# OCCULT HEPATITIS "B" VIRUS INFECTION AMONG EGYPTIAN BLOOD DONORS

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***Introduction:*** HBV remains the most frequent transfusion-transmitted viral infection. Egypt is considered as an area of intermediate endemicity for HB. HBV transmission by HBsAg-negative components occurs, in part, during the serologically negative window period, but more so during the late stages of infection, the later is referred to as occult HBV infection (OBI). Most OBI are asymptomatic and would only be detected by systematic screening of large populations. No published guidelines are provided up till now categorizing those who should be screened for OBI and data reporting the infectivity of OBIs by transfusion is rare.

***Aim of the Work:*** The aim of this work is to determine the prevalence of occult HBV among Egyptian healthy blood donors; highlight the residual risks of transmitting HBV in blood banks through blood transfusion and to determine whether routine anti-HBc screening of blood donations provides any concrete benefits with regard to HBV transmission risk reduction.

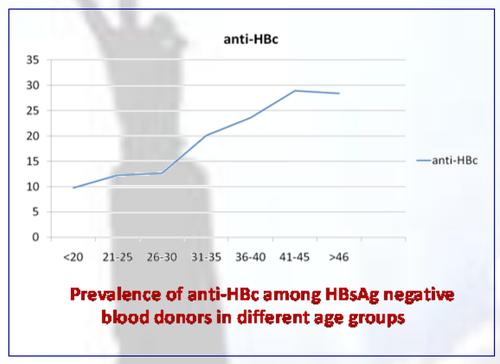
***Patients and Methods:*** A cross sectional study was undertaken on 3,167 blood donors negative for anti-HCV, anti-HIV, and HBsAg. Recipient sample was collected before transfusion and a follow up sample was recollected whenever possible from those whose donor found to be positive for HBV total anticore. Sera were tested for ALT & AST (Spectrum, Egypt) as well as HBV Total anti-HBc (Monoliza Anti-HBC Plus-Bio-Rad). Anti-HBc positivity was confirmed with (ARC-Hepatitis B core total-ABBOT). Positive samples were subjected to quantitative detection of anti-HBs (ETI-AB-AUK-3, Dia Sorin-Italy).HBV DNA was estimated mainly for blood units with baseline low or undetectable serum anti-HBs levels and also for 32 whose anti-HBs, serum titers >1000 IU/L. All available recipients' samples as well as follow-up samples were investigated for ALT & AST as well as HBV serological markers: HBsAg (ETI-MAK-4, Dia Sorin-Italy), anti-HBc, quantitative detection of anti-HBs and HBV DNA. HBV DNA was quantified by real-time PCR using automated system. Viral DNA was extracted from serum samples using QIAxtractor®, and VX kit (QIAGEN- Germany). PCR setup was automated via QIA-gility (QIAGEN,Germany).HBV real-time assays were performed in combination of Artus HBV RG PCR Kit (Artus™ GmbH, Hamburg Germany) and the Real time PCR instrument, Rotor-Gene Q (QIAGEN, Germany). Detection limit of HBV DNA in the current study assay is 3.8 IU/mL assessed by the WHO international standard (97/750).

***Results:*** 525/3167(16.6%) of blood units were positive for total anticore, where 64% of them were anti-HBs positive. HBV DNA was quantified in 52/303 (17.2) % of anti-HBc positive blood donors with median of 200IU/mL. Anti-HBc was the only marker in 68.6% of them. Univariate and multivariate logistic analysis for identifying risk factors associated with anti-HBc and HBV-DNA positivity among blood donors showed that **age above thirty** and marriage were the most significant risk factors for prediction anti-HBc positivity with AOR 1.8(1.4-2.4) and 1.4(1.0-1.9) respectively. Among anti-HBc positive blood donors, **age below thirty** was the most significant risk factors for prediction of HBV-DNA positivity with AOR 3.8 (1.8-7.9). Serological profiles of followed up recipients showed that, all of them were negative for the studied HBV markers. No HBV DNA was detected among these recipients. No one developed post-transfusion hepatitis (PTH) and the clinical outcome was good.

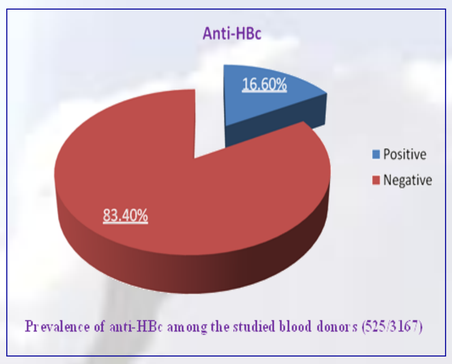
**Detection of Total Anticore in the studied groups**

| ELISA Positive | | Architect + | Architect - | % |
|---|---|---|---|---|
| Donors | 525* | 451 | 47 | 90.6 |
| Recipients | 49 | 47 | 2 | 95.9 |

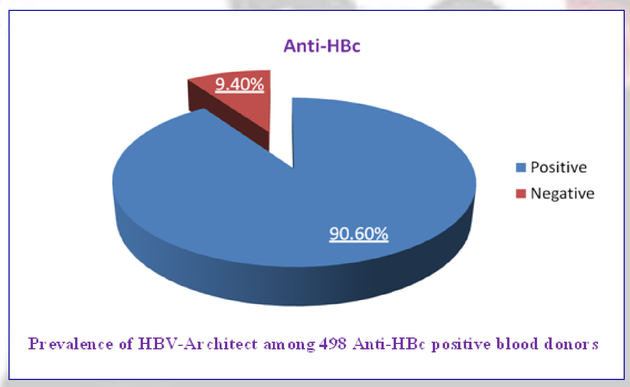
- 498 sample were available for Architect detection of total anticore
- Total Anticore ELISA sensitivity is 99.5% & specificity is 99.9%
- Total Anticore Architect sensitivity is 98.6% & specificity is 99.4%.



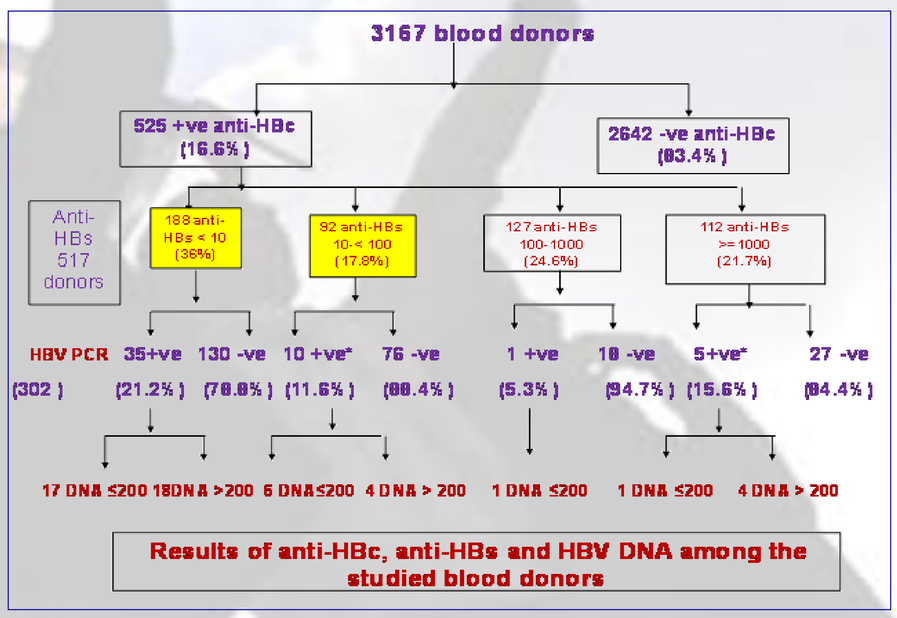
Prevalence of anti-HBc among HBsAg negative blood donors in different age groups



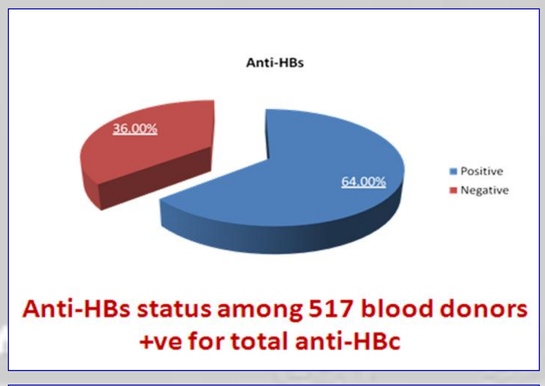
Prevalence of anti-HBc among the studied blood donors (525/3167)



Prevalence of HBV-Architect among 498 Anti-HBc positive blood donors



Results of anti-HBc, anti-HBs and HBV DNA among the studied blood donors



Anti-HBs status among 517 blood donors +ve for total anti-HBc

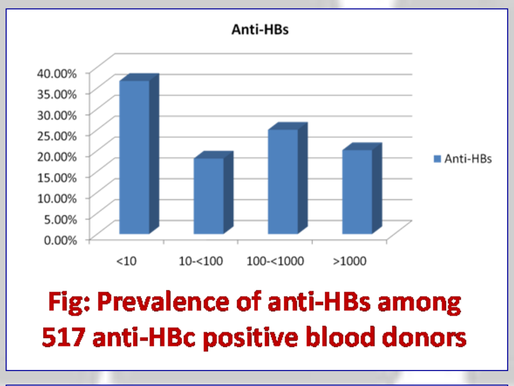
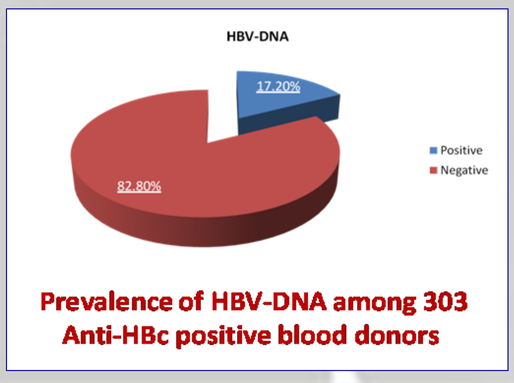
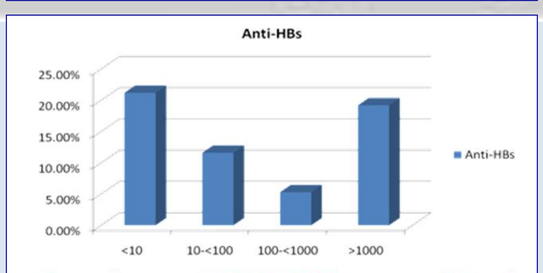


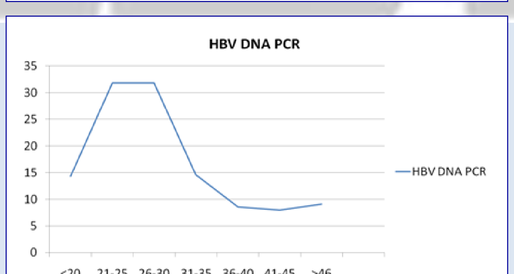
Fig: Prevalence of anti-HBs among 517 anti-HBc positive blood donors



Prevalence of HBV-DNA among 303 Anti-HBc positive blood donors



Prevalence of HBV-DNA among blood donors with different anti-HBs levels (P>0.05)



Prevalence of HBV DNA among anti-HBc positive/HBsAg negative blood donors in different age groups

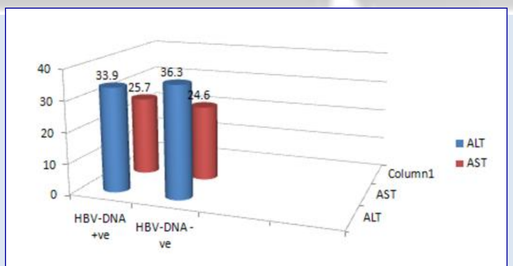


Fig: Mean ALT & AST according to HBV-DNA status among blood donors (P>0.05)

### HBV Profile in Followed Up Recipients:

- Among 33 followed up recipients, all at base line were –ve for HBsAg, total anti-HBc by ELISA & Architect, antiHBs and HBV-DNA.
- Among the 11 +ve anti-HBc blood donors who donate blood to recipients, all were Architect +ve , 9 were HBV-DNA–ve (81.8%), and two were HBV-DNA +ve (18.2%); 1 was 8 IU/ml & the other was 3.3 x $10^4$ IU/ml.
- Follow up of the 11 +ve anti-HBc blood donors' recipients after 3-6 months revealed that:
  - ✓ All of them were –ve for HBVsAg
  - ✓ All of them were –ve for anti-HBc
  - ✓ One developed anti-HBs 10 - <100
  - ✓ No one was HBV-DNA positive

### Conclusions:

- ❑ Occult HBV infection is not uncommon among Egyptian Blood Donors.
- ❑ The potential infectivity of OBI in blood transfusion cannot be excluded.
- ❑ Most OBI is asymptomatic and would only be detected by systematic screening of large population.
- ❑ All cases of OBI have normal ALT level.

### Recommendations:

- ➢ Anticore screening would possibly eliminate the risk of unsafely blood donation.
- ➢ Nucleic acid amplification should be considered as the primary screening method for high risk recipients as:
  - Those who are immunocompromised.
  - Specific management strategy for OBI should be implemented.

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