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Viral Hepatitis: An overview

Jyothi Bhat

Viral hepatitis is a systemic infection affecting the liver predominantly. All cases of viral hepatitis are caused by one of the five viral agents; Hepatitis A virus, Hepatitis B virus, Hepatitis C virus, HBV associated delta agent or HDV and Hepatitis E virus. Other transfusion-transmitted agents e.g. 'Hepatitis G' and 'TT virus' have been isolated from cases of viral hepatitis but were not found to influence the natural course of the illness and recovery[1]. Except for HBV, which is a DNA virus all the human hepatitis, viruses are RNA viruses. Although these viruses can be distinguished by their molecular and antigenic properties all of them produce similar clinical picture. These range from asymptomatic and inapperent to fulminant and fatal infections, on the one hand and from sub clinical persistent infections to rapidly progressive liver disease with cirrhosis and even hepatocellular carcinoma (HCC) on the other[2].

Agents

Hepatitis A: HAV is a nonenveloped 27 nm heat, acid and ether resistant RNA virus in the hepatovirus genus of the picornavirus family. HAV is the only human hepatitis virus that can be cultivated reproducibly in vitro. Hepatitis B: HBV is a DNA virus belonging to family hepadnaviridae. It presents itself in 3 different forms with size of 42nm, 27 nm and 22nm.

Hepatitis D: The delta hepatitis agent is a defective RNA virus that coinfects with and requires the helper function of HBV for its replication and expression.

Hepatitis C: Hepatitis C virus belongs to the family Flaviviridae.

Epidemiology

The hepatic viruses have mainly two modes of transmission; parenteral and enteric. In India professional blood donors constitute the major high risk group for HBV infection. However, most of India's carrier pool is established in early childhood, predominantly by horizontal spread due to crowded living conditions and poor hygiene.

Clinical features: Incubation period for acute viral hepatitis varies in agents.

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Table 1: Mode of transmission and prognosis of hepatic viruses[3]

Virus	Transmission	Chronicity	Neoplasia
Hepatitis A	Enteric: water Food Shell Fish	No	No
Hepatitis B	Parenteral: Blood Sexual Needles Enteric	Yes	Yes
Hepatitis C	Parenteral : Blood Sexual	Yes	Yes
Hepatitis D	Co-infection	Yes	No
Hepatitis E	Enteric	? No	? No

Generally, incubation period for hepatitis A range form 15-45 days, for hepatitis B & D from 30-180 days for hepatitis C from 15-160 days and for hepatitis E from 14-60 days. The prodromal symptoms include anorexia, nausea & vomiting, fatigue, malaise, arthralgias and myalgias with fever. This is followed by icteric phase with jaundice, hepatomegaly and sometimes (10%) splenomegaly[2].

Complications of acute hepatitis include relapsing hepatitis and cholestatic hepatitis. The most feared complication is fulminant hepatitis mainly seen in hepatitis B, D and E. Chronic hepatitis is an important complication of hepatitis B[2]. In India acute and subacute liver failure are common complications of viral hepatitis and HBV is reckoned to be the aetiological agent in 42% and 45% of adult cases, respectively. It is reported that HBV is responsible for 70% of cases of chronic hepatitis and 80% of cases of cirrhosis of the liver. About 60% of patients with hepatocellular carcinoma are HBV marker positive. Coinfection with HCV or HDV is comparatively uncommon in India[4].

Treatment: In 99% of the cases of hepatitis B specific therapy is not required. Acute hepatitis with HCV progresses to chronic hepatitis. Interferon alpha is beneficial in some cases[2].

Prophylaxis:

For hepatitis A passive immunization with immune globulin (IG) and active immunization with killed vaccine are available. For hepatitis B passive immunization with hepatitis B immune globulin (HBIG) and active immunization with recombinant vaccines are available. There is no vaccine or IG for HCV. Hence prevention is by behaviour change and precautions to limit exposure to infected persons[2].

Indian scenario:

India has intermediate endemicity of Hepatitis B, with Hepatitis B surface antigen (HBsAg) prevalence between 2% and 7% among populations studied with the average prevalence being 4%[5]. It is estimated that there are 12.5 million HCV carriers in our country, and at least a quarter of them are likely to develop chronic liver disease in the next 10 to 15 years[6]. In a community prevalence study from Tamilnadu the HBsAg prevalence was 5.7 per cent (CI 4.6- 6.8) with 23.5 per cent (25/106) of these having positive HB e-antigen[7].

Laboratory diagnosis:
Diagnostic markers in patients presenting with acute hepatitis[3]

HBsAg	IgM Anti-HAV	IgM Anti Hbc	Anti HCV	Diagnostic interpretation
+	-	+	-	Acute hepatitis B
+	-	-	-	Chronic hepatitis B
+	+	-	-	Acute hepatitis A superimposed on chronic hepatits B
+	+	+	-	Acute hepatitis A and B
-	+	-	-	Acute hepatitis A
-	+	+	-	Acute hepatitis A and B (HbsAg below detection threshold)
-	-	+	-	Acute hepatitis B (HbsAg below detection threshold)
-	-	-	+	Acute hepatitis C

Few studies have reported the prevalence of hepatitis in tribal populations. During the year 2000, Murhekar et al.(2000)[8] reported an HBsAg prevalence of 23.3% (95% CI 21.0-25.9) and anti-HBs prevalence of 23.9% (95% CI 21.2-26.9) among the Nicobarese. HepatitisB e antigen (HB eAg) positivity among the HBV carriers was 18.4%.



Baiga woman with tattoo

In an earlier study done by RMRCT, Jabalpur among tribal population with sexually transmitted infections the HBV carriage rate was 3.4% in STI patients, against 2.9% in the general population. The anti-HCV prevalence was higher in the general population (4.6%) than in the STI patients (3.9%)[9]. RMRCT Jabalpur recently conducted prevalence study for hepatitis in seven primitive tribes of M.P and Chattisgarh. A total of 1223 subjects were screened for various hepatitis markers. The overall prevalence of HbsAg was between 0.6-10 %. The prevalence of anti HBs was between 5-33%. Genotype D was the predominant Hepatitis B genotype in the area. Seropositivity for anti HCV was found in the range of 1-14.4%. The prevalence of anti HCV was alarmingly high (14.4%) in Bharia tribe. Exposure to hepatitis A & E was between 94 - 100 and 36 -65% respectively. The findings of the study indicate that viral hepatitis infection is an important problem in primitive tribes of M.P and Chattisgarh. Control measures in the form of HBV vaccination and IEC strategies are necessary among them.

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Dr. Jyothi Bhat - Scientist 'B' (Microbiology)

Publications

1. Bhat J, Rao VG. Gopi PG, Yadav R, Selvakumar N, Wares DF. 2009. Prevalence of Pulmonary tuberculosis amongst the tribal population of Madhya Pradesh, central India. International Journal of Epidemiology. 2009 Aug; 38(4):1026-32.
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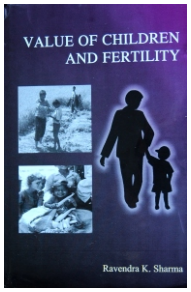
Book

- Ravendra K. Sharma. 2009. Value of Children and Fertility. New Delhi: Radha Publications.



Conference/Workshop/ Meeting attended

Dr. Neeru Singh

1. Attended meeting regarding Health impact assessment under Narmada irrigation project in Bhopal on 4th April 2009.
2. Attended meeting on Brainstorming Session on Research Data Repository & Clinical Data Management at ICMR Delhi on 19th May 2009.
3. Delivered lectures on 'Tribal Malaria Control' in a training course for DMOs, Biologists and senior health officers of Gujarat state on 4th and 17th June 2009 at NIMR Delhi.
4. Attended a meeting on 'Consultation on malaria elimination' at NIMR Delhi on 25th June 2009.
5. Delivered lectures on "Tribal malaria control - a success story" in a training Course organized by NIMR for DMOs, Biologists, Entomologists and Sr. Officers of Gujarat on Prevention and Control of Vector Borne Diseases at NIMR Delhi on 1st, 22nd and 28th July 2009.
6. Attended meetings at Bareily on 30th September 2009 and presented paper on "Field Malaria in India: Are we losing the battle"?

Dr. V.G. Rao

Attended a Symposium on "Tuberculosis: Trends, Challenges and solutions" at Bhopal Memorial Hospital and Research Centre, Bhopal on 22nd May 2009.

Dr. Jyothi Bhat

1. Attended a Symposium on "Tuberculosis: Trends, Challenges and Solutions" at Bhopal Memorial Hospital and Research Centre, Bhopal on 22nd May 2009.
2. Delivered a lecture on 'Laboratory diagnosis of HIV and CD4 testing' in the training of Medical officers for Community care centre's of HIV, organized by NACO at NSCB Medical College, Jabalpur on 7th July 2009.
3. Attended training on DBS specimen collection and transportation organized by MPSACS at Gandhi Medical College, Bhopal on 19th August 2009.

Workshops/Training/Meetings conducted

- Five days refresher training was conducted in collaboration with MPSACS for laboratory technicians of ICTC in two batches from 23.06.2007 to 27.06.2009 and then 29.06.2007 to 3.07.2009. Thirty laboratory technicians were trained during this period.



Promotions/Joining/Retirement/Resignation

Ms. Pushpa Umate was promoted to the post of Assistant on 30.07.2009.

- Mr. Baisakhu Lal was promoted to the post of UDC on 30.07.2009.
- Mr. G. C. Jain was promoted to the post of Administrative Officer on 11.09.2009.
- Mr. Ramanuj joined as Data Entry Operator on 22.06.2009.
- Mr. W. H. Venkat Seshan retired from the post of Administrative officer on 31.07.2009.
- Mrs. Ujjwala Das resigned from the post of Research Assistant on 12.06.2009.

Events

- Flag hoisting on Independence Day celebration on 15.8.2009 in front of the centre.



- Prize distribution during "Hindi Rajbhasha activities" on 29.9.2009



Visits

- Collector Jabalpur organized a review meeting to assess the performance of Revised National Tuberculosis Control Programme on 3rd June 2009 at RMRCT auditorium.



- Collector Jabalpur organized a lecture on Time Management for the state Government Officials at RMRCT auditorium during 9th September 2009.



- Collector Jabalpur organized a review meeting to assess the progress of RCH-II/NRHM and other National Programs for the year 2009-10 at RMRCT on 9th October 2009. Dr. J. L. Mishra, Chief and Health Officer/Secretary, District Health Society, Jabalpur also delivered lecture.

Awards

- Dr. R. S. Balgir, Scientist-F, received the BGRC silver Jubilee Oration Award for the year 2006 in the field of Public health genetics and community heamoglobino-pathies on September 18, 2009.

Technical Assistances

- Dr. J. Bhat and Mr. Gyan Chand extended technical support to state Government for dengue outbreak at Bhopal.
- Dr. T. Chakma organized scabies camps for awareness and intervention at Baiga Ashram School of Jabalpur.
- Dr. R. K. Sharma extended his expertise for evaluation of the project 'Newborn Infants Care and Intervention' under NIMS (ICMR), New Delhi.

Foreign visits

- Dr. C.K. Dolla, Attended viva leading to MPH degree at Royal Tropical Institute, Netherlands (2nd-11th September 2009).
- Dr. S. R. Qamra, Attended 16th World Congress of the International Union of Anthropological and Ethnological Congress at Yunnan University, China (27th-31st July 2009).

Establishment of new laboratory/ facility

- H1N1 Testing Laboratory : To assess the burden and help in its control. Staff for this laboratory trained at NIV, Pune.





Completion of Trainee Hostel





