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PREVALENCE OF HEPATITIS C VIRUS AMONG PREGNANT WOMEN OF UPPER EGYPT

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ABSTRACT

Background: Egypt is a hepatitis C anomaly. Roughly 1: 50 persons are infected with hepatitis C virus (HCV), nearly one person in ten carries viral RNA and is therefore chronically infected (1). **Objective:** to find out the prevalence of HCV infection among pregnant women and the possibility of vertical transmission to newborns. **Patients & Methds:** A total of 1036 full term pregnant women were randomly selected from those attendants of delivery ward of obstetrics department in hospitals of three governorates of Upper Egypt (Assiut, South Vally and Luxor) from September 2014 to December 2015. 3-4 ml of venous blood were obtained from all participants and 5ml of Cord blood immediately after birth in delivery ward or operative room from all babies whom their mother had positive HCV-RNA test. HCV detected by Acon cards (HCV antibody using a third-generation ELISA kit), Positive samples were submitted to a confirmatory test using RNA polymerase chain reaction (bioelisa HCV 4.0). **Results:** Out of 1036 pregnant women, HCV antibodies test was positive in only 55 cases (5.31%) and was negative in 981 cases (94.69%). According to PCR assay, patients were classified into two groups (Group I with PCR positive in 36 cases (3.4%) and Group II with negative PCR in 1000 cases (96.6%)). As regard to vertical transmission, 19 infants (52.8%) had HCV antibodies positive test but 4 infants only (11.1%) had HCV-PCR positive. Risk factors for HCV infection were advanced maternal age, history of blood transfusion, history of previous surgery, positive husband HCV infection, working at health services (p value <0.001) and residence in rural areas (p value <0.01). **Conclusions:** The prevalence of HCV in pregnant women in Upper Egypt is lower than in Delta Egypt and had same incidence in other countries. Risk factors for transmission are age, parity, past history of previous surgery, blood transfusion, husbands with HCV infection, working at health services and in rural areas.

KEYWORD: HCV- Pregnant women - Upper Egypt.

INTRODUCTION

Egypt is a hepatitis C anomaly. Globally, roughly 1 person in 50 is infected with hepatitis C virus (HCV). In Egypt, a recent study found that about one person in seven of Egypt's 83 million populations tested positive for antibodies against HCV, indicating that these individuals have been infected with the virus at some point. However, nearly one person in ten carries its viral RNA and is therefore chronically infected.[1] Hepatitis C virus (HCV) is one of the major etiological agents for parenteral acquired hepatitis. It is asymptomatic in large proportion of cases (65-75%) and revealed accidentally by abnormal liver function tests or anti-HCV positivity. The long term morbidity and mortality is due to chronic hepatitis, cirrhosis, hepatocellular carcinoma and liver failure and perinatal transmission of HCV from mother to offspring is relatively low but possible (less than 10%).[2] The epidemiology of HCV is varies among countries and the reported prevalence of HCV in pregnant women has not been extensively studied, due to the lack of preventative screening of infection and the lack of preventative measures of mother-to-child transmission. The pathogenesis of HCV infection during pregnancy remains poorly understood. During pregnancy, the maternal immune system must at the same time develop tolerance to paternal alloantigen to prevent maternal immune aggression against the fetus and maintain active immunity against HCV to protect both mother and fetus from infection.[3]

The risks of HCV infection are associated with active Schistosomiases, blood transfusion, dental treatment and hospital invasive procedures.[4] HCV is a spherical, enveloped, single-stranded RNA virus belonging to the Flaviviridae family and Flavivirus genus.[5]

HCV prevalence has increased considerably over the past decade, yet few surveys have been conducted on national level.[6]

The prevalence of HCV in general population ranges from 4 – 25.7%,[7] with highest number of infection reported in Egypt.[8] The predominant HCV genotype in Egypt is genotype 4a which shows limited response to treatment.[9] HCV is transmitted mainly through contact with blood and blood products with blood transfusions and sharing of non-sterilized needles and syringes being the main causes of its spread and intravenous drug use is the most common risk factor. However, many other patients acquire HCV without any known exposure to blood or intravenous drug use.[10] Hepatitis C mainly transmits by three different routes, namely, percutaneous, non-percutaneous and sporadic. The non-percutaneous transmission may represent occult percutaneous exposure.[11] HCV infection is infrequently diagnosed during the acute phase of infection and clinical manifestations occur usually within 7 to 8 weeks after exposure to HCV, but the majorities of persons have either no symptoms or only mild symptoms.[12] Symptoms of acute hepatitis have been documented and consisted of jaundice, malaise, and nausea but the infection becomes chronic in most cases, and chronic infection is typically characterized by a prolonged period in which there are no symptoms.[13] Viral hepatitis during pregnancy is associated with high risk of maternal complications. HCV-positive pregnant women appear to be at risk for adverse neonatal and maternal outcomes.[14] Pregnancy does not affect the clinical course of acute or chronic hepatitis C, although several studies have shown improvement in biochemical markers of liver damage in HCV-positive women during pregnancy.[15] Vertical transmission of the hepatitis C virus from mother to neonate occurs in 3-10% of pregnancies complicated by maternal HCV infection and is the leading cause of pediatric chronic HCV infection.[16] The risk of vertical transmission of HCV appears to be related to the level of viremia in the pregnant mother and not to the route of infection.[17]

Aim of the Study: This study aimed to find out the prevalence of HCV infection among pregnant women and the possibility of vertical transmission to newborns.

PATIENTS AND METHODS

A total of 1036 full term pregnant women were randomly selected from those attendants of delivery ward of obstetrics department in three hospitals of some governorates of Upper Egypt (Assiut, South Vally and Luxor). presented by symptoms and signs of labor from September 2014 to December 2015. A written consent was obtained from each participant in the study.

Inclusion criteria

- Full term viable pregnancy (determined by calculation method and documented by ultrasound fetal biometry).
- In labor (having true labor pains and cervical dilatation)
- No history of current hepatic diseases.

Exclusion criteria

- Patients with History of hepatitis, jaundice, or fever hospital admission.
- IUFD.

Methods: patients included in this study were subjected to.

- Careful history taking to select women meeting inclusion Criteria and detecting the presence of any exclusion Criteria
- General examination for: Body weight and height, Blood pressure, signs of anemia or jaundice, lower limbs examination
- Abdominal examination for estimation of fundal level and auscultation of fetal heart sound.
- Local examination to confirm diagnosis of labor and cervical assessment, adequacy of the pelvis and for detection of any indication of cesarean section.

- **Routine investigations**
  - Complete blood picture
  - Renal function tests including: urine analysis, serum uric acid, blood urea and serum creatinine.
  - Random blood sugar.
  - Liver function tests: including liver enzymes, total proteins, total bilirubin, prothrombin time and concentration.

- **Specific investigations to detect maternal and neonatal HCV infection**

3-4 ml venous blood samples were obtained from all patients and 5ml of Cord blood samples were obtained immediately after birth in delivery ward or operative room for all babies for detection of maternal and newborn HCV infection. For detection of maternal HCV infection 3-4 ml of venous blood were obtained from all participants and 5ml of Cord blood were obtained immediately after birth in delivery ward or operative room from all babies whom their mother had positive HCV-RNA test. The collected venous and cord blood samples were centrifuged; the resultant serum were stored at -20°C until assayed collectively.

Laboratory analysis

The stored serum was analyzed for hepatitis-C antibody by Acon card which is a rapid method for qualitative detection of HCV antibodies. Then positive samples were submitted to more confirmatory test (bioelisa HCV 4.0). The results were expressed as positive or negative.

Statistical work

***Sample size justification*:** The appropriate sample size was determined based on the given data: Study population i.e. the number of deliveries in the chosen hospitals, an average of 10 deliveries per day. The known incidence of hepatitis –C infection among Egyptians (according to the Egyptian demographics) is almost 8.7% in women.

Statistical analysis: Data were analyzed using Statistical Package for Social Science (SPSS) version 20.0.Categorical variables were described using number and percentages using *Students T test:* To test the significant difference between two sample means. The P value was**:** Insignificant if P > 0.05. – Mildly significant if P ≤ 0.05 – Moderately significant if p <0.01and highly significant if P ≤ 0.001.

RESULTS

HCV antibodies test was positive in 55 cases (5.31%) and was negative in 981 cases (94.69%). According to PCR assay, patients were classified into two groups (Group I with positive PCR in 36 cases (3.4%) and Group II with negative PCR in 1000 cases (96.6%). As regard to vertical transmission, 19 out of 36 infants delivered to PCR +ve mothers (52.8%) had HCV antibodies positive tests of them only 4 infants (11.1%) had HCV-PCR positive.

Table (1): HCV Antibodies and HCV-PCR.

Mothers	No.	%
HCV antibodies positive	55	5.31
HCV PCR positive	36	3.47
HCV PCR/ HCV Abs	36/55	65.45

Table (2): Demographic criteria of Group I and Group II.

	Group I (N=36) NO (%)	Group II (N=1000) NO (%)	P value
Maternal Age in Years			
<20	3(8.3)	695(69.5)	**<0.001**
20-36	6(16.7)	185(18.5)	**>0.05**
>36	27(75.0)	120(12.0)	**<0.001**
BMI in kg/m2			
<25	3(8.3)	493(49.3)	**>0.05**
25-29	14(38.9)	310(31.0)	**>0.05**
>29	19(52.8)	197(19.7)	**>0.05**
Parity			
0	3(8.3)	450(45.0)	**<0.001**
1-3	10(27.8)	331(33.1)	**>0.05**
>3	23(63.9)	219(21.9)	**<0.001**
Residence			
Urban	14(38.9)	623(62.3)	**<0.01**
Rural	22(61.1)	377(37.7)	

Table (3): Risk factors in Group I and Group II.

Risk factor	Group I (N=36) NO (%)	Group II (N=1000) NO (%)	P Value
Previous surgery or dental extraction	25(69.4)	402(40.2)	**<0.001**
Place of previous surgery or dental extraction			
At private clinic or hospital	14(56.0)	183(45.5)	**>0.05**
At governmental hospital	11(44.0)	219(54.5)	
Working in health services	14(38.9)	48(4.8)	**<0.001**
History of blood transfusion	4(11.1)	9(0.9)	**<0.001**
Husband with positive history of HCV	9(25.0)	35(3.5)	**<0.001**
Female circumcision	10(27.8)	120(12.0)	**<0.001**

Table (4): Incidence of vertical transmission at birth.

HCV infants	No.	%
HCV Antibodies positive	19/36	52.8
HCV PCR positive	4/36	11.2

DISCUSSION

In this study HCV antibodies test was positive in only 55 cases (5.3%) and HCV-PCR was positive in 36 cases (3.4%) this is lower than what was reported (4.2%) in 2014[18] and in 2010 in Benha university (6.8%)[19] and much lower than what was reported in Alexandria, Egypt (14%) in 2000[20] and (13.8%) in 2002.[21] in this study the prevalence of HCV infection in upper Egypt (5.31% HCV antibodies positive and 3.4% HCV-PCR positive) was very low in comparison to Delta Egypt (10.4% HCV antibodies positive and 8.2% HCV-PCR positive) in upper Egypt (Edessy et al., 2015) this may be explained as incidence of schistosoma infection in Delta Egypt is higher than in Upper Egypt which is constantly associated with HCV infection. In this study the prevalence of HCV infection was associated with

advanced maternal age, increased parity, working at health services, history of blood transfusion, history of surgery or dental extraction, positive HCV husband and inhabitant in rural areas all these considered risk factors of increase HCV infection but we found no statistically significant differences among infected group and health one as regard to body mass index, place of surgery and dental extraction in private clinics or governmental hospitals which reflects that private clinics or hospitals in Upper Egypt have no more contribute in increase the prevalence of HCV infection. The prevalence of HCV in Upper Egypt appears to have decreased; our prevalence of 3.4% slightly higher than in other countries such as the USA (3.2%), Taiwan (1.5%)[10], [19] and.[22] Risk factors for HCV infection Multivariate analysis in this study found many factors associated with HCV infection. Advanced maternal age was the first independent factor, which suggests the cumulative effect of exposure to HCV due to the long period of viral exposure over one's lifetime, as well as exposure to other potential HCV risk factors. Our results are in agreement with reported in 2010(17) and in 2009[23] that indicated that HCV is associated with older age, a previous community-based study in Egypt in 2002 has found that older age patients have a higher prevalence of HCV.[24] Parity >3 was a significant risk factor, which suggests the cumulative effect of exposure to HCV. This is against previous studies that showed that HCV is not associated with greater number of pregnancies.[23] In our study blood transfusion represented a risk factor for HCV infection went with that reported in 2010[15], 2009[24], 2000[25] and 2000[18] who stated that history of previous blood transfusion is a significant risk factor for HCV infection. Newer assays to detect HCV antibodies have reduced the risk of transfusion-associated HCV, yet up to 10% of donors may be seronegative carriers at the time of blood donation.[26] Current estimates place the risk of HCV transmission at 1 in 100,000 per unit transfused.[27] There is a high seroprevalence rate of anti-HCV antibodies among patients who underwent surgery before.[28]The past history of surgical operation was a significant risk for hepatitis C virus infection.[17] An infected surgeon can transmit hepatitis C virus infection to patients.[29] Before routine testing for hepatitis C virus infection, almost 4% of surgical patients who received blood transfusion became seropositive for hepatitis C virus.[30] Female circumcision practice at home with less or unsterilized instruments may be responsible for persistence and propagation of infection in Upper Egypt and this agreed with what reported by study Kamal et al.[31] As regard to vertical transmission in Upper Egypt (52.8% HCV antibodies positive and 11.2% HCV-PCR positive) was nearly the same as what was reported by Edessy et al[32] in Delta Egypt (69.1% HCV antibodies positive and 11.4% HCV-PCR positive). Another figure for vertical transmission of HCV (4.6%) was reported from Egypt at one year of age at 2009[33], In 1998 found that overall vertical transmission rate of 6%9[34] and in 2003 reported an overall vertical transmission rate of HCV of 2.7%, and it was higher in HIV co-infected women (5.4%) than in HIVnegative women (2.0%).[16]

CONCLUSION

The prevalence of HCV in pregnant women in Upper Egypt is lower than in Delta Egypt and had same incidence in other countries. Risk factors for transmission suggest that there is a correlation between the age and parity of the studied women and the incidence of hepatitis C infection. Hepatitis C virus infection was found more among those women with past history of previous surgery, blood transfusion, husbands with HCV infection, working at health services and in rural areas. Incidence of vertical transmission of HCV in Egypt equals to world incidence.

RECOMMENDATIONS

- Antenatal care program should include routine screening for HCV antibodies for all pregnant women and PCR test should be only confirmatory for HCV antibodies positive test
- Neonates of PCR positive pregnant women should be investigated for HCV antibodies by ELISA and HCV- RNA by PCR immediately after birth for early management by neonatologists.
- Pregnant women with HCV-PCR positive should be referred to hepatologist for early interference, follow-up together with obstetrician during pregnancy and after delivery.
- Health service personnel should take care at dealing with infected mothers to prevent risk of getting infection with HCV and to limit mother-to child transmission.
- Prevalence of HCV infection during pregnancy in Upper Egypt was much lower than in Delta Egypt which reflects presence of variable risk factors as presence of endemic schistosoma infection in Delta Egypt.
- All risk factors that increase prevalence of HCV infection should be eliminated as good hygiene and standard sterilization sets should be used, blood transfusion must be used in badly needed cases and infected husband should be treated and health education programs should be offered to wires of infected husbands.

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