Etiologic Investigation of Sporadic Cases of Parotitis

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Background

- Mumps is an acute, viral illness whose classic symptom presentation includes parotitis (swelling of the parotid salivary glands)
- Other causes of parotitis exist, both infectious and non-infectious
- Mumps is the only known cause of epidemic parotitis
- Approximately 30% of mumps cases can be asymptomatic
- In the United States, mumps is well controlled, with approximately 300 cases reported annually
- Mumps vaccination coverage rates in the U.S. are approximately 92% for one dose, and 90% for two doses
- Laboratory diagnostic tests for mumps include
  - Detection of anti-mumps IgM antibody
  - Four-fold increase in anti-mumps IgG antibody titer measured by quantitative assays or seroconversion from negative to positive using a standard serologic assay of paired acute and convalescent serum samples
  - Detection of mumps RNA using RT-PCR
  - Isolation of mumps virus in culture
- Among previously vaccinated or previously infected people
  - Mumps IgM test results may be negative
  - Mumps IgG test results may be positive or of a high titer on initial blood draw
  - Viral detection by RT-PCR or culture may have a low yield if the specimen was collected more than 2 days after parotitis onset
- Therefore, a suspect case of mumps cannot be ruled-out based on negative laboratory test results
- Identification of cases of mumps is important in the initiation of control measures to prevent the spread of the disease among persons who do not have presumptive evidence of immunity
- Public health follow-up for even a single case of mumps can be resource-intensive
  - Contact tracing
  - Assessment of contacts' immune status
  - Isolation of cases and quarantine of exposed, susceptible contacts, where appropriate
- Intensive public health follow-up is generally not required for non-mumps cases of parotitis
- The etiologic cause of a sporadic case of parotitis in a vaccinated individual with negative laboratory test results for mumps is often undetermined
- This project examined the detection frequency of a panel of viruses suspected to cause parotitis among sporadic cases of parotitis

Methods

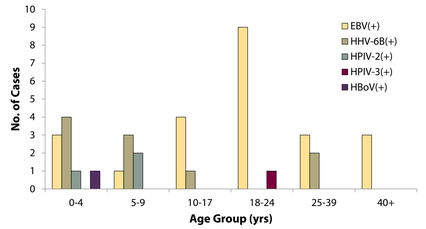
- Eight locations participated in this project during 2009-2011
  - Arizona, California, Kansas, Michigan, North Carolina, Philadelphia, Tennessee, and Washington State
- Following established, routine procedures, health departments investigated cases of parotitis under the assumption that they were cases of mumps
  - Demographic data, clinical details, exposure history, and vaccination information were collected
  - Buccal and throat swab specimens were requested
- Patient inclusion criteria included
  - Parotitis
  - No epidemiological link to a confirmed or probable case of mumps
  - No epidemiological link to more than one case of parotitis
- Viral specimens from eligible patients were tested at CDC for the following viruses by PCR methods
  - Mumps virus (MuV)
  - Enteroviruses (EV)
  - Human parechovirus (HPeV)
  - Human herpesviruses 6A & 6B (HHV-6A & HHV-6B)
  - Epstein-Barr virus (EBV)
  - Human parainfluenza viruses 1-3 (HPIV-1-3)
  - Adenovirus (AdV)
  - Human bocavirus (HBoV)

Results

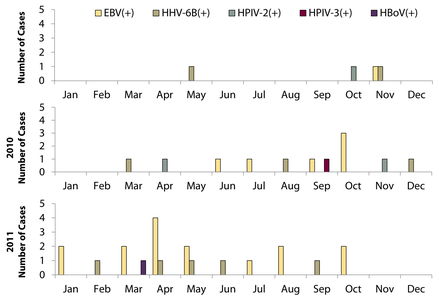
- A non-mumps virus was detected in 38% of specimens
- MuV, EV, HPeV, HHV-6A, HPIV-1, and AdV were not detected in any specimen
- No specimen was positive for more than a single virus
- A virus was detected in 42% of specimens collected within 2 days of parotitis onset, and in 32% of specimens collected on days 3-12
- A virus was detected in 45% of patients vaccinated for mumps, and in 50% of patients not vaccinated for mumps

Patient	Median Age in Years (Range)	Number Female (%)	Number 0 MMR doses (%) Number 1 MMR doses (%) Number 2+ MMR doses (%) Number unknown MMR doses (%)	State (n)
All patients n=101	19 (0.3-76)	46 (46%)	12 (12%) 13 (13%) 40 (40%) 36 (36%)	AZ (6), CA (4), KS (13), MI (33), NC (15), PHL (10), TN (1), WA (19)
No Virus Detected n=63	22 (3-76)	28 (44%)	6 (10%) 9 (14%) 20 (32%) 28 (44%)	AZ (5), CA (1), KS (4), MI (24), NC (10), PHL (6), WA (13)
Virus Detected n=38	16.5 (0.3-71)	18 (47%)	6 (16%) 4 (11%) 20 (53%) 8 (21%)	AZ (1), CA (3), KS (9), MI (9), NC (5), PHL (4), TN (1), WA (6)
EBV(+) n=23	19 (1-71)	12 (52%)	3 (13%) 2 (9%) 12 (52%) 6 (26%)	AZ (1), CA (1), KS (5), MI (5), NC (4), PHL (3), WA (4)
HHV-6B(+) n=10	6 (0.3-35)	5 (50%)	1 (10%) 2 (20%) 5 (50%) 2 (20%)	CA (2), KS (3), MI (2), NC (1), TN (1), WA (1)
HPIV-2(+) n=3	5 (4-7)	0 (0%)	1 (33%) 0 (0%) 2 (67%) 0 (0%)	KS (1), MI (2)
HPIV-3(+) n=1	21 (N/A)	0 (0%)	0 (0%) 0 (0%) 1 (100%) 0 (0%)	PHL (1)
HBoV(+) n=1	3 (N/A)	1 (100%)	1 (100%) 0 (0%) 0 (0%) 0 (0%)	WA (1)

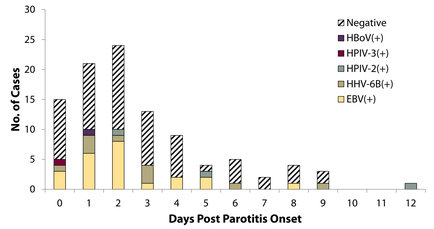
Viruses Detectd by Age Group



Viruses Detected by Onset Month



Timing of Swab Collection



Conclusions

- Non-mumps viruses may be associated with parotitis
- There may be a low predictive value of a clinical diagnosis of sporadic cases of mumps
- The viruses detected may not have caused the parotitis, as the carriage rate among individuals without parotitis was not assessed
- At the time of testing, the association between HBoV and parotitis was unclear, but recent data do not suggest such an association exists

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