HAND, FOOT AND MOUTH DISEASE (HFMD)

Historical
The Coxsackieviruses were named after an Algonquin Indian village in Upper New York State. It was first discovered by G. Daldorf and Sickles who were virologists at the New York State Department of Health. The “Cox” portion of the village’s name should be pronounced as if it were spelled “Cook” rather than “Cox”.

The Coxsackieviruses are part of a larger family of viruses known as the Picornaviruses. The viruses found in this family are among the most diverse viruses (200 known serotypes). Hand, Foot and Mouth disease (HFMD) is one of the oldest viral infections known and was described in Egyptian hieroglyphs dating back to 1,400 BC.

The Viral Agent(s)
Most cases of the disease known as hand, foot and mouth disease are caused by three serotypes in the Coxsackievirus genus (namely A16, A5 and A10). A much smaller number of cases are the result of infection by Enterovirus 71. They are all RNA viruses. The word “Pico” means small.

Clinical Findings associated with Disease
Most cases of infection are benign and exhibit symptoms that are no more serious than those associated with a common cold and/or sore throat. Most cases, in fact, are subclinical and hence not diagnosed.

The clinical findings associated with coxsackie infections include:
- An incubation period of three to seven days,
- Sore throat,
- Fever,
- Vesicular lesions on the gums, cheeks, sides of tongue, hands and feet.

The clinical descriptive term used to describe the disease is “Enteroviral vesicular stomatitis with exanthem”. In addition to appearing in the usual places (feet), the vesicles occasionally appear on the buttocks about two to three days after the fever. They range from three to seven mm in diameter and are painless. Occasionally, they go on to ulcerate.
Generally, HFMD is a mild disease and recovery is usually complete within seven to ten days. Occasionally, there are neurological complications and these can lead to death. Fatal cases of meningitis associated with HFMD occurred in Malaysia in 1997 and in Taiwan in 1998. These were associated with EV71.

**Epidemiology and Transmission**

Most cases of HFMD are moderately contagious with the person being most contagious during the first week of infection. Transmission can occur via direct contact with nasal and throat discharges, saliva, fluids from blisters and in the stool. Most cases are among young children (newborns to about four years of age).

Virus particles can continue to be excreted for up to a month in stool specimens.
The Causative Viral Agents
The most common causes of HFMD are Coxsackievirus A16, A5, A10 and Enterovirus 71 (EV 71).

Transmission electron micrograph of the Coxsackievirus
Public domain

Diagnosis
The disease is usually diagnosed by physical examination. Additionally, throat swabs and stool samples can also be tested by the laboratory for the presence of the virus.

Quest Diagnostics has antibody panels available for both Coxsackieviruses A and B. Additional tests are available for the detection of Enterovirus RNA.

Treatment
There are no effective treatments for this disease. For children who are old enough to do so, gargling with warm water and salt may give some relief.

Infection Control Practices
The most effective infection control practices are exceptional handwashing and the disposal or laundering of potentially contaminated cloth and bedding.

Isolation of the patient is not very practical inasmuch as the virus can be shed in feces for many weeks (even months) after symptoms have disappeared. Lesions on the feet and hands should be covered and allowed to dry and heal naturally. Care should be taken not to puncture vesicles.

Recommended References


Mayo Clinic. 2012. Hand, foot and mouth disease. Click here to access website.

World Health Organization. 2011. A guide to clinical management and public health response to hand, foot and mouth disease (HFMD). Click here to access website.

Other Infectious Disease News

How do Unnecessary Antibiotics contribute to Clostridium difficile Infection

Investigators at a Veterans Affairs Medical Center recently reviewed medical and pharmacy records of 246 patients with new-onset Clostridium difficile Infection (CDI). They found that antimicrobial use (other than drugs to treat CDI) during and for up to 30 days after totaled 2,147 antimicrobial-treatment days and 445 antimicrobial sources.

Two reviewers checked over the records independently and found that 85 % of the treatments were unnecessary. When they put their heads together and discussed the results, they agreed on another 14 %. That means that just about 99 % of the antibiotics were not needed.

75 % of the CDI patients received at least one course of unnecessary antibiotics and 26 % of the patients received only unnecessary antibiotics. The drugs used unnecessarily were frequently fluoroquinolones and the β-lactams.

The conclusion of the study was that there should be increased awareness concerning the use of antimicrobials in the case of patients with recent CDI.


BCG Vaccine may have Protective Role for Adults

This writer was taught that the major documented protective effect from the BCG vaccine was against tubercular meningitis and disseminated TB during childhood. As the child grows into adulthood, protection wanes.

Investigators recently examined 2,385 participants in Taiwan prisons to see if there was any protection against TB in adulthood as a result of the BCG vaccine.

The bottom line of the studies was that the BCG vaccine seems to have some protective effect in adults decades after they received the BCG vaccine.


Tedizolid: a new antibiotic effective against MRSA

Here’s a “look alike” drug for linezolid but has one other big advantage: a six-day course of tedizolid is as effective as a 10-day course of linezolid (Zyvox®) for the treatment of acute bacterial skin and skin structure infections (ABSSSI). Also, both drugs appear to be equally safe.

The early clinical response for tedizolid was 79.5 %, while the early response for linezolid for 79.4 %


New SARS-like Virus Reported to have Spread between Humans

In September 2012, The World Health Organization (WHO) and CDC reported on a new virus with many similarities to the virus responsible for SARS. This novel coronavirus was given the name of “hCoV-EMC” which stands for “Human Coronavirus-Erasmus Medical Center”. Studies thus far have indicated that this new isolate has the potential to be considerably more dangerous than SARS. The virus causes fever, cough, shortness of breath and breathing problems. Worldwide, 13 cases have been confirmed as of March 16th. Three deaths occurred in Saudi Arabia (out of five patients) and two in Jordon.
Electron micrograph of hCoV-EMC. 
Courtesy of CDC

Thus far, there have been no cases reported in North and South America. Three cases were recently reported in Great Britain that indicate the virus can indeed be transmitted from person-to-person. Within one family, a patient with this virus returned from the Middle East. Two other family members, who had not traveled recently, also acquired the disease.

Hitherto, it was a little bit confusing as to how the virus was transmitted since it has been demonstrated that there are receptor site in bats, pigs and humans. This suggests the possibility of a zoonotic role in transmission.


U.K. Health Protection Agency. Third case of novel coronavirus identified in family cluster. 15 February 2012. Click here to access press release.

Müller, M.A. et al. 2012. Human coronavirus EMC does not require the SARS-coronavirus receptor and maintains broad replicative capability in mammalian cell lines. mBio 3: e00515-12. Click here to access complete article online.


The Burden of Human Metapneumovirus (hMPV) Among Young Children

Human Metapneumovirus (hMPV) was first isolated in the Netherlands in 2001. It is now recognized as the second most common cause of lower respiratory tract infections among young children after the respiratory syncytial virus (RSV).

Just how much of a burden among young children (< five years of age) this virus represents was a subject of research for the New Vaccine Surveillance Network.

They found that about 6 % of hospitalized children tested positive for this virus using reverse-transcriptase PCR.

Among nonhospitalized healthy controls, the percentage was approximately 1 %.

The authors concluded that hMPV is associated with a substantial burden of hospitalizations during the first five years of life.

Artist's rendition of an electro micrograph of hMPV
Courtesy of Bode Science Center

Sternal Wounds in Three Patients Following Open Heart Surgery transmitted from A Healthcare Worker

In one hospital, three sternum infections were found to be caused by *Gordonia bronchialis*. Formerly known as *Rhodococcus*, this is definitely not a very common organism.

The outbreak was eventually traced back to scrubs worn by a nurse anesthetist that had been laundered at home in her own washing machine. When this practice ceased, so did the infections.

Wright, S.N. *et al*. *Gordonia bronchialis* sternal wound infection in 3 patients following open heart surgery: intraoperative transmission from a healthcare worker. *Infection Control and Hospital Epidemiology* 33: 1238-1241. Click [here](#) to access abstract.

New CDC Guidelines for Carbapenem-resistant Enterobacteriaceae

There have been many reports to the effect that carbapenem-resistant Enterobacteriaceae (CRE) is spreading at an alarming rate. It’s even become a very popular subject in newspapers and magazines. As a consequence, CDC has issued a health advisory expanding their previous guidelines for the prevention of the spread of these organisms.

The new guidelines contain the following recommendation:

“When a CRE is identified in a patient (infection or colonization) with a history of an overnight stay in a healthcare facility (within the last six months) outside the U.S., the isolate should be sent to a reference laboratory for confirmatory susceptibility testing and test to determine the carbapenem resistance mechanism. At a minimum, this should include evaluation for *Klebsiella pneumoniae* carbapenemase and New Delhi metallo-β-lactamase”.

The guidelines have been expanded because most CREs isolated in the U.S. have come from patients who have received overnight treatment in medical facilities outside the U.S.

Readers should be mindful of earlier recommendations made by CDC. The precautions indicated in these are as follows:

- Make sure that healthcare providers adhere closely to hand hygiene procedures,
- Use stool, rectal or perirectal cultures to screen patients who may have come in contact with CRE-colonized patients,
- Alert hospitals when a CRE-colonized patient is transferred,
- Dedicate rooms and staff to CRE patients whenever possible,
- Remove temporary medical devices as soon as they have fulfilled their purpose.

CDC, in their advisory, pointed out that unusual forms of CRE, while still relatively uncommon, are increasing. Of the 37 unusual isolates of CRE that have been reported in the U.S, at least 15 of them have been reported in the last six months.

Official CDC Advisory. 2013. New carbapenem-resistant Enterobacteriaceae warrant additional action by healthcare providers. Click [here](#) to access the entire article via the Health Alert Network.

Composition of the 2013-2014 Northern Hemisphere Influenza Vaccine

The World Health Organization (WHO) has recommended vaccine viruses for the 2013-2014 Northern Hemisphere vaccines, and the Food and Drug Administration’s Vaccines and Related Biological Products Advisory Committee (VRBPAC) has made recommendations for the composition of the 2013-2014 influenza vaccines to be used in the United States.
Both agencies recommend that trivalent vaccines contain an A/California/7/2009-like (2009 H1N1) virus, an A(H3N2) virus antigenically like the cell-propagated, or cell-grown, virus A/Victoria/361/2011 (A/Texas/50/2012), and a B/Massachusetts/2/2012-like (B/Yamagata lineage) virus. It is recommended that quadrivalent vaccines containing an additional influenza B virus contain a B/Brisbane/60/2008-like (B/Victoria lineage) virus in addition to the viruses recommended for the trivalent vaccines.

These recommendations were based on global influenza virus surveillance data related to epidemiology and antigenic characteristics, serological responses to 2012-2013 seasonal vaccines, and the availability of candidate strains and reagents.


Gonorrhea cases in England Increases By 25 %
Within the last year, the number of gonorrhea cases in England has increased by 25 %. In 2011, nearly 21,000 new cases were diagnosed. One third of these were among gay men and more than a third were among persons who previously have had gonorrhea.

English Authorities there have also noted a gradual decrease in susceptibility to the cephalosporin drugs which are normally recommended for these infections. The emergence of multi-drug-resistant strains of N. gonorrhoeae is of great concern.

The disease is quite prevalent in South and Southeast Asia and in the sub-Saharan Africa region. In the U.S., there are about 7,000 cases reported annually.


Training Phlebotomists on Blood Cultures
One of the biggest problems with regards to blood cultures is “volume”. If you are able to collect twice the volume in the blood culture bottle, then you will literally double your chances of finding a pathogen in the blood stream. That makes perfect sense.

Laboratorians ina Netherlands hospital met with the phlebotomy teams and provided them with a short, but concise inservice as to the need to collect adequate samples of blood for cultures.

The result was that the volume of the blood specimens collected post-training literally doubled.


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