Commentary

Changing epidemiology of hepatitis A infection

Viral hepatitis continues to be a major public health problem in India. Since the first officially reported epidemic of viral hepatitis in 1955 at Delhi, many outbreaks of hepatitis have occurred in different parts of the country. In India, hepatitis A virus (HAV) is still a major cause of sporadic acute hepatitis in children whereas HEV is the major agent for epidemics in adults. Most of the outbreaks of waterborne hepatitis in India have been attributed to HEV, but the epidemiology of viral hepatitis is changing as outbreaks of hepatitis A are being reported with increased frequency, in the paediatric age group as well. Children with HAV tend to present with non-specific gastrointestinal symptoms and jaundice with cholestasis is common. Viral hepatitis A in adults has a more severe course than in children. In recent years children and adults with acute viral hepatitis A have been reported to have more relapses and a protracted course. A study on 37 patients with acute viral hepatitis A (20 children and 17 adults) showed that the mean hospitalization period in adults was longer (28 days as compared with 19), the average serum bilirubin value was higher (5.5 mg/dl as compared with 3 mg/dl), there were more patients with obvious jaundice (59% as compared with 30%) and the serum antibody IgM anti-HAV persisted longer (19 wk as compared with 14 wk). Relapses of the disease were equally frequent (12 vs. 10%), however adults had more often a protracted course of hepatitis (23.5 vs. 10%). The observed differences were not statistically significant, suggesting that viral hepatitis A in adults takes a more severe course than in children.

Recent changes in the epidemiology of HAV infection and the availability of effective vaccines have renewed interest in this infection. Various studies have shown beyond doubt the increasing seroprevalence rates with age with rates as high as 80.8 per cent in those aged 16 yrs or more. Prevalence was lower in the higher socio-economic group (64.5%) compared with the lower socio-economic group (85%). Based on these results, possibility of epidemics of HAV in high socio-economic status population can be predicted wherein HAV vaccination would be of much help. The first recorded outbreak of HAV in Indian adults was from Kottayam, Kerala, and the infection was traced to the presence of a sewage treatment plant which was overflowing and getting mixed with canal water. Another study from Delhi over a 5 year period showed an increased incidence of symptomatic HAV among children (10.6 to 22.0%) and also in adults (3.4 to 12.3%) amongst the patients with acute viral hepatitis attending the hospital. A study done in Chile showed that routine vaccination of toddlers reduced the rates of symptomatic hepatitis A and associated mortality. The two-dose vaccine schedule evaluated in the study was less expensive than disease-related costs in the absence of vaccination from the sixth year of its implementation. These findings supported the establishment of a routine vaccination programme for toddlers in Chile. Routine childhood vaccination against hepatitis A has been introduced in Argentina. Inactivated hepatitis A vaccine also demonstrated a good protective effect against an outbreak of hepatitis A in China where vaccination was given after the outbreak in an emergency vaccination campaign. A similar study in Israel showed that within 2 wk of starting a mass immunization campaign with hepatitis A vaccine, the incidence of hepatitis A declined dramatically; the last case occurred 6 wk after the immunization programme began and post-exposure administration of immunoglobulin to contacts was ineffective in controlling the outbreak. Selective vaccination of the high-risk populations, based on their serological evidence of HAV antibody, could be a rational and cost-effective approach.

The study by Sowmyanarayana and colleagues in this issue describes a hepatitis A outbreak in children...
in an urban slum in Vellore using geographic information systems (GIS). The authors need to be complemented for introducing this system in the study of this HAV outbreak. GIS integrates common database operations, statistical analysis, unique visualization and geographic analysis benefit offered by maps, which make it easier to take decisions, plan strategies and predict outcomes. It is a powerful tool for examining population-level effects of services as reflected in geographical and spatial distribution of populations. The use of GIS for capturing, storing, analyzing and managing data and associated attributes which are spatially referenced to earth is not new. In 1854, John Snow depicted a cholera outbreak in London using points to represent the locations of some individual cases, possibly the earliest use of the geographic method\textsuperscript{17}. His study on the distribution of cholera led to the source of the disease, a contaminated water pump within the heart of the cholera outbreak in Broad Street, London\textsuperscript{18}. The present study identified 23 cases from the 3 index cases with the help of GIS. Of the 26 cases, 13 (50\%) cases were aged 5 yr or more suggesting the increasing detection of symptomatic children with hepatitis A virus infection. The lack of spatial clustering suggested that the outbreak was due to contamination of water supply to the entire area. Many studies worldwide have used GIS for outbreak investigations. Epidemiological investigation of an outbreak of acute diarrhoeal disease was done using GIS in a village in southern India when maps of the water supply system, sewage channels and areas with observed faecal contamination of soil were drawn\textsuperscript{19}. An outbreak of nosocomial Salmonella enteritidis investigated using GIS supported epidemiological investigation and analysis of food production showed that most likely vanilla pudding had been the vehicle of infection as its production took place in direct spatial and temporal association with the preparation of turkey\textsuperscript{20}. Similarly, GIS was used to document an anthrax outbreak in Alberta in 1999 and to describe the physical and environmental conditions of the area when it was found that majority of infected farms were located on poorly drained organic soils\textsuperscript{21}. GIS and remotely sensed environmental images were used to develop predictive risk maps of the probability of occurrence of urinary schistosomiasis and quantify the risk for infection in Ogun State, Nigeria\textsuperscript{22}. To study an outbreak of fever in a village in south India spatial analysis was done with the help of GIS software which demonstrated a centrifugal spread of cases from the most affected street until it involved the entire village\textsuperscript{23}.

GIS helps in ‘hepatitis risk zone’ analysis to map the impact areas, which are in dire need of health care facilities and thus helps to fully utilize the existing infrastructure and manpower. Awareness programmes as well as vaccination camps can be held at specific locations. Health-care facilities, strategies for addressing high-risk individuals or mobile carriers can all be better addressed through effective information supported through GIS. GIS is going to be an effective tool in epidemiological surveillance of various outbreaks in future.

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**References**


