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Original Research

Risk factors for hospitalisation and associated costs among patients with hepatitis A associated with imported pomegranate arils, United States, 2013

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ABSTRACT

Objectives: To assess hospitalisation risk factors and economic effects associated with a multistate hepatitis A outbreak in 2013.
Study design: Retrospective case series.
Methods: Eligible outbreak-related cases confirmed by September 1, 2013, were defined as acute hepatitis symptoms and positive IgM anti-hepatitis A during March 15–August 12 among patients who consumed the food vehicle or had the outbreak genotype. We reviewed medical records, comparing demographic and clinical characteristics among hospitalized and non-hospitalized patients; we used logistic regression analysis to identify factors associated with hospitalization. We interviewed patients regarding symptom duration and healthcare usage and estimated per-patient and total costs. Health departments reported outbreak-related personnel hours.
Results: Medical records were reviewed for 147/159 (92%) eligible patients; median age was 48 (range: 1–84) years, and 64 (44%) patients were hospitalized. Having any chronic medical condition was independently associated with hospitalisation (odds ratio, 3.80; 95%

Abbreviations: HAV, hepatitis A virus; HCV, hepatitis C virus; CDC, Centers for Disease Control and Prevention; ED, emergency department; DOL, US Department of Labor; PEP, postexposure prophylaxis; IG, immune globulin.

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confidence interval, 1.68–8.62). Interviews were completed for 114 (72%) eligible patients; estimated per-patient cost of healthcare and productivity loss was $13,467 for hospitalized and $2138 for non-hospitalized patients and $1,304,648 for all 165 outbreak-related cases. State and local public health personnel expenditures included 82 h and $3221/outbreak-related case.

Conclusions: Hospitalisations in this outbreak were associated with chronic medical conditions and resulted in substantial healthcare usage and lost productivity. These data can be used to inform future evaluation of expansion of hepatitis A vaccination recommendations to include adults with chronic medical conditions.

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Introduction

Hepatitis A virus (HAV) infection is an acute illness, characterised by fever, abdominal pain, elevated aminotransferase enzymes, and jaundice. Illness is typically self-limited and complications are uncommon; however, symptomatic infection, jaundice, hospitalisation, and other complications are more frequent among adults.[1–3] Fulminant hepatic failure from hepatitis A has been associated with pre-existing chronic liver disease, especially among persons with hepatitis C virus (HCV) coinfection.[4] Among patients identified through national surveillance data, death attributed to hepatitis A occurs among 0.8%, but increases to 2.6% among persons aged ≥60 years.[3]

Effective hepatitis A vaccines were licensed during the mid-1990s and recommended for persons at increased risk for hepatitis A exposure (e.g., international travellers) and for persons at greater risk for complications (e.g., persons with chronic liver disease)[5]; in 2006, hepatitis A vaccine was recommended for all children aged one year.[6] Although hepatitis A vaccine coverage is low (53% among U.S. children during 2012),[7] the overall incidence of hepatitis A among persons in all age groups in the United States has declined substantially after the vaccine became available,[3] which has been attributed to herd immunity.[8] Meanwhile, because fewer opportunities for exposure to hepatitis A exist, a growing susceptible adult population has emerged. Protective anti-HAV seroprevalence has decreased among persons aged ≥30 years, from 55% during 1990–2000 to 37% during 2010–2011 [Centers for Disease Control and Prevention (CDC), unpublished data, 2013].

Despite low overall hepatitis A incidence, sporadic foodborne outbreaks of hepatitis A continue to occur in the United States.[9–11] These outbreaks can result in substantial morbidity as well as costs associated with medical care, productivity losses, and public health expenditures related to case investigations and implementation of control measures; however, contemporary data are lacking.[12–14] During May–September 2013, a total of 165 persons from 10 states were reported with hepatitis A in the largest outbreak in the United States in 10 years. Epidemiologic investigation identified a frozen berry-pomegranate mix containing pomegranate arils imported from Turkey as the likely food vehicle, and HAV genotype 1B, uncommon in the United States[15] but endemic in the Middle East and North Africa,[16] was isolated from the majority of clinical specimens.[17] In this outbreak, 69 (42%) persons were hospitalised as a result of their illness, compared with previous U.S. hepatitis A outbreaks in which proportions hospitalized ranged from 15% in 154 outbreaks during 1973–1992 (CDC, unpublished data, 2001) to 26% and 33% in foodborne outbreaks associated with green onions during 2003[9] and 1998,[10] respectively. To assess this substantial proportion of hospitalized persons in this foodborne HAV outbreak after substantial shifts in the hepatitis A epidemiology in the United States, we expanded our outbreak investigation to identify factors associated with hospitalisation. In addition, we estimated costs of medical care and lost productivity among affected persons, as well as the state and local public health personnel hours spent during the outbreak investigation and control efforts, with the expectation that such information could inform future discussion regarding expansion of current hepatitis A vaccination guidelines.

Methods

Outbreak case-patients

Confirmed outbreak-related cases were defined as onset of acute hepatitis symptoms and positive anti-HAV IgM reported during March 15–August 12, 2013, in a patient who had either consumed the suspect food vehicle or had the outbreak HAV genotype. All outbreak-related cases confirmed by public health authorities in nine participating states (Arizona, California, Colorado, Hawaii, Nevada, New Jersey, New Mexico, Utah, and Wisconsin) as of September 1, 2013, were eligible for this investigation.

Medical records reviews

For each eligible confirmed outbreak-related case, hereafter referred to as a case, patient medical records from hospitals and outpatient healthcare facilities were requested by public health staff, and all available records were reviewed by using a standardised data collection instrument. Investigators recorded the presence of documented pre-existing chronic medical conditions at the time of hepatitis A diagnosis. Whether a patient was pregnant at the time of hepatitis A diagnosis was also collected. Patients were categorized as having any

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