

INFECTION WITH DELTA AGENT IN PAKISTAN INTRODUCTION OF A NEW HEPATITIS AGENT

Pages with reference to book, From 126 To 128

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Abstract

Delta agent is a defective virus which may coinfect with hepatitis B virus (HBV) or superinfect a carrier of hepatitis B surface antigen (HBsAg). Sera from 1130 adult and young jaundiced patients and volunteers of both sexes were tested for seromarkers of viral hepatitis by ELISA technique. One hundred and ninety three cases, positive for HBsAg, were further tested for delta antibody. A low prevalence (3.11%) of delta agent infection was found in these HBsAg positive individuals. As HBsAg carrier rate in general population is fairly high in Pakistan (10%) and all modalities of spread of HBV/ delta agent are also present, so the risk of spread of delta agent is also high. The mandatory use of disposable syringes and elimination of HBsAg positive blood units for transfusion should be strongly emphasised to prevent the further spread of HBV/delta agent infection in the country (JPMA 38: 126, 1988).

INTRODUCTION

The delta agent and antibody were first detected in 1977 in the liver biopsy material and serum of the carriers of hepatitis B surface antigen (HBsAg) in Italy by Rizetto and coworkers¹. Subsequent experimental studies revealed that delta antigen is a transmissible hepatitis agent which requires the helper function of hepatitis B virus (HBV) for its replication². The characterisation studies have shown that this new viral agent has an RNA genome and is smaller than any known RNA virus³. The delta agent being small and defective in metabolic activity requires an external help for its replication³. The 35-37 nm particles containing delta antigen and RNA genome have structural characteristics of a pseudovirion and may be considered the putative delta agent.^{3,4} Although delta infection is prevalent in most parts of the world, it is more common in Southern Italy⁵ Epidemiological data consistently indicates that delta infection is endemic in other areas of Southern Europe⁶, Middle East⁷ and South America⁸. In these countries, the delta infection has mostly been associated with intravenous drug abusers and the HBsAg carriers who had repeated blood transfusions⁹. The frequency and pattern of delta agent infection in Pakistan is not known. This study was planned to assess the prevalence of delta antibody in HBsAg carriers/patients in our country.

MATERIAL AND METHODS

The study was conducted between 1984-86 in the Pathology Department and the Pakistan-US Laboratory for Sero-epidemiology (PULSE), of the Army Medical College, Rawalpindi. The sera of 1130 individuals were analysed by ELISA technique for the seromarker of viral hepatitis. Hepatitis B surface antigen (HBsAg) was detected in 193 cases and only they were included in this study. Amongst them 88 (45.6%) had acute viral hepatitis (AVH) and the remaining 105 individuals (54.4%) were apparently healthy carriers of HBsAg. From each patient/carrier, 5 ml blood was drawn into vacutainer, the serum separated in a centrifuge and stored at -70°C , until tested. These sera were analysed for the

presence of anti-delta antibody by utilising anti-delta EIA kit prepared by Abbott Laboratories, Illinois, Chicago. Besides anti-delta, other seromarkers of acute and chronic hepatitis B infection were also tested, i.e., anti-HBc (CORZYME), IgM anti-HBc (CORZYME-M), anti HBs (AUSAB), HBeAg (Abbott HBe EIA), anti-UBe (anti-HBe EIA), with the help of Abbott Laboratories kits and for reading of the results QUANTUM-II was used.

RESULTS AND OBSERVATIONS

There were 178 males (92.23%) and 15 females (7.77%). The maximum number of HBsAg positive cases (69.18%) was seen in second and third decade of life. The mean age of the males was 30.14 ± 10.81 years and that of females 28.25 ± 19.32 years.

Delta agent infection:

On serology, 6 cases (3.11%) out of 193 were found to be positive for delta antibody. Detailed serological profile of these 6 cases is given in Table I.

Table 1. Serological Profile of Cases of Delta Antibody Positive Cases.

Sero- markers Patients (initials)	Age	Sex	HBsAg	Anti-HBc	Igm		anti-HBs	HBeAg	anti-HBe	anti-Delta
					anti-HBc					
M.I.	33	M	Pos	Neg	Neg		Neg	–	–	Pos
N.D.	28	M	Pos	Pos	Pos		Neg	Pos	Neg	Pos
M.D.	42	M	Pos	Pos	Neg		Neg	Neg	Pos	Pos
M.K.	30	M	Pos	Pos	Neg		Neg	Neg	Neg	Pos
M.	25	M	Pos	Neg	Neg		Neg	Neg	Neg	Pos
M.N.	28	F	Pos	Pos	Neg		Neg	Neg	Neg	Pos

Their ages ranged between 25 to 42 years. Five were males and one female. One was a patient admitted for acute hepatitis B infection (IgM anti-HBc) whereas the remaining 5 cases were carriers of HBsAg.

Serological profile of hepatitis B infection:

Amongst 193 HBsAg positive cases, 74.61% were positive for anti-HBc while 45.6% were suffering from acute hepatitis B (IgM antiHBc). Three cases (1.55%) were positive for antiHBs and 27.27% for HBeAg (Table II).

Table II. Serological Profile of 193 Cases.

No % Sero-Markers	Positive No (%)	Negative No (%)	Total
HBsAg	193 (100)	0 (0)	193
Anti-H Bc	144 (74.61)	49 (25.39)	193
IgM anti-HBc	88 (45.60)	105 (55.40)	193
Anti-HBs	03 (1.55)	190 (98.45)	193
HBeAg	12 (29.27)	29 (70.73)	41
Anti-HBe	06 (14.63)	35 (85.37)	41
Anti-delta	06 (3.11)	187 (96.89)	193

DISCUSSION

Association of the delta agent with hepatitis B virus (HBV) was first recognised by Rizet to¹ and confirmed by subsequent studies^{10,11}. The delta agent is invariably pathogenic, as almost all the

individuals infected with delta antigen develop some form of liver cell damage³. The co-infection of delta antigen/HBV usually results in an illness which may not be different from classical acute hepatitis B which may or may not cause extensive liver cell damage or chronic liver disease. However, superinfection of delta agent may aggravate the previously existing HBV liver disease or produce hepatitis in an asymptomatic carrier of HBsAg^{12,13}. Delta agent infection is global in distribution.¹⁴ The geographical distribution of delta infection in HBsAg positive individuals has been reported to be variable in different countries. A high prevalence of delta infection was initially found in Southern Italy, where upto 50% of HBsAg carriers with chronic liver disease had delta antibody in their sera⁵. Seroepidemiological surveys also indicate that delta infection is common (10-21%) in several Mediterranean countries.⁶ A frequency of 20-40% is found in the Middle East⁷, also in some parts of South America, where it predominantly exists in HBsAg positive individuals, who have been given blood transfusions⁸. In contrast, delta virus infection is much less common not only in Western Europe (1-5%) and the United States (4%)¹⁵ where HBsAg carrier rate is low but also in most of African countries (8%)¹⁶ and Asia (1-4%)¹⁷ where 5—20% of the adult population is carrier of HBsAg. In our study, the frequency of delta infection was found to be low (3.11%). It shows that the delta agent has been introduced in our population but its prevalence is still low. Studies from Asian countries like Taiwan and China have also described a low incidence of delta infection (1-4%) despite the high prevalence of endemic HBV infection⁹. The reasons are unknown but probably the delta agent may not have as yet diffused to this region or there may be some kind of genetic resistance among the orientals against delta infection. In view of the obligatory association of delta agent with hepatitis B virus, the transmission of delta agent tends to follow the routes of transmission similar to HBV. There is negligible possibility of delta agent transmission with blood transfusions, which have been properly screened for HBsAg by the latest and most sensitive techniques like ELISA and RIA. As disposable syringes and needles are not yet routinely used in our country, nor the blood donors regularly screened for HBsAg by sensitive serological techniques, and since all possible modes of spread for delta agent are available in our general population, the risk of spread of HBV/delta agent is high. To prevent the spread of HBV/delta infection in Pakistan, the mandatory use of disposable syringes and pre-transfusion testing of blood for HBsAg by using the latest technique, should be strongly advised.

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