ASIAN BIRD FLU: AN UPDATE FOR EMBALMERS.

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Speculation regarding Bird Flu and its worldwide repercussions is running rampant in the world press. Numerous predictions of a pandemic with worldwide devastation are common. What actually are the facts and interrelationships of Bird Flu to human influenza viruses and the consequences of interaction and infection among the global human population? What does the embalming industry and individual embalmers need to know and do in the event that the worst-case predictions come true? These topics will be discussed and analyzed in depth in our current article.

Bird Flu is not human viral influenza, but they are closely related. Closely enough, in fact, that mutation and co-infection or cross-infection can and does occur, with potentially deadly consequences. The current Asian Bird Flu was first spotted in Hong Kong in late 1996, 1997 and determined to be a new and virulent strain designated H5N1. It reemerged in Hong Kong, again, in 2003 and began its global march in 2004-2005. 10's of millions of birds have been infected and died in these 2 years. Asian Bird Flu has been found mostly in South Korea, Turkey, Southeast Asia, Ukraine, Romania, Russia and Karzakhstan. It is currently in the process of migrating all over Europe. Roughly 200 infections in humans have been documented and close to a hundred deaths attributed to this deadly H5N1 strain. Symptoms of profound infection include: high fever (>100.5), diarrhea, vomiting, bloody gums and nose, abdominal and chest pain, breathing problems developing in 5 days with respiratory distress, hoarseness, and cracking of voice, pneumonia quickly develops with bloody sputum and multiorgan failure as the ultimate cause of death. Approximately 200 people have been sickened worldwide with close to 100 deaths reported. Looking at these statistics might lead one to believe of an imminent danger and maximum lethality (apparently at least 50%) from this virulent strain. Given the massive number of infected birds worldwide, the documented human infections are minuscule. Regular seasonal human flu kills 250,000-1 million people worldwide every year. 36,000 Americans die every year from regular seasonal flu. The lethality of human strain viruses have historically been only a few deaths per 10,000, and it is unlikely the H5N1 strain would be much above this and the apparent high lethality would not play out in a worldwide pandemic, at least in the developed countries.

The incubation period of H5N1 appears relatively longer than usual, being 2-8 days typical with possibly as long as 2 weeks. This compares to regular flu viruses that have incubation periods of 2-3 days. High-risk exposures would be handling of infected bird carcasses, drinking of duck blood (common in Southeast Asia) and long-term proximity to infected birds and their droppings. Direct human-to-human transmittals are very rare and all occurred from close, long term intimate contact. Health-care workers, for example, do not appear to become infected despite the constant contact with patients. Some supposedly high-risk groups actually have low incidence of infection, such as slaughterhouse workers and other poultry workers. On the other hand, some apparent low-risk groups have higher incidences, such as children playing in backyards with mixed wild and domestic fowl running loose (also typical in most infection areas). This is in stark contrast to poultry farming in the U.S., where strict controls, sanitation, disinfection, inoculations and isolation techniques are typical. The ability of the H5N1 virus to survive in the environment is relatively good with survivability at 6 days at 98.6 degrees in carcasses and surfaces and up to 35 days in bird feces at only 39 degrees. This survival factor, no doubt, contributes to the tenacity of the strain and its ability to continually reappear despite efforts at eradication.

There have been deadly flu's in the past, with the Spanish Flu of 1918 being the most famous and lethal. The Spanish Flu was an H1N1 strain of human flu that originated in the U.S. in 1918 and ended up killing between 20-50 million people worldwide. It was a typical strain that turned virulent when it literally marched into WW1 through the trenches, battlefields and generalized overcrowded and unsanitary conditions of war. Its virulence, however, waned considerably within 18 months and exists to this day as a normal flu strain that can still be found in some parts of the world. The Asian Flu of 1957 (58) -59 was an H2N2 derivative strain that was particularly deadly with at least 70,000 dead in the U.S. alone. The China Flu of 68-69 was an H3N2 virulent strain that killed 34,000 in the U.S. (twice the normal number at that time). New strains are constantly appearing and targeting the worldwide human population, the most recent being an H7N7 strain that caused a limited outbreak in the Netherlands in 2003 but was contained.

The problem with the H5N1 bird strain is that there is no good treatment and no vaccine. The only effective way to control a flu epidemic is through vaccination. There is an experimental H5N1 vaccine that was based on an early 2004 variant. The U.S. has a few million doses of a partially effective vaccine and a new vaccine based on a much later mutated variant is in the works. At this point, however, there is no effective ,hard hitting vaccine. Relenza (zanamivir), a nasal inhalant and Tamiflu (oseltamivir), a capsule or oral suspension, are moderately effective in lessening the symptoms of typical strains of flu and reducing the virulence. Both are antiviral agents that target the viral protein neuraminidase (the N in strain typing) that allows the viral migration from infected to healthy cells. Both antiviral agents are for types A and B human strains, but some strains have shown unilateral and cross-resistances, thus limiting their effectiveness.

Bird flu can and has jumped, in the past, from birds to humans. Bird flu viruses only infect ciliated epithelial cells, while human viral strains infect both ciliated and non-ciliated cells. The H5N1 strain that has been found in humans has been isolated deep in lung tissues, making it less likely for aerosolization and transmittal to other humans. Millions of individuals, worldwide, handle chickens and other poultry, yet few, up to now, have contacted disease. At this point, it appears the H5N1 strain has some difficulties in human infectivity, however, that can change. Avian flu viruses can go lethally transmissible to humans by gene swapping through a co-infected human (simultaneous avian and human strains) like the 1957 and 1968 outbreaks or by evolving into a lethal human strain, such as the 1918 outbreak. Fortunately, H5N1 does not appear to be progressing in either of these directions, from gene and strain monitoring for 2 years now. H5N1 has, however, learned how to become infective in rodents, cats and a very few humans.

Wild birds migrating are causing the worldwide spread with poultry smuggling, the fighting cocks trade and the illegal exotic bird trade contributing to cross-border failures at containment. H5N1 does exhibit one unusual trait that has not been seen before. This strain is apparently capable of traveling from wild fowl to domestic poultry and then can back transmit from domestic poultry to wild fowl. This has never been observed before, as all other strains have dead-ended in domestic poultry and been eradicated by various measures.

There is no H5N1 strain in the U.S., but, no doubt, it will show up. The problem will be migrating ducks, swans and geese. The impact will probably be limited due to our modem high-tech poultry farming conditions and safeguards. The rest of the worlds' poultry farming is archaic compared to the U.S. Outbreaks of other avian strains have occurred over the years and been effectively eradicated. The latest outbreak was in Texas in 2004, which was a H5N2 strain that was quickly controlled by extermination and quarantine of chickens. The U.S. learned many of its lesson from a costly outbreak in Pennsylvania in 1968 which took 2 years to control and forced the destruction of 17 million chickens. The U.S. poultry industry is set up for rapid response to future outbreaks with swift and effective eradication and disposal of infected birds and inoculation of healthy stock. I concur with the analysis of some experts that the worst-case scenario would probably mimic the 1957 outbreak

in the U.S., as that strain also carried avian-derived variants of both the hemagglutinin (H) and neuraminidase (N) viral proteins and were new to human hosts at that time. H1N1 variants of the 1918 Spanish flue still circulate and reappeared in 1977 in Southeast Asia and may provide additional protection during a pandemic and prevent maximum lethality of the H5N1 strain.

Disinfection and sanitation measures are easy and effective. The viruses are very susceptible to sanitizing and disinfecting agents that are readily available. Thorough cooking of poultry destroys the virus and makes the meat safe to eat. Careful hand-washing and use of hand-sanitizers minimizes transmission and infection. Typical measures to control common flu viruses are effective against H5N1 bird flu. Despite doomsday predictions, embalming procedures utilizing universal precautions and the elimination of inhalable aerosols by the use of HEPA masks will provide effective protection to the embalmer during the embalming of these cases. Disposal of embalming garments and HEPA masks is advised as well as the use of disposable instruments or the thorough disinfection of all instruments after embalming with the use of a glutaraldehyde-based high-level disinfectant, such as Metricide 28, with a pre-cleaning by a medium-level disinfectant, such as Bruphene. This coupled with the use of a highly effective disinfecting surface spray, such as Metriguard, will ensure disinfection, sanitation and safety. Selection of arterial and cavity chemicals should focus on maximum effectiveness of sanitation with glutaraldehyde and phenolic based chemicals being the preferred choices, as they deliver, ounce -for-ounce, the maximum amount of sanitizing ability of available embalming chemicals. Typical examples of maximum impact chemicals would include LEX and DiForm40 as arterials with cavity choices being Cavity48 or DiCav45. No other unusual or extraordinary measures would be necessary in embalming and preparation. Normal post-embalming procedures would be unaffected and traditional viewings and funerals could be conducted along with transport of bodies for final disposition.

So there you have it. A potentially deadly and troublesome situation, if and when it occurs, but not the doomsday scenario that has been painted by pop culture and the media.

References: Information of Bird Flu is voluminous on the Internet. Just Google it and a vast array of articles and information will appear from multiple sources, some excellent, others not so. WebMD is a good place to start as well as some of the news sources. Discover magazine and New Scientist also have excellent and relevant articles concerning bird flu and related infectious topics.