In the Literature

Avian H7 Influenza Viruses with Adaptation to Human Airway Epithelial Cell Receptors


While attention has been focused on the avian spread of H5N1 influenza, there have also been multiple outbreaks of H7 influenza in poultry in Eurasia and North America. As with the H5 viruses, the number of cases of human H7 type infection (mostly conjunctivitis) has been relatively small, and there has been little evidence of human-to-human transmission. Tropism for avian species results largely from their preferential viral binding to α2–3-linked sialic acid (SA) glycans, which are the dominant receptors on avian epithelial cell surfaces. Human tracheal epithelial cells, in contrast, predominantly express α2–6-linked SA glycans, and tropism for these molecules is important for human infection. The small number of human cases and the rarity of human-to-human transmission of these avian H5N1 viruses are believed to result, at least in part, from its preferential binding of the virus to α2–3-linked SA. Belser and colleagues used glycan microarray technology to determine the receptor binding preference of European and North American H7 viruses, as well as their transmissibility in the ferret model of infection. This model is believed to reflect transmissibility in humans. The distribution of SA in ferrets resembles that of humans, with α2–6-linked SA glycans predominating on epithelial cells of the upper respiratory tract and α2–3-linked SA predominating on lower-tract epithelial cell surfaces.

As is the case with highly pathogenic avian H5N1 influenza, similarly pathogenic avian H7N7 viruses isolated in The Netherlands in 2003 preferentially bound to α2–3-linked SA and were not readily transmissible in ferrets. In contrast, the hemagglutinin of some highly pathogenic avian H7N3 and H7N2 viruses isolated in North America in 2004 and 2002–2003, respectively, had increased affinity for α2–6-linked SA. Furthermore, a low-pathogenic H7N2 virus isolated from a patient in New York replicated in ferrets and was transmissible by direct contact (although not by respiratory droplets) in this model.

This receptor binding preference of the North American avian H7 viruses and their transmissibility in the ferret suggest a great potential for transmissibility to and among humans. As a consequence, the risk of the emergence of a human pandemic strain may prove to be greater with H7 influenza viruses than with the H5 viruses that have received so much attention.

Spinal Facet Joint Infection


Michel-Batôt and colleagues describe 6 patients with septic arthritis of vertebral facet (interapophyseal) joints. The facet joint is the site of articulation of the posterior elements of adjacent vertebrae that serve to both guide and restrict vertebral motion. The mean age of the patients was 61.5 years (range, 50–76 years), and 5 patients were male. The lumbar spine was involved in 4 patients, and the cervical spine was involved in the remaining 2. Bilateral infection was present in 1 patient. The mean time from onset of symptoms to diagnosis was 42.7 days. All 6 patients presented with spinal pain and severe reduction of mobility of the involved spinal segments.

Plain radiographs all yielded normal findings, with the exception of 1 case in which asymmetry of facet joint spaces, with widening of the involved site plus hazy bone margins, was seen. Radionuclide bone scan findings were abnormal in each patient, demonstrating abnormally increased uptake lateral to the spine that was more intense on the posteroanterior than the anteroposterior view. CT, which was performed for 4 patients, demonstrated widening of the joint space and marginal erosion, and 3 patients also had soft-tissue abnormalities. MRI was the most informative study, identifying joint effusions and destruction, synovitis, and soft-tissue enhancement, with an epidural abscess demonstrated in 1 patient. Blood culture results were positive in 3 patients, aspirate culture results were positive in 2, and surgical specimen culture results were positive in 1. Staphylococcus aureus was isolated in 3 cases, and Staphylococcus epidermidis, viridans group Streptococcus species, and Enterococcus faecalis were isolated in 1 case each.

Although facet joint infection is rarely reported, one group found that it represented approximately one-fifth of cases of spontaneous (endogenous) pyogenic spinal infection (10 of 52 cases) [1]. The descriptions of the infection reviewed here are concordant with those of previously reported cases [1]. Most cases involve the lumbosacral spine, and S. aureus is the predominant pathogen. Patients usually present with fever and stiffness. Pain is often unilateral, and radiation to the flank or buttocks is common. Spine tenderness is usually present and is often lateral to the axis of the vertebral bodies, and tenderness and spasticity of the paravertebral muscles are frequently present. Symptoms are reported to be more acute in onset than is usually the case in patients with spondylodiscitis. Although aspiration of the facet joint may allow recovery of the etiologic pathogen and may also afford some pain relief, surgery is not generally required in the absence of an epidural abscess. It is recommended that patients be kept supine for 3–4 weeks and receive a
prolonged course of appropriate antibiotic therapy.

Reference


The Downs and Ups of Infection with Group B Streptococci (GBS)


In 1996, the United States experienced a significant decrease in the incidence of early-onset infection (i.e., infection during the first 7 days of life) after adopting a strategy of prevention of perinatal infection due to GBS that was based on intrapartum antibiotic prophylaxis. Phares and colleagues have now examined the trends in GBS disease among all age groups since the 2002 publication of revised prevention guidelines, which recommended antenatal culture screening, by comparing the incidences of invasive infection reported during the period 1999–2001 versus 2003–2005. The incidence of early-onset infection decreased from 0.47 to 0.34 cases per 1000 live births (a 27% decrease; \( P < .001 \)), whereas there was no significant decrease among infants during days 7–89 of life or among pregnant women. The incidence increased among individuals aged 15–64 years, from 3.4 cases per 100,000 population in 1999 to 5.0 cases per 100,000 population in 2005 (a 48% increase; \( P < .001 \)). The incidence also increased, by 20%, among individuals aged \( \geq 65 \) years, from 21.5 to 26.0 cases per 100,000 population (\( P < .001 \)). Thus, although there has been significant success in reducing the incidence of early-onset, invasive GBS infection, the incidence among adults has, in contrast, increased.

Maybe Femoral Venous Catheterization Isn’t So Bad after All


Parienti and colleagues performed a blinded, randomized, multicenter trial involving 750 severely ill adults who required a first catheter insertion for renal replacement therapy, to test the hypothesis that jugular venous catheterization is associated with a lower risk of associated bacterial colonization and infection than is femoral venous catheterization. Catheters were removed at the discretion of the investigator, and the tips were subjected to a quantitative broth dilution quantitative culture, with colonization of the device defined as the detection of \( > 10^7 \) cfu/mL.

Catheter colonization occurred in 84 (25.9%) of 324 patients with femoral catheters and 78 (24.9%) of 313 patients with jugular devices, with corresponding incidences of 40.8 and 35.7 cases per 1000 catheter-days, respectively; these differences were not statistically significant. There was also no significant difference in the incidences of catheter-related bloodstream infection, which occurred at frequencies of 1.5 and 2.3 cases per 1000 catheter-days, respectively. There was, however, a significantly lower incidence of colonization associated with jugular than with femoral catheterization in a subset of patients with a body mass index (BMI; calculated as weight in kilograms divided by the square of height in meters) \( > 28.4 \) (individuals with a BMI \( > 45 \) were excluded from the study), but with a higher incidence in those with a BMI \( < 24.2 \). There was also, overall, a higher incidence of hematoma formation associated with jugular venous catheterization. The cumulative hazards of catheter colonization are linear, without a threshold duration for an increased daily risk.

Thus, jugular venous catheterization in these patients was not safer than femoral catheterization with regard to colonization or related bloodstream infection, except in patients with a BMI \( > 28.4 \). In addition, although the National Foundation of Kidney Disease recommends that femoral acute dialysis catheters be changed every 5 days, the lack of an inflection point in the cumulative risk curve over time provides a strong argument against routine catheter change, a conclusion that is in accord with recommendations from the Centers for Disease Control and Prevention.

Multidrug-Resistant Staphylococcus aureus (MRSA) Infection among Men Who Have Sex with Men


When first recognized, community-associated MRSA differed from hospital-acquired strains because it was resistant to fewer classes of antibiotics. Diep and colleagues now report identification of a USA300 MRSA strain that has become prevalent among men who have sex with men in San Francisco, California, and Boston, Massachusetts. The strain, which belongs to the dominant USA300 clone, carries a large, promiscuous conjugative plasmid, pUSA03, which carries genes encoding resistance to erythromycin, clindamycin, and mupirocin.

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