

Sensitivity of Diagnostic Codes in Identifying Laboratory Confirmed Congenital Cytomegalovirus Infections in Electronic Health Record Database

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Introduction

- About 1 in 200 babies are born with congenital Cytomegalovirus (cCMV) in the US and 90% of infections are asymptomatic¹
- Infections can result in permanent sequelae such as sensorineural hearing loss, vision impairment, and developmental disabilities
- More than 50% of symptomatic infections result in permanent sequelae²



- Studies using administrative databases have used CMV diagnostic codes assigned within the first 90 days of life to identify cCMV infections and found a prevalence of 1-4 per 10,000 births³
- ICD-9-CM and ICD-10-CM diagnostic codes are used primarily for billing or administrative purposes, and their sensitivity in identifying cCMV infections has not been evaluated

Objectives

- To evaluate the sensitivity of diagnostic codes in identifying infants with laboratory-confirmed cCMV infections at healthcare facilities that provide CMV lab data
- To determine the prevalence of laboratory-confirmed cCMV
- To investigate conditions associated with cCMV using diagnostic codes

Methods

Patient Population: Infants with at least one encounter in the first 21 or 90 days of life at a facility that provided CMV data to Cerner Health Facts Database from 2010-2017

Laboratory-confirmed cCMV infected infants: Infants with a positive CMV laboratory test meeting inclusion criteria in the first 21 or 90 days of life

Inclusion Criteria: PCR, DFA, or culture from saliva, urine, respiratory secretion, CSF, or blood samples or IgM serology

Diagnostic Codes (ICD-9-CM and ICD-10-CM) corresponding to CMV and CMV-related conditions were investigated among the laboratory-confirmed cCMV infected infants. A restriction of 21 or 90 days was applied for CMV diagnostic codes to account for delay in assignment and 90 days for all other diagnostic codes.

Results

7,908,711 infants with encounters in first 90 days of life (349 hospitals)

1,072 infants had a positive CMV test

838 infants had a test that met cCMV laboratory criteria

668 infants were within 21 days at time of test

Prevalence of Laboratory-confirmed cCMV infected infants:

Using 90-day cut-offs for tests/encounters:
1.1 cases per 10,000 infants

Using 21-day cut-offs for tests/encounters:
0.9 cases per 10,000 infants

CMV Testing Criteria	CMV Diagnostic Code Assignment	Total No. of Infants	No. with CMV codes	Sensitivity % (95% CI)
CMV test in first 21 days	≤21 days	668	69	10.3 (8.0, 12.6)
CMV test in first 21 days	≤90 days	668	74	11.1 (8.7, 13.5)
CMV test in first 90 days	≤90 days	838	107	12.8 (10.5, 15.0)

The sensitivity of CMV diagnostic codes among laboratory-confirmed cCMV infected infants using 21- and 90-day cut-offs for CMV tests and diagnostic code assignment

Conclusions

- About 1 in 10 infants with laboratory-confirmed cCMV also had CMV diagnostic codes in this population of infants at 349 US hospitals
- The sensitivity of CMV diagnostic codes did not substantially change with different age restrictions
- The administrative prevalence of cCMV was like other studies, but laboratory results were used instead of diagnostic codes to identify infants
- Low birth weight (31%), jaundice (26%), and thrombocytopenia (15%) were the most common cCMV associated conditions in those less than 21 days at time of test. Microcephaly was present in about 4% and hearing loss in 6%.
- Most laboratory-confirmed infants (21 days) were identified through culture alone (77%) and only 10% had a positive PCR test
- Infants in the Northeast represented 20% of the total patient population and 55% of the laboratory-confirmed cCMV infected population which indicates missing laboratory data.

References

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