CHIRP
Program Highlights

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Community and Hospital Infections in Real Practice (CHIRP) was a half-day-long academic program accredited by the Manitoba College of Family Physicians and co-ordinated by the staff of the Infection Prevention and Control Unit at the Health Sciences Centre. The following three summaries provide an overview of the major issues addressed by the speakers.

1. Managing community-acquired pneumonia

John M. Embil, MD, FRCPC

What causes community-acquired pneumonia?

The most common pathogens responsible for community-acquired pneumonia are *Streptococcus pneumoniae*, *Haemophilus influenza* and atypical bacteria, such as *Mycoplasma pneumoniae*; however, the underlying pathogen is often unknown at the time of the initial patient assessment and, therefore, therapy must be initiated empirically.

What are the risk factors?

Several studies have demonstrated that a multitude of risk factors, such as dementia, seizure disorders, congestive heart failure, cerebral vascular disease, chronic obstructive lung disease, infection with human immunodeficiency virus, diabetes, extremes of age and an immunocompromised state are risk factors for community-acquired pneumonia. Persons in these risk categories are the same persons who would benefit from the pneumococcal vaccine and yearly influenza vaccine.

How is it treated?

The approach to the patient with community-acquired pneumonia depends upon a number of factors; specifically, whether the individual is sufficiently stable to be managed with an oral antibiotic or whether they are unstable and require hospital care.

Large epidemiologic studies of *in vitro* susceptibility testing of bacterial isolates recovered from across Canada provide insights as to the status of antimicrobial resistance and agents that can be used to treat community-acquired pneumonia. A recent survey by the Canadian Bacterial Surveillance Network revealed that, amongst *S. pneumoniae* isolates, penicillin non-susceptibility was approximately 15% (8.5 intermediate, 6.5% resistant), compared to 12.45% in 2000. Macrolide non-susceptibility was observed in 13.9% of the isolates and ciprofloxacin non-susceptibility was 2.7% compared to 1.4% in 2000; however, non-susceptibility to amoxicillin and ceftriaxone remained uncommon.

Table 1 provides suggestions for the empiric management of community-acquired pneumonia based upon the 2003 Infectious Diseases Society of America Recommendations.

What if the pneumonia isn't improving?

If the patient is clinically improving, with resolution of fever, constitutional symptoms and cough, this clearly

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Table 1

Empiric therapy for bacterial community-acquired pneumonia

Patient factor	Therapeutic options
Outpatient	
Previously healthy	
• No prior antibiotic therapy	Macrolide (erythromycin, azithromycin or clarithromycin) or doxycycline
• Prior antibiotic therapy	Respiratory fluoroquinolone alone, or an advanced macrolide with high-dose amoxicillin or advanced macrolide (azithromycin or clarithromycin) with high-dose amoxicillin-clavulanate
Co-morbidities	
• No prior antibiotic therapy	Advanced macrolide or respiratory fluoroquinolone
• Recent antibiotic therapy	Respiratory fluoroquinolone alone or advanced macrolide with beta-lactam
• Suspected aspiration with infection	Amoxacillin-clavulinate or clindamycin
• Influenza with a superinfection	A beta-lactam or respiratory fluoroquinolone
In-patient	
Medical wards	
• No prior antibiotic therapy	Respiratory fluoroquinolone or advanced macrolide with beta lactam
• Recent antibiotic therapy	Advanced macrolide with beta-lactam or respiratory fluoroquinolones
Nursing home	
• Receiving care in nursing home	Respiratory fluoroquinolone alone or amoxicillin-clavulanate with advanced macrolide

- Co-morbidities: Lung disease, diabetes, renal, underlying malignancy
- Respiratory fluoroquinolone: Moxifloxacin, gatifloxacin or levofloxacin
- Advanced macrolide: Azithromycin or clarithromycin
- Beta-lactam: Third-generation cephalosporin (ceftriaxone or cefotaxine) or beta-lactam—beta-lactamase inhibitor, ertapenem

marks progress. An infiltrate on the chest radiograph will require six to eight weeks to resolve completely. If the patient has persistence of clinical symptoms with persistence of the pulmonary infiltrate, the differential diagnosis must broaden beyond that of a conventional community-acquired bacterial pneumonia to include a foreign body aspiration, neoplasm or fungal infections, such as those caused by *Blastomyces dermatitidis*, or infection with *Mycobacterium tuberculosis* must be considered and additional investigation and consultation must be undertaken, if deemed appropriate. These considerations must be made in the context of the history and relevant epidemiologic factors.

2. Sexually transmitted infections in Canada

Pierre Plourde, MD, FRCPC

How has syphilis re-emerged in Canada?

In the mid- to late-1990s, syphilis rates in Canada were so low (< 0.5/100,000 population) that some were beginning to talk about the possibility of syphilis eradication from the North American continent. Since 1997, there have been outbreaks of syphilis reported in Canada and the US in several major urban centres. Most outbreaks have primarily involved men who have sex with men (MSM), but some have also implicated sex trade workers.

Heterosexually transmitted syphilis outbreaks have primarily involved the downtown, core-area, middle-aged populations frequenting inner city bars. The strongest correlates of transmission have been unprotected casual sexual encounters after consumption of significant amounts of alcohol and sex trade work. Syphilis outbreaks involving predominantly MSM populations have noted large numbers of anonymous sexual contacts frequenting bathhouses, bars and meeting on chat lines. Such contacts cannot easily be reached by traditional public health methods of partner referral or contact tracing.

How does syphilis present clinically?

Early in the outbreak, most syphilis cases present as primary chancres (painless genital ulcers) or as secondary syphilis rashes. With aggressive public health followup of contacts, several cases can be detected in the "incubating" stage, before occurrence of any symptoms (defined as early latent syphilis).

Clinical presentations of secondary syphilis have ranged extensively from rashes that resemble vasculitis to

The Five Cs of STI Control

Confidentiality: All case and contact management of sexually transmitted infections (STIs) should occur in a strictly confidential clinical setting; if one works in a setting where this cannot be assured (such as a small rural community setting), STI control may become very challenging as patients will be reluctant to come forward for clinical assessment, and the natural history of most STIs is eventual symptom resolution, in the absence of curative therapy, with ongoing asymptomatic internal pathologic damage.

Compliance: Adherence to therapy is essential for effective STI control. Hence, a single dose easily administered directly observed (oral) or administered (parenteral) therapies are always preferred in both cases and contacts. Such therapies exist for gonorrhea (cefixime, ceftriaxone, ciprofloxacin), chlamydia (azithromycin) and syphilis (penicillin).

Counselling: Every sexually active patient in any general medical practice should have a complete sexual history taken at some point in time, with appropriate screening for STIs. When unprotected non-mutually monogamous sexual behaviours are reported, screening for all STIs should be undertaken (gonorrhea, chlamydia, syphilis, human papillomavirus and human immunodeficiency virus.

Contact tracing: Better know as partner referral, it is an essential component of effective STI control, as every case of an STI translates into one or more additional untreated cases. All known contacts of a case of STI should be tested and treated empirically; awaiting laboratory results prior to treating is not considered best practice, as the (usually asymptomatic) STI contact may not return for followup and an opportunity to cure an untreated STI will have been lost if treatment is not administered at the time of testing. Most bacterial STIs have transmission rates of 20% to 50% after a single sexual encounter and most STIs are asymptomatic in a large proportion of individuals.

Condom promotion: Although not 100% protective, use of condoms reduces the transmission of most STIs and should be strongly encouraged in those who are likely to have casual or anonymous sexual encounters.

maculopapular eruptions that look like allergic reactions ("hives") to eczematous cutaneous eruptions. The general rule for a secondary syphilitic rash is that it can present with any clinical appearance, except for vesicles. Also, syphilitic rashes are rarely pruritic. Therefore, clinicians need to have a very high index of suspicion when diagnosing a syphilitic rash, as it can look like almost any other dermatologic condition. For this reason, syphilis was designated "the great mimicker."

Later in a syphilis outbreak, a greater proportion of latent syphilis cases are detected by aggressive screening strategies (such as testing MSM onsite in bathhouses or offering online access to testing centres on chat lines).

How is syphilis treated?

The treatment of choice for all infectious stages of syphilis (primary, secondary and early latent) is one single dose (given in two to four injections, depending on the preparation used) of benzathine penicillin G 2.4 million units IM. There is controversy as to whether this treatment is sufficient for persons concurrently infected with the human immunodeficiency virus (HIV) and with syphilis; some advocate three weekly injections of benzathine penicillin G, 2.4 million units, to treat infectious syphilis in the HIV-positive individual.

How does HIV interact with syphilis?

All genital ulcerative diseases (including syphilis) are known to enhance the transmission of HIV by providing a portal of entry for HIV by virtue of the broken mucosal or cutaneous barrier. There is some evidence to suggest that clinical manifestations of syphilis may be more severe in the immunosuppressed HIV-infected person and that progression to secondary and tertiary stages of syphilis may be accelerated in those who are HIV-infected. Neurosyphilis may also be more common in the HIV-infected person.

These interactions lead to what has been termed an "epidemiologic synergy" between syphilis and HIV, in that syphilis enhances the transmission of HIV and HIV accelerates or worsens the clinical manifestations of syphilis which, in turn, leads to more transmission of syphilis and, ultimately, more transmission of HIV at a population level. Reflective of this interaction is the fact that up to 50% of syphilis cases among MSM in current syphilis outbreaks are HIV co-infected.

What is the newest emerging STI in Canada?

Lymphogranuloma venereum (LGV) is an STI caused by *Chlamydia trachomatis* subtypes (L1, L2, L3) that cause genital ulcers and hemorrhagic proctitis. LGV has the potential to become invasive, preferentially targeting lymph nodes so that they can become large and purulent, especial-

ly in the inguinal and femoral lymph node distribution.

LGV outbreaks were first reported in Europe in 2003 in MSM and have now been described in several Canadian provinces in MSM. Associated risk factors include co-infection with HIV and hepatitis C virus (HCV), bathhouse and chat line contact and higher-risk sexual activities, such as "fisting." Diagnosis is primarily clinical, supported by positive chlamydia antigen detection (culture, nucleic acid amplification) in clinical specimens or by positive chlamydia serology.

As this is a more invasive STI, treatment is more aggressive, consisting of a 21-day course of doxycycline, 100 mg, twice a day, or erythromycin, 500 mg, four times a day—alternatively, azithromycin, 1 g, once weekly for three consecutive weeks may be used. All cases of LGV should be immediately reported to local public health authorities.

Table 2

Common empiric therapeutic options for typical skin and soft tissue infections

Micro-organism	Therapeutic option	Usual adult dose
Mild infection		
• *Staphylococcus aureus*	Cloxacillin	500 mg po q 6 h
• Beta-hemolytic streptococci	Cephalexin	500 mg po q 6 h
	Clindamycin	300 mg po q 6 h
Moderate infection		
• *Staphylococcus aureus*	Cefazolin	2 gm iv q 24 h
• Beta-hemolytic streptococci	Cefazolin and probenecid	2 gm cefazlin iv q 24 h, with 1 g of probenecid administered prior to the parenteral cefazolin
	Ceftriaxone	1 gm iv q 24 h
	Vancomycin	1 gm iv q 12 h, adjusted to renal function
Severe infections		
• *Staphylococcus aureus*	Ceftriaxone and metronidazole	1-2 gms q iv 24 h 500 mg iv/po q 8 h
• Beta-hemolytic streptococci	Ciprofloxacin and clindamycin	400 mg iv q 12 h 600 mg iv q 8 h
• Polymicrobial infection	Meropenem	1 gm iv q 8 h
	Imipenem cilastatin	500 mg iv q 6 h
	Piperacillin/tazobactam	3.375 gm iv q 6 h

po: Orally h: Hour
q: Every iv: Intravenously

3. How are skin and soft tissue infections classified?

John M. Embil, MD, FRCPC

Although there are numerous suggestions as to how to best classify skin and soft tissue infections (SSTIs), there is currently no uniformly accepted classification system. The simplest approach would be to categorize them as mild, moderate or severe. Mild infections are those considered to be of limited depth and extension of the soft tissue involvement, resulting in the patient as hemodynamically stable and managed as an outpatient with oral antimicrobial therapy.

Moderate infections are those involving a deeper degree of tissue invasion. The patient could potentially be managed either as an outpatient with an oral antimicrobial agent that is well-absorbed from the gastrointestinal tract and achieves high tissue penetration, or the patient could be admitted to a hospital for bedrest and elevation of the affected limb in conjunction with a brief course of parenteral antimicrobial therapy, followed by an oral stepdown regimen.

The decision to hospitalize a patient with a moderate infection depends upon the patient's clinical status at the time of presentation; specifically, whether they are hemodynamically stable and the extent of tissue involvement. Clearly more extensive infections require admission to the hospital, compared to those who are limited and could be managed as an outpatient with oral antimicrobial therapy.

Severe infections are those that extend to the deeper tissues and ultimately require admission to the hospital for parenteral antimicrobial therapy. These patients are often toxic and may require incision, drainage of abscesses and debridement of any necrotic tissue. These

patients require parenterally antimicrobial therapy.

What are the common pathogens?

The most frequently encountered organisms causing SSTIs are *Staphylococcus aureus* and the *streptococci* (most frequently groups A, B or C). Increasingly, other *streptococci*, such as group G, are being detected as causing significant SSTIs; infection with these micro-organisms are treated similarly to group A and B *streptococci*. Recently, community-acquired, methicillin-resistant *Staphylococcus aureus* has also emerged as a significant cause of SSTI. This micro-organism is associated with deep, necrotizing abscesses that fail to respond to conventional beta-lactam antibiotics.

Frequently, superficial swabs from ulcers and wounds yield coagulase-negative *staphylococci*, *enterococci* and yeast. These are not traditionally considered to be etiologies of SSTIs but rather represent superficial skin colonization. Clinically, if the patient is presenting with typical signs of an SSTI (specifically, heat, erythema, pain and edema), the most likely pathogens will be *S. aureus* or *streptococci*. Unless there are epidemiologic hints, such as animal bites or exposure to fresh water or brackish water, the clinician may be guided to another potential diagnosis and an alternative empiric regimen.

What are the therapeutic choices?

Table 2 demonstrates the most frequently used single or combination therapies for the management of mild, moderate and severe infections. If the patient is not toxic and the infection is mild, an oral agent may be administered. If a moderate infection exists, the clinician must make a decision as to whether the patient can be managed as an outpatient receiving parenteral therapy or requires admission to a hospital. Ideally, if ambulatory parenteral therapy is to be administered, an agent or agents with infrequent dosing are desired.

A popular therapeutic combination is cefazolin with probenecid. When using this regimen, it is imperative to ensure that the patient's renal function is intact and that potential drug interactions with probenecid be excluded prior to the initiation of this therapy. For serious infections, consideration of a polymicrobial process must be entertained, as broad spectrum therapy may be necessary.

Data is lacking to support the use of clindamycin in combination with other beta-lactam agents unless necrotizing fasciitis is being treated, in which case there is some animal model data to support the use of clindamycin in combination with penicillin.

How long will it take for SSTIs to show improvement?

Most SSTIs will take 24 to 78 hours to show some sign of improvement. Typically, persistence of edema, pain and erythema occur when a cellulitic limb is dependent.

To minimize this eventuality, please ask the patient to keep their affected extremity elevated above the level of the heart whenever possible. Some of the most common mimics of SSTIs include the dependent rubor of an ischemic limb or stasis dermatitis in those that have venous insufficiency. It is important to note that infection can also occur in these situations.

Many times, erythema persists or extends beyond the initial location. If the patient has become afebrile and feels symptomatically improved, therapy does not need to be modified and reassurance can be provided to the patient, as the progression of erythema is likely related to bacterial toxins that have been released into the surrounding tissues.

How long is the treatment?

There is no hard and fast rule as to the duration of treatment. Typically, mild infections can be treated with seven to 10 days of oral antibiotics, provided that any other underlying process, such as the presence of foreign bodies, has been removed. For moderate to severe infections, five to seven days of parenteral therapy, followed by culture-directed oral therapy to make up the balance of a 14-day course of therapy, would be reasonable.

It is essential to ensure that underlying processes, such as arterial insufficiency, venous incompetence and underlying osteomyelitis, in addition to the presence of any foreign body and necrotic tissue, have been addressed. Clearly, the duration of therapy is directed by the patient's response to therapy.

Suggested reading

- Mandell LA, Bartlett JG, Dowell SF, et al: Update of Practice Guidelines for the Management of Community-Acquired Pneumonia in Immunocompetent Adults. Clin Infect Dis 2003; 37(11):1405-33.
- Kropp RY, Wong T; On behalf of the LGV Working Group: Emergence of Lymphogranuloma Venereum in Canada. Can Med Assoc J 2005; 172(13):1674-6.
- Eron LJ, Lipsky BA, Low DE, et al: Managing Soft Skin and Tissue Infections: Expert Panel Recommendations on Key Decision Points. J Antimicrob Chemother 2003; 52(Suppl S1):I3-I17.