DOI:10.1111/j.1750-2659.2011.00310.x
www.influenzajournal.com

Absence of fetal transmission of H1N1 despite severe maternal infection

Clayton A. Wiley, Donald M. Carter, Ted M. Ross, Stephanie J. Bissel

University of Pittsburgh, Pittsburgh, Pennsylvania, USA.
Correspondence: Clayton Wiley, University of Pittsburgh, Pathology, 200 Lothrop Street, A-506, Pittsburgh, Pennsylvania 15213, USA.
E-mail: wileyca@upmc.edu

Accepted 17 October 2011. Published Online 22 November 2011.
Keywords Encephalitis, fetomaternal infection transmission, influenza.

To the editor:
Influenza infection displays a spectrum of clinical severity dependent upon host immune status and viral strain. The outbreak of H5N1 in humans has been accompanied by both severe pneumonia and viral spread beyond the lung. In 2007, a postmortem study of two adults and one fetus infected with H5N1[1] demonstrated infection of lung, liver, small intestine, brain, and placenta indicating transmission across the placenta. The recent H1N1 pandemic[2] has been notable for the involvement of young, healthy adults. We recently observed an H1N1 infection in a pregnant 26-year-old female that led to severe maternal disease and spontaneous abortion.

The patient presented to the emergency room (ER) with acute onset of upper respiratory infection (URI). She had been in a state of good health without significant past medical history except for a pregnancy of approximately 16 weeks. The patient and her significant other had developed nasal congestion, cough, and fever the previous day. Medical evaluation confirmed the URI but a chest X-ray showed no evidence of bacterial infection. Given the severity of infection and systemic signs and symptoms, there was concern for possible influenza infection. Nasopharyngeal swabs were sent for viral culture, Tamiflu was prescribed, acetaminophen was administered, and the patient was discharged.

Two days later the patient returned to the ER with complaints of worsening URI, now accompanied by more severe myalgias, headaches, diarrhea, and elevated heart rate (pulse 175). On questioning, the patient indicated she had not been able to afford the Tamiflu prescription so she had only taken acetaminophen at home. The patient was placed on nasal oxygen. Despite aggressive therapy, receiving 4 l of intravenous fluids, her pulse rate decreased only minimally. The patient was started on antibiotics and Tamiflu, but within 3 hours she spontaneously aborted her fetus. Four days after her initial ER visit the patient's nasopharyngeal swab culture grew Influenza A, swine origin 2009 A (H1N1).

The patient continued to do poorly and developed adult respiratory distress syndrome (ARDS) requiring aggressive intervention. After 2 weeks, evaluation of acute neurological deterioration demonstrated multifocal hypoattenuated lesions on head CT scan. She was diagnosed with ''influenza encephalitis'' but no CSF tap was performed because of suspected increased intracranial pressure for which she was treated with steroids, mannitol, and Lasix. Her neurological condition stabilized, and after 1 month of hospitalization she was discharged to a chronic care facility.

Pathological examination demonstrated a 470 g second trimester placenta with severe acute deciduitis. By weights and measures, the abortus was estimated to be 15-week gestation. No systemic or CNS histopathology was observed. Extensive immunohistochemical and *in situ* hybridization with S^{35} labeled probes for influenza demonstrated no evidence of infection in any systemic organ or the CNS. Nucleic acids were extracted from paraffin blocks of H1N1 (A/Mexico/4108/09) infected mouse lung and the human placenta, umbilical cord, and fetal organs (cerebral cortex, cerebellum, lung, liver, heart, and spleen) then assessed with PCR for H1N1 sequences. H1N1 sequences were detected in the positive mouse control but not the human tissues.

In summary, this 26-year-old female suffered severe H1N1 infection with CNS complications. Three to 4 days after symptom onset, she spontaneously aborted a 15-week fetus that showed no evidence of influenza infection. Therefore despite severe maternal infection, H1N1 did not transmit across the human placenta during acute infection as has been reported with H5N1 infection.

References

1 Gu J, Xie Z, Gao Z *et al.* H5N1 infection of the respiratory tract and beyond: a molecular pathology study. Lancet 2007; 370:1137–1145.
2 Maritz J, Maree L, Preiser W. Pandemic influenza A (H1N1) 2009: the experience of the first 6 months. Clin Chem Lab Med 2010; 48:11–21.