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Clinical and Molecular Correlation of Hepatitis B e Antigen Status in HBsAg-Positive Blood Donors: Implications for Disease Staging and Transfusion Safety: Reg ID: 326

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ABSTRACT

Background: Hepatitis B e antigen (HBeAg) is a key serological marker indicative of active viral replication and high infectivity in hepatitis B virus (HBV) infection. Understanding the frequency and clinical implications of HBeAg positivity among HBsAg-positive blood donors is critical for transfusion safety and early disease management. **Objective**: To evaluate the serological and molecular profiles related to HBeAg status in HBsAg-positive blood donors and to correlate these with biochemical and radiological markers for clinical staging of HBV infection. **Methods:** A cross-sectional observational study was conducted on 150 HBsAg-positive blood donors at a tertiary care centre of North India between April 2024 and August 2025. Serological markers including HBeAg and anti-HBe were assessed using enzyme-linked fluorescent immunoassay (ELFA). HBV viral load was quantified by real-time PCR (qPCR). Liver function tests (ALT, AST) and transient elastography (FibroScan) were performed wherever feasible. Data were analyzed to assess associations between HBeAg positivity, viral load, liver fibrosis, and biochemical parameters. **Results:** HBeAg positivity was observed in 15.3% of donors, amongst which 74% showed a very high viral loads (>2×10^7 IU/mL) indicating active replication and high infectivity. Anti-HBe positivity (76.4%) predominated in HBeAg-negative donors, reflecting immune control phases. Older age groups (31-40) had higher HBeAg positivity (43.4%), suggesting cumulative viral activity. No significant correlation was found between HBeAg status and elevated ALT (p=0.418) or liver stiffness(p=0.662), highlighting asymptomatic nature of the infection. **Conclusion:** HBeAg positivity in HBsAg-positive donors signifies high infectivity driven by active viral replication. This study shows that many such donors with elevated HBV DNA may appear normal on liver enzymes or Fibroscan, leading to missed cases if screening relies only on serology or biochemistry. Integrating HBV DNA testing with serology and clinical evaluation is therefore essential for accurate risk stratification, transfusion safety, and appropriate linkage to care.

KEYWORDS