Screening for HBsAg among Vaccinated School Children in Upper Egypt

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Abstract: Background: HBV infection is preventable with safe and effective vaccines that have been available since 1982. In 1992, Egypt started a program of universal immunization in infancy. The vaccine is effective in preventing chronic infections from developing in 95%, and is the first vaccine that can prevent a major human cancer. Hepatitis B surface antigen (HBsAg) is the serologic hallmark of HBV infection. The prevalence of HBsAg in Egypt is intermediate (2%-7%). Research question: does breakthrough infection occur with passage of years after infancy HBV vaccination. **Aim:** To screen for HBsAg in vaccinated school children in Upper Egypt. **Methods:** This study included one hundred school children of both sex, from a primary school in a small village in Assiut. They included 50 boys and 50 girls. Their ages ranged between 8 to 12 years. All included children had been given three doses of a recombinant HB vaccine (0.5 mL = 10 lU intramuscularly) at 2, 4 and 6 months of their age. All children in this study were subjected to full history taking; clinical examination and serologic test. The serum samples were used to determine the presence of HBsAg by AxSYM HBsAg (V2). **Conclusion:** The prevalence of HBsAg among vaccinated school children was 0% despite some of them had risk factors for infection. No break through infection could be detected among vaccinated school children 8- 12 years after vaccination.

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Key words: HBsAg; HBV Vaccine; Children.

1. Introduction

Worldwide, an estimated two billion people have been infected with hepatitis B virus and more than 240 million have chronic (long-term) liver infections. About 600 000 people die every year due to the acute or chronic consequences of hepatitis B [(1)].

HBV infection is preventable with safe and effective vaccines that have been available since 1982. The vaccine is effective in preventing chronic infections from developing in 95%, and is the first vaccine that can prevent a major human cancer. More than 160 countries added this vaccine to their routine immunization programmes [(2)].

The carriage of hepatitis B virus (HBV) is the major risk factor for liver cirrhosis and hepatocellular carcinoma. Vaccination for infant against HBV has become effective in preventing horizontal transmission during early childhood. Early HBV vaccination provides long-lasting protection against carriage [(3)].

The Hepatitis B virus (HBV) is endemic in many developing countries, including Egypt [(4-6)]. Hepatitis B surface antigen (HBsAg) is the serologic hallmark of HBV infection. The prevalence of HBsAg in Egypt is intermediate (2%-7%) [(7-9)].

In 1992, Egypt started a program of universal immunization in infancy. The schedule adopted by Egyptian Ministry of Health was three doses of yeast-recombinant hepatitis B vaccine administered to all infants at 2, 4, 6 to coincide with other compulsory vaccines (Diphtheria, Tetanus, Pertussis and oral polio (DPT- OPV) [(10)].

The implementation of vaccination strategies in most developed countries was responsible for decreasing in the incidence of new infections [(11)].

Aim of the work

To screen for HbsAg in vaccinated school children in Upper Egypt.

2. Patients and Methods

Study population

This study included one hundred school children of both sex, from a primary school in a small village in Assiut. Those children included 50 boys and 50 girls. Their ages ranged between 8 to 12 years. The research has got the approval of the ministry of education and the ministry of health. The parents of those children accepted the study. A written consent was taken from the students parents before enrollment in the study.

All included children had been given three doses of a recombinant HB vaccine (0.5 mL = 10 lU intramuscularly in the anterolateral region of the middle third of the right thigh) at 2, 4 and 6 months of their age. The date and dose intervals of HB vaccine were confirmed by checking the vaccination record written on their birth certificates.

Methodology

All children in this study were subjected to: 1- **Full history taking**: with special stress on present history of hepatitis (fever, jaundice, fatigue, change in the colour of urine); past history of hepatitis; blood transfusion; history of operation; dental manipulation and family history of hepatitis. 2- **Clinical examination:** With special stress on presence of fever, jaundice, organomegally. 3- **Serologic test:** Four cc of blood were collected (under complete aseptic condition), centrifuged after clotting and the serum samples were stored at -80^{0}c until serologic assays. The serum samples were used to determine the presence of HBsAg. All collected samples screened by AxSYM HBsAg (V2). AxSYM HBsAg (V2) is an enzyme immunoassay which uses microparticles coated with monoclonal anti-HBs for the detection of HBsAg.

Statistical analysis:

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS, version 17). All data were expressed as mean ± SD or frequencies.

3. Results

Characteristics of the study group

Among 100 Egyptian vaccinated school children enrolled in this study, 50% (n=50) were males and 50 % (n=50) were females. The mean age was 10.2 ±1.14 years (Range 8:12). Twenty seven of them were less than 10 years of age and seventy three of them were equal to or more than 10 years of age. All of them were recruited from the same rural area (Table 1).

Risk factors for hepatitis among study group

One case had past history of blood transfusion 3 years ago and 11 out of 100 vaccinated school children (11%) had past history of operation (major or minor) as shown in (Table 2).

Prevalence of HBsAg seropositivity

The prevalence of positive HBsAg among the study group was 0%. None of the studied children had any detectable level of HBsAg (Table 3).

4. Discussion

Our study included 100 healthy vaccinated school children, aged between 8:12 years and showed that none of the studied children had positive HBsAg.

The vaccine was well tolerated and producing high protection against HBV infection among the studied children. This observation was similar to other studies results in different parts of the world.

The current results are comparable to the results of El- Sawy and Mohamed (1999) who not find HBsAg positive sera among 180 children with a one month to 5 year time lapse since their last dose of vaccination [12], while in Shatat *et al.* (2000) study in Alexandria, Egypt, only one child out of 184 vaccinated 5 year old children was HBsAg positive [13].

Table 1: The demographic data and history of the vaccinated school children.

Variable	Number (percentage) *
Gender	
Male	50 (50%)
Female	50 (50%)
Age (Total)	10.2±1.14 (Range 8:12)
< 10 years	27(27%)
≥ 10 year	73(73%)
Residence	
Urban	0 (0%)
Rural	100 (100%)
Present history	
Jaundice	0(0%)
Fatigue	0(0%)
Dark urine	0(0%)
Hemorrhage	0(0%)
Past history	
Jaundice	0(0%)
Hepatitis	0(0%)
Contact with patient of hepatitis	0(0%)
Family history	
HBV infection in parents	0(0%)
Family History of liver diseases	0(0%)

* Values are number and percentages except Age presented as mean ± SD
Total number of vaccinated school children = 100

Table 2: Risk factors for hepatitis among vaccinated school children.

Variable	Number (percentage) *
Blood transfusion	1(1%)
Duration since blood transfusion	3 years
Operation	11(11%)
Duration since last operation in years	2.91±1.14
Visit to dentist or tooth extraction	0(0%)

*Values are number and percentages except duration since blood transfusion; duration since last operation in years presented as mean ± SD; Total number of vaccinated school children = 100

Table 3: Prevalence of positive HBsAg among the study group

In the total cases	
Positive HBsAg	0/100 (0 %)

Values are number and percentages; total number =100

Reda *et al.*(2003) reported that the percentage of HBsAg carriers is significantly lower among the vaccinated (0.8%), compared to the unvaccinated (2.2%) in 6 year old children and they attributed this to the preventive effect of the vaccine [14].

In many countries, where 8–15% of children used to become chronically infected with the hepatitis B virus, vaccination has reduced the rate of chronic infection to less than 1% among immunized children [15].

El-Raziky *et al.* (2012) reported decrease in the annul incidence of HBV infection from 2.8 cases per year before vaccine implementation to 1.7 cases per year after vaccine implementation [16].

Conclusion

All blood samples collected from vaccinated school children were negative for HBsAg which implicates that, the vaccine is safe and effective. No

break through infection could be detected among vaccinated school children 8- 12 years after vaccination.

Limitations of the study:

1- The sample size of the study was small as it was a pilot study and so it is not a representative sample of children in Egypt.
2-All the included children were from small village in Upper Egypt and not from different locations.
3-We did not measure HBsAb which is essential for better evaluation of the impact of mass vaccination against the hepatitis B virus (HBV).

Recommendation

- ✓ To do further studies with larger sample size.
- ✓ To measure HBsAb titre and hepatitis B core antibody (anti-HBc) for better evaluation of the impact of mass vaccination against the hepatitis B virus (HBV).
- ✓ To do further comparative study of vaccinated and unvaccinated persons in order to compare prevalence and assess effectiveness of immunization programs.

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