# NEUROLOGIC COMPLICATIONS ASSOCIATED WITH H1N1 INFLUENZA IN THE PEDIATRIC POPULATION

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## Rationale

The numbers of hospitalizations, multiorgan complications, and deaths continued to rise during the H1N1 influenza pandemic. Although there are several reports of H1N1 influenza associated neurologic complications in all ages, there is no clear suggestion that the 2009 influenza A (H1N1) virus is associated with a disproportionate amount of neurologic illness beyond that observed with seasonal influenza.

We describe the serious neurologic complications of children hospitalized with H1N1 influenza in Houston, Texas during the 2009 season. We retrospectively studied five hospitalized children with neurological complications who were polymerase chain reaction (PCR) positive for the H1N1 virus (PICU).

## Case Reports

| Pt | Age/gender | Admit Chief Complaint | PCR + for H1N1 | Cranial MRI | MRA/MRV | EEG | CSF | CNS complications | Outcome |
|---|---|---|---|---|---|---|---|---|---|
| **1** | 6 yo/F | RD, T 104 | yes | L MCA stroke, R BG ICH | 4 vessel - vasculitis | decreased amplitude of the left centroparietal area and diffuse slowing | ND | stroke (ischemic and hemorrhagic) | Improved overall, residual R hemiparesis |
| **2** | 10 month/M | RD, T 102 | yes | R BG infarct | Normal | diffuse slowing<br>increased slowing in L occipital region | no WBCs, RBCs, or organisms protein 18, glucose 71, opening pressure 31 mg H2O | stroke (ischemic) | Improved |
| **3** | 10 yo/F | Hematuria | yes | Patchy hyperdensities of frontal lobe | ND | generalized epileptiform discharges and diffuse slowing with possible focal slowing | protein 61, all else was normal | encephalopathy, seizures (Partial seizures with secondary generalization) | Improved |
| **4** | 6 yo/M | RD | yes | ND | ND | asymmetric focal slowing in the temporal region | NA | encephalopathy | Death |
| **5** | 6 yo/M | New onset Seizures | yes | WNL | WNL | focal slowing in the right temporo-parietal regions | WBC1, RBC 0, total protein 13, glucose 95 | encephalopathy, status epilepticus | Improved |

## Results

Of these 5 children, 2 had stroke (ischemic and/or hemorrhagic), 2 had seizures, and 3 had encephalopathic features. Regarding the outcome, improvement in neurological function occurred in four and one child died.

Among all H1N1 influenza PCR positive patients admitted to the PICU that month, 21% had neurologic complications.

## Conclusion

There are several case reports of neurologic complications with H1N1 influenza infection in children and in adults [1, 2]. The severity of the neurologic disease in the five children described in this report included a wider range of symptoms and complications than those described in prior case reports [2-4]. In the previous case reports related to H1N1 influenza neurological complications, the manifestations were generally mild and included mainly new onset seizures [2- 4].

Our patients had a different clinical profile. Two out of 5 children had stroke (hemorrhagic or ischemic), 2 of the 5 children had seizures, and 3 children had severe encephalopathic features. The variability of CNS complications in this group stresses the importance of recognizing the CNS complications of H1N1 influenza in endemic areas. Clinicians should consider H1N1 influenza associated encephalopathy in the differential diagnosis of children with influenza-like illness with seizures, stroke-like manifestations, or mental status changes and remain aware of the potential for severe neurologic sequelae associated with the novel influenza A (H1N1) virus infection.

The Centers for Disease Control (CDC) recommends that vaccinations should be given to pregnant women, those persons who live with or provide care for infants aged less than 6 months, health-care and emergency medical services personnel who have direct contact with patients or infectious material, children aged 6 months to 4 years, and children and adolescents aged 5 to18 years who have medical conditions that put them at higher risk for influenza-related complications. Following these strict guidelines is imperative to those clinicians treating these vulnerable populations.

## References

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3.Cox N, Subbarao K. Lancet. 1999; 354: 1277-1282.
4.Morishima T, et al. Clin Infect Dis. 2002; 35: 512-517.