 4-6 weeks followed by oral penicillin V for 6-12 months for severe cases; tetracycline, erythromycin, clindamycin, ceftriaxone and chloramphenical may be used as alternatives if penicillin allergy; drainage of abscess and surgical excision of scar and sinus tracts needed to aerate tissue and enhance penetration of antibiotics; scarring and disfigurement occur

**Gonorrhea** - one of the most common bacterial infections in humans; caused by N. gonorrhoeae; transmitted by direct sexual contact with infected person; orogenital contact is responsible for transmission of genital infection to oral cavity and pharyngeal mucosa
Oral Symptoms - nonspecific; range from generalized stomatitis with ulcerations, erythema, sore throat, lymphadenopathy

Treatment - single dose of penicillin; certain regions are resistant to penicillin and may be managed effectively with ciprofloxacin

Infection in Children - perinatal - infections of conjunctiva, pharynx, respiratory tract; Older children (>1 year) considered possible evidence of sexual abuse

Syphilis - T. pallidum; can penetrate mucous membranes, require a break in the skin; organism dies quickly when exposed to air/temp changes; transmission by sexual contact (active lesion), transfusion, transplacental

Stages - Primary - highly infectious, chancre forms at site of invasion, regional lymphadenopathy, lesions heal w/o tx; disease enters latent stage; Secondary - 6 weeks after primary lesion appears, highly infectious, spontaneous remission, can recur, mucous patches (oral lesions); Tertiary - gumma lesion, necrotic and ulcerative stage affects tongue and palate in oral cavity, affects CVD and CNS systems

Differential DX - great mimicker or imitator, SCC, chronic traumatic lesions, TB, HSV, histoplasmosis, gumma - T-cell lymphoma

Laboratory analysis - darkfield examination of scrapings or exudates from active lesions, special silver stain or immunologic preparation of biopsy tissue, serologic tests for antibodies to T. pallidum

Treatment - drug of choice for all stages is penicillin; second line = erythromycin and tetracycline

Acute Osteomyelitis - acute inflammation of the bone and bone marrow of the mandible and maxilla; commonly a result of the extension of perio abscesses; can also result from bone surgery or physical trauma and staph and strept infections

Clinical - pain is primary feature, painful lymphadenopathy, leukocytosis, parasthesia of the lower lip occasionally occurs with mandibular involvement, usually not readily identified on radiographs until ~60% of the bone has been resorbed or demineralized, then radiolucent changes will begin to appear
Treatment - antibiotics and drainage; surgery may be indicated depending on disease severity, the organisms involved and the patient's health

**Chronic Osteomyelitis** - a sequela of acute osteomyelitis, long-term low-grade inflammatory reaction that never went through a significant or clinically noticeable acute phase, caused usually by infection, may be affected by Paget's disease, osteopetrosis, sickle cell disease

Radiographic - radiolucent lesion that may show focal zones of opacification, lucent pattern often described as "moth eaten" because of mottled appearance, lesions may be very extensive and margins are often distinct

Treatment - antibiotics, surgical intervention, culture and sensitivity testing prior to tx, immobilization may be needed for pathologic fx, hyperbaric oxygen - stimulates vascular proliferation, collagen synthesis, osteogenesis.

**Candidiasis** - overgrowth yeast-like fungus *C. albicans;* flora is normal, present in >30% of healthy adults

Predisposing Factors - immunodeficiency, immunologic immaturity of infancy, acquired immunosuppression, endocrine disturbances, diabetes, hypoparathyroidism, pregnancy, hypoadrenalism, corticosteroid therapy, systemic antibiotic therapy, malignancies and their therapies, xerostomia, poor oral hygiene

Types - pseudomembranous (white colonies), erythematous (red mucosa -acute or chronic), hyperplastic (white keratotic plaques), angular cheilitis, median rhomboid glossitis, palatal papillary hyperplasia

Diagnosis - part of normal oral flora, presence is not considered pathologic, mucosal smear more valuable than culture for organism, recurrent oral candidiasis may be an early sign of a severe underlying medical problem, immune-compromised patient often presents with chronic candidiasis

Differential DX - chemical burns, traumatic ulcerations, mucous patches of syphilis, drug reactions, erosive lichen planus, discoid lupus erythematosis

Treatment - attend to predisposing factors, topical application of nystatin suspension or systemic tx with fluconazole or ketoconazole, continue topical tx at
least 1 week post disappearance of clinical manifestations, good prognosis, may recur

**Deep Fungal Infections** - primary involvement of lungs, oral infections typically follow implantation of infected sputum in oral mucosa, may follow hematogenous spread of fungus from another site such as the lung

Types - histoplasmosis (worldwide, in Midwestern US, from the dust of dried pigeon droppings); coccidioidomycosis (western US, known as valley fever); blastomycosis (Ohio-Mississippi river basin area); cryptococcosis (transmitted through inhalation of avian excrement)

Lung Involvement - cough, fever, night sweats, weight loss, chest pain, hemoptysis, skin eruptions resembling erythema multiforme may occur in coccidioidomycosis infection

Oral - ulceration, single or multiple, lesions are nonhealing, indurated and painful, purulence may be present with blastomycotic lesions

Differential DX - SCC, chronic trauma, oral TB, primary syphilis, cervical actinomycosis for blastomycosis

Treatment - ketoconazole, fluconasole and amphotericin B (highly toxic to kidneys), surgical resection of I&D may be used to enhance drug effects in treating some necrotic lung infections

**Mucormycosis** - rare fungal infection, caused by genera Mucor and Rhizopus, normally found in bread mold, decaying fruits and vegetables, route of infection is through GI tract or respiratory tract; infections typically occur in patients with poorly controlled diabetes, advanced malignancies, transplant recipients, patients being treated with steroids or radiation, and other immunosuppressive conditions such as HIV or AIDS, lesions most likely to occur in nasal cavity, paranasal sinuses, and oropharynx in head and neck area

Clinical - pain and swelling precede ulceration, tissue necrosis results in perforation of palate, extension into the orbit or brain is a common complication, fungus has a tendency for arterial wall invasion which can lead to hematogenous spread, thrombosis or infarction
Treatment - amphotericin B is drug of choice, surgical debridement of the upper respiratory tract is often required, prognosis depends on severity of underlying disease, death is frequent consequence of this infection, especially lung infection

**Human Papillomavirus (HPV)** - types - 6 and 11 -low infectivity; 16 and 18 - high infectivity; subtypes 16 and 18 implicated with relation to SCC, strongest for tonsil SCC - up to 60% of tumors contain evidence of HPV, VCC also identified as positively related to HPV infection; mechanism of contribution to carcinogenesis via protein (E6) inhibition of p53 accelerating the cell cycle and compromised DNA repair; ~ 79 million Americans currently infected with HPV, another 14 million people become newly infected each year, HPV is so common that nearly all sexually active men and women get at least one type of HPV at some point in their lives

Genital warts - about 360,000 sexually active adults in the US get genital warts each year
Cervical cancer - each year, about 12,000 women get cervical cancer in the US. Other cancers that can be caused by HPV are less common than cervical cancer. Each year there are about 2100 women who get vulvar cancer, 500 get vaginal cancer, 600 men get penile cancer, 2800 women and 1500 men get anal cancer, 1700 women and 6700 men get head and neck cancers
RRP (recurrent respiratory papillomatosis) is very rare, estimated that ~800 children get RRP every year in the US

Treatment - difficult and frustrating; depends on modality used, dry ice, liquid nitrogen, caustic agents, retinoic acid for verruca vulgaris/warts; routine excision or laser ablation for others

**Herpes Simplex Infection** - primary infection manifested systemically by fever, malaise, cervical lymphadenopathy and orally by painful erythematous, swollen gingival, multiple tiny vesicles; majority are subclinical in children 6 months to 6 years, self-limiting in 1-2 weeks

Recurrent HSV - persist in latent stage, usually trigeminal ganglion, causes localized recurrent infection in 1/3 to ½ of population, prodromal signs of itching, tingling and burning, manifestations - vesicles, rupture, ulcer, crusting; heals 10-14 days, recurs; precipitating factors - sunlight, URI, trauma, stress,
immunosuppression, post-transplant, HIV, menstruation, fever; transmission - autoinoculation, person-to-person, inanimate object to person

Diagnosis - clinical characteristics, viral culture to confirm, blood assay

Treatment - antiviral drugs (acyclovir, penciclovir, valtrex, docosanol), viral shedding continues an average of 12 days, prevention - sunscreen, recurs

Differential DX - strept pharyngitis, erythema multiforme, anug, aphthous stomatitis, chancre

HSV - 40% gave secondary herpes, asymptomatic shedding of contact virus particles in saliva and other secretions may occur in previously infected individuals as much as 6x per month at many intraoral sites; shedding is more common in HSV-1 than HSV-2; shedding is more common in younger individuals than older persons; infected saliva is a potential source of transmission; HSV-1 is not as dormant during latency as previously believed; HSV may recur in 2 weeks; therefore, recommended NO treatment of patient until crusted lesions are completely healed + 2 weeks to ensure no recurrence

Herpetic Whitlow - antiviral meds, duration is protracted and may last 4-6 weeks, must double-glove if practicing during infection, must use universal precautions

**Varicella-Zoster Virus (VZV)**

Chicken pox in children - highly contagious, vesicular and pustular eruptions of skin and mucous membrane, systemic - headache, fever, malaise, oral-not severe, recovery 2-3 weeks, usually single episode in children, rare to recur, virus lies dormant and recurs in adults as shingles, vaccine available for children

Herpes Zoster (Shingles) - unilateral painful eruptions of vesicle and ulcers along the distribution of a sensory nerve - any of the 3 branches of the trigeminal nerve (ophthalmic, maxillary, mandibular), oral lesions - painful, burning parasthesia; contributing factors - immune compromised, Hodgkin’s, leukemia, radiation tx, surgery of the spinal cord; prodromal sign of pain or parasthesia persist for several days followed by skin eruption that becomes pustular and eventually ulcerates, lasts several weeks, may be followed by post-herpetic neuralgia that
takes months to resolve, complications also may include secondary infection of ulcers and motor paralysis

Treatment - valacyclovir, nsaid, narcotic analgesia, wound dressing, bland lotions (Calamine), steroids; Zostavac vaccine (by Merck) may help prevent shingles, cannot be used in those with HIV/AIDS, taking steroids or other immune-suppressants, undergoing CA therapy, hx of leukemia or lymphoma, those with TB or pregnant

Epstein-Barr Virus (EBV) - suggested as a factor in many diseases which occur in the oral pharyngeal region including mono and hairy leukoplakia.

Infectious mononucleosis - characterized by sore throat, fever, lymphadenopathy, enlarged spleen, malaise, fatigue, palatal petechiae; benign and self-limiting, resolves 4-6 weeks

Hairy leukoplakia - asymptomatic, variable appearance - irregular surface contour that is folded or corrugated, or smooth and macular; majority occur on lateral borders of tongue, may have suprainfection of candidiasis, herpetic ulcerations and lymphadenopathy may occur, often found in those with HIV/AIDS; treated with antiviral and antifungal medications, limited success with tx, prognosis influenced by association with HIV infection

Coxsackievirus - Herpangina - etiology is Coxsackie type A virus, manifested as vesicles on the soft palate, fever, malaise, sore throat, dysphagia, erythematous pharyngitis, mild to moderate cases resolve in 1 week usually without treatment

Hand, foot and mouth disease - caused by picornavirus, highly contagious; occurs in children < 5 years old, oral lesions are painful vesicles/ulcers throughout the mouth, skin has macules or papules; diagnosis based on clinical features, viral cultures, measurement of circulating antibodies; treatment - none usually as self-limiting, short duration, bland mouth rinses with sodium bicarbonate, some children get dehydrated requiring hospitalization

Measles - paramyxovirus spread by airborne droplets through the respiratory tract; highly contagious, fever, respiratory symptoms, skin rash, common in childhood; may present with Koplik spots - small erythematous macules with white necrotic centers, may occur in the oral cavity; treatment includes supportive therapy - bed rest, fluids, adequate diet, analgesics; secondary infections of otitis
media or pneumonia may develop; do not confuse with German measles (rubella) which do not produce Koplik spots and do produce congenital defects in developing fetus; prevention of measles via MMR vaccine

**Mumps** - viral infection of salivary glands - paramyxovirus, Coxsackie A virus, echovirus, choriomenigitis virus, cytomegalovirus, parainfluenza virus types 1 and 2; common in children with manifestations of fever, malaise, headaches, chills, preauricular pain, painful swelling of salivary glands, bilateral swelling of parotid glands - Stensen’s duct may become partially occluded as the glands swell; treatment = bed rest, analgesics, corticosteroids, complete recovery usually, some fatalities occur associated with viral encephalitis, myocarditis, nephritis; nerve deafness and bilateral testicular atrophy may occur in male adults who acquire this infection; prevention via MMR vaccine

**Diagnosis and Care Plans** - determine diagnosis based on history, clinical presentation, cultures, microscopic/histologic analysis, biopsies. Care plans based on following model:

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Post-test

Questions and Answers
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