Influenza H1N1

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History of H1N1

• Spanish Influenza of 1918 said to be the earliest form of pandemic influenza.
• Similar H1N1 like virus out broke in Fort Dix 1976.
  ➢ Early forms of the H1N1 virus were found in pigs, over time mutated and can infect humans.
  ➢ 1970’s Government tried to make a vaccine for this virus, but was associated with rare instances of neurological complication as in Guillian-Barre-Syndrom and was discontinued.
History of H1N1

- Origins: From Orthomyxoviride which distinguishes Influenza A, B and C.
- Influenza A H1N1: First detection in Mexico, spring 2009, caused some deaths in young people and increasingly in summer 2009.
- WHO (World Health Organization) as an endemic case in Mexico was later categorized as pandemic by June 2009.
- First pandemic in 41 years.
- Contains 18 strains ranging from Avian, swine and human flu.
- Trivalent vaccine made for the 2009-10 flu season offered no protection against H1N1 until Sept-Oct. 2009 a new vaccine with both live and killed viruses was available.
History of H1N1

- December- January ‘09-’10: Moderate supply of vaccine available worldwide reading infection and stopped the pandemic.

- However it is still present in the world populations yearly vaccines were incorporated 2010- 2011 season.
Objective: Evaluate the association of 2008-09 Seasonal trivalent inactivated vaccine with case of influenza A H1N1 during epidemic in Mexico.

- Case Controlled study done in Mexico City, Mexico. March-May 2009.
- 60 patients with laboratory confirmed Influenza A H1N1 and 180 controls with other discusses living in Mexico City and matched for age and socioeconomic status.
- Main outcome measures: Odds ratio and effectiveness of trivalent vaccine against influenza H1N1.
Case Study of H1N1

- Case and control: Were people admitted to hospital or as out patients at The National Institute of Respiratory Disease and had clinical diagnosis of influenza and respiratory tract specimen testing positive for H1N1.

- Controls were people in the same hospital who revived medical care for a clinical diagnosis other than influenza during the study period.

- Case was matched by age (5-60+) and socioeconomic status (low, med, high.)

- Analysis: Binomial tests used to compare the prevalence of conditions conferring a higher risk influenza related complications between surviving and non-surviving cases.
  - Binomial tests also used to test to determine if the proportion of patients who required invasive mechanical ventilation or died among vaccinated and unvaccinated cases differed significantly.
Case Study of H1N1

- Modelled association between influenza and influenza A H1N1 using conditional regression analysis. Analyzed vaccination status as a categorical measure of exposure, with vaccination as referent.

- Case study results: Those who were infected by H1N1 had more severe clinical manifestations than controls. They were more likely to be admitted to hospital, undergo invasive mechanical ventilation and die. Most cases has been previously healthy.
  - Overall controls were more likely than cases to have underlying conditions conferring a higher risk of influenza related complications.
  - Conditions among 10 surviving cases included chronic renal insufficiency, obesity, congenital thoracic deformity, and chronic obstructive pulmonary disease.
Case Study of H1N1

- Symptoms of infected cases: Coughing, sore throat, sneezing, muscle pain, headaches and fever. This would make it difficult to differentiate between seasonal flu and H1N1.

- Infections spread during case study; due to contamination.

- This study presents a clinical data suggest that this vaccine may provide some protection against influenza A H1N1, as none of the vaccinated cases died. Indicating seasonal vaccination may protect against the most severe forms of disease.
Description and Virulence

- Influenza A H1N1 is a virus.
- Virus are enveloped like influenza A viruses in forms of filaments or spherical, with 8 single strand RNA.
- The capsid surface proteins are H and N; Hemagglutnin and Neuraminidase, which are what causes RBC to clump, and glycoside hydrolase enzymes. (18 types of H and 11 types of N)
- Structurally the same as influenza A viruses, and similar in size to most viruses.
Description and Virulence

- Nano size and too miniscule to be seen with a regular light microscope.
- Will always evolve and create new strains.
- Reports that the H1N1 strain contained genes from 5 different flu viruses from Nor. American swine flu, Nor. American Avian flu, human influenza and 2 swine flu found in Asia and Europe.
- **Virulence Factors:** Non-motile, spreads from person to person.
- Can infect cell deep in the lungs as well as like traditional flues, infect the nose and throat.
Description and Virulence

- PB2, PB1 and PA are ailments found from avian, swine and human influenza.
Pathophysiology

- Clinical symptoms: non-severe
- More severe have respiratory syndrome with labored breathing, fever, nasal discharge, conjunctivitis, some weight loss, chills, headache, myalgia and general malaise.
- In mild virulent viruses as H1N1 can be cleaved by proteases found in the throat and lungs- cannot infect other tissue.
- Prognosis: Incubation 1-4 days. Full recovery takes 1-2 weeks. Severe developments include pneumonia that can be deadly for the weak and chronically ill.
- Children: develop apnea, tachypnea, dyspnea, cyanosis, dehydration altered mental status and irritability.
Mode of Transmission

- Direct/Indirect contact
  - Direct contact: Coming in close contact secretions of an infected person; placing our hands on our eyes, nose and mouth.
  - Indirect contacts: touching objects or surfaces contaminated by the virus.
- First transmission said to come from pigs in contact with infected animals. Airborne trans. Through the aerosols produced by pigs cough and sneezes.
- Mode of transmission to humans: People working with poultry and swine are at higher risk for exposure of Zoonotic infection.
Mode of Transmission
Diagnosis

- CDC criteria (real time PCR) for suspected H1N1 influenza:
  - Onset of acute, febrile respiratory illness within 7 days of close contact with person who has confirmed case of H1N1.
  - Or Onset of acute, febrile respiratory illness within 7 days of travel to a community (within the US or internationally) where 1 or more H1N1 cases have been confirmed.
  - Acute febrile respiratory illness in a person who resides in a community where at least 1 H1N1 case been confirmed.
  - Quick test: Nasopharyngeal swab sample, to see if patient is infected with influenza A or B virus.
  - If positive for influenza A person could have conventional flu strain or swine.
Method of prevention & Treatment.

- Avoid contact with someone with confirmed H1N1.
- Always wash hands or use sanitizer.
- Avoid touching eyes or mouth.
- **Treatment:** Vaccination (Seasonal)
- Take antiviral drugs, work best if started soon after getting sick.
- At home care or hospital care; control fever, relieve pain, monitor fluid balance.
- Medicines as Tamiflu and Relenza help too.
Number of Cases each year and in Oregon

- CDC Jan. 26- Feb 12 2014
- High influenza activity.
- National status: Out patients; Elevated, percentage of visits are above the base line. % Positive for flu in the last 3 weeks 19.6%
- Number of jurisdiction reporting regional or widespread activity in all 50 states including DC, Guam, Puerto Rico, Virgin Islands: 48 of 54.
- Case in Oregon: Out patient elevated, positive for influenza 21.4% over baseline, 4 of 4 regions reported.
- Year estimates for the virus is 40 million cases.
Importance of H1N1

- It's still active in the world especially during flu season.
- Has not died off.
- In severe cases, it will lead to pneumonia and death.
- Some workplaces will require you to get vaccinated, especially in the health community.
- Highly contagious.
The Case study was found in the following about a study done in Mexico at the time of the H1N1 outbreak:


Retrieved information:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2758337/

The most important source of information was the CDC for Description and number of cases each year.

Centers for Disease Control and Prevention (2014) *Seasonal Influenza (Flu).*

Retrieved information:
http://www.cdc.gov/flu/weekly/
References (cont.)

- A big portion of the report including history and method of prevention and treatment.
  
  Davis. P. C (2013, September, 23) Swine Flu (Swine influenza A [H1N1 and H3N2v] viruses)
  
  Retrieved from: http://www.medicinenet.com/swine_flu/article.htm#swine_flu_h1n1_and_h3n2v_influenza_virus_facts

- A lot of pictures and information on pathophysicsology and method of transmission was found here:

  Wikipedia (2014, Feb. 4) Influenza
  
  Retrieved information:
  http://en.wikipedia.org/wiki/Influenza