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Pathology

PREVALENCE OF HEP B, HEP C, HIV AND VDRL AND INCIDENCE OF BLOOD GROUP PATTERN, GESTATIONAL DIABETES AND ANAEMIA IN ANTENATAL PATIENTS OF GREATER GWALIOR REGION – A PROSPECTIVE STUDY.

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ABSTRACT

INTRODUCTION: - Mother and child group is at risk of various infections and conditions either acquired perinatally or during antenatal period such as hepatitis B & C, syphilis, HIV/AIDS, anaemia, gestational diabetes mellitus (GDM) and blood group disturbances. Most of the diseases and deaths are preventable among them.

AIMS AND OBJECTIVES: - The purpose of this study was to find out Prevalence of Hep B, Hep C, HIV and VDRL and Incidence of Blood group Pattern, Gestational diabetes and anaemia in antenatal patients of Greater Gwalior Region

MATERIAL & METHODS: - This is a prospective study on 300 antenatal cases, aged < 20->35 years arrived at JA hospital of GR Medical College Gwalior.

CONCLUSION:- Out of 300 cases studied 4% were found to be of gestational diabetes, 1% HIV positive,1.33% as HBV positive, none of the case was seropositive for hepatitis C & VDRL (0%).51% cases were having anemia and most common blood group was O positive.

KEYWORDS :

INTRODUCTION

Mother and child (MCH) is considered as one unit. Together, the mothers and children constitute a major group of the population (Mothers=20% and children below 15 years=40%, together 60%. (Suryakant Textbook of Community Medicine, 2009). They also constitute a vulnerable special risk group. The MCH group is at risk of various infections and conditions either acquired perinatally or during antenatal period such as hepatitis B & C, syphilis, HIV/AIDS, anaemia, gestational diabetes mellitus (GDM) and blood group disturbances. Most of the diseases and deaths are preventable among them.

Hepatitis B virus (HBV), a serious global public health problem, is the 10th leading cause of death worldwide. Approximately 2 million people worldwide are infected with the virus and about 350 million live with chronic infection. An estimated 600000 people die each year due to acute or chronic consequences of Hepatitis B. (Lavanchy D, 2004). The likelihood that infection with the hepatitis B virus becomes chronic depends upon the age at which a person becomes infected.India has over 40 million HBV carriers and account for 10-15% of the entire pool of HBV carriers of the world. Of the 25 million infants born every year in India, it is estimated that over 1 million run the lifetime risk of developing chronic HBV infection.

Spread of HBV infection in many South Asian countries is attributed to unsafe blood supply, reuse of contaminated syringes, lack of maternal screening to prevent perinatal transmission and delay in the introduction of Hepatitis B vaccine (Zaidi et al, 2004). The predominant mode of transmission is horizontal rather than vertical in India (Gupta et al, 2008). Women should be offered a screening test for HBV early in pregnancy. The optimal time for screening appears to be at the first antenatal visit. There is no evidence to support repeat screening in the 3rd trimester or that a repeat test for HBV in late pregnancy will result in increased detection of HBV. Screening for active HBV infection with HBSAg is recommended at the 1st prenatal visit so that postnatal intervention can be offered to decrease mother to child transmission. Women at increased risk of acquiring HBV can be vaccinated safely during pregnancy and should be screened again for surface antigen before they give birth.

Hepatitis C virus (HCV) is one of the major aetiological agents of parenterally acquired hepatitis. HCV infection is asymptomatic in a large proportion of cases (65-75%) and revealed only accidentally by abnormal liver function tests and / or anti- HCV positivity. The long term morbidity and mortality is far greater than its counterpart hepatitis B in terms of chronic active hepatitis (70%), cirrhosis (20-30%), hepatocellular carcinoma and liver failure. (Ericksen NL, 1999)

The prevalence of HCV in population can be predicted by the risk factors associated with transmission of infection. These risk factors includes blood products transmission, occupational injury, surgery, injection and vertical transmission (Yen T et al, 2003). Viral hepatitis during pregnancy is associated with high risk of maternal complications. It has a high risk of vertical transmission, and it has been reported as the leading cause of maternal death. (Elinav E et al, 2006; Tseky et al, 2005). Perinatal transmission from mother to offsprings is relatively low but possible (<10 %) (Zhou DX et al, 2006).

The diagnosis of HCV infection can be made by detecting either anti-HCV by enzyme immunoassay (EIA) or HCV RNA using the reverse transcriptase polymerase chain reaction (RT-PCR). If the HCV RNA result is negative supplemental testing should be performed. Hepatitis C is a preventable disease with serious implications, so proper sterilization of instruments, health education and awareness of general population should be improved and screening for HCV should be encouraged.

Globally, about 50% of all adults living with Human Immunodeficiency Virus (HIV) are women and the prevalence of HIV positive children is 2.5 million. In 2001, the United Nations General Assembly Special Session on HIV/AIDS committed countries to reduce the proportion of infants infected with HIV by 20% by 2005 and by 50% by 2010. Regarding Indian scenario, twenty seven million new pregnancies occur per year in India of which 97000 pregnancies occur in HIV positive mothers (prevalence- 0.36%). There are 30000 HIV infected babies (25-30% transmission rate) born every year. Still, significant number of pregnant women needs to be covered under the umbrella of HIV testing and preventive medicine.

HIV infection from an HIV- positive mother to her child can occur during pregnancy, labour, delivery or breastfeeding. Without treatment, around 15-30% of babies born to HIV positive women become infected with HIV during pregnancy and delivery. A further 5-20% become infected through breastfeeding. In 2008, an estimated 430000 children became newly infected with the majority of them through mother to child transmission (MTCT). The risks associated with perinatal transmission of HIV-I are multifactorial. Known risk factors include high maternal plasma viraemia, advanced clinical HIV-I disease, reduced maternal immunocompetence, vaginal delivery and a lengthy interval between rupture of the amniotic membrane and delivery. In addition, direct exposure to maternal blood, presence of ulcerative genital infection in the maternal vaginal tract at the time of delivery, illicit drug use during pregnancy, prematurity and low birth weight

have all been associated with increased mother to child transmission. (Chan F et al, 2000).

HIV transmission to the foetus can occur as early as the 15th week of pregnancy. Prenatal infection may cause a HIV- specific embryopathy in the majority of infected children. It is characterised by a small forehead, short flat nose, pronounced philtrum, microcephaly, thick lips and hypertelorism. There is evidence suggesting that pregnancy also favours the progression of the HIV disease in the mother. The most important determinant is the virus load in the mother.

Syphilis is an important preventable cause of pregnancy wastage. Syphilis is a sexually transmitted disease caused by the Treponema pallidum, a spirochete and constitutes a major public health problem in many parts of the world, including developed countries (Peterman TA et al, 2005). Globally, around 340 million cases of curable new STI (Sexually Transmitted Infection) occur every year. Of these, syphilis accounts for an estimated 12 million cases, 2 million of them among pregnant women. (CDC, 2002).

Syphilis remains a major cause of reproductive morbidity and poor pregnancy outcomes in developing countries. Syphilis in pregnant women can result in adverse outcomes of pregnancy in upto 80% of cases, such as stillbirth and spontaneous abortion (40%), perinatal death (20%) and serious neonatal infections and low-birth weight babies (20%) (CDC, 2011). Syphilis has also acquired a new potential for morbidity and mortality through association with increased risk for HIV infection. Transmission occurs more commonly in the last two trimesters, but the spirochete can cross the placenta at any time during pregnancy (Chahine et al, 2011). Fetal death and morbidity due to congenital syphilis are preventable if the infected mother is identified and treated appropriately by the middle of the second trimester. Because of the serious complications of syphilis in pregnancy, WHO (World Health Organization) has recommended universal antenatal screening. WHO further recommended screening for syphilis at the first antenatl visit, as early as possible in pregnancy, repeating in the third trimester if resources permit, to detect infection acquired during pregnancy (Workowski et al, 2011). Venereal disease research laboratory test (VDRL) and Rapid Plasma regain (RPR) which are the non-treponemal tests are helpful indicators of infection, are cheaper, and are simpler to perform than treponemal tests. The sensitivity of these tests increases from primary to secondary syphilis, while their specificity is generally high in the absence of an underlying chronic disease. Positive non-treponemal tests should be confirmed by a treponemal test, such as the Treponema Antibody Absorption (FTA-ABS) Test. Treponemal tests have higher sensitivity and specificity, but do not correlate with disease activity; are difficult and costly to conduct, plus they are not recommended for primary health care facilities (MMWR, 1998).

Testing for syphilis in pregnancy and labour is medically indicated because of the potential risk for congenital infection and foetal loss (MMWR, 2005). Depending on how long a pregnant woman has been infected, she may have a high risk of having a stillbirth (a baby born dead) or of giving birth to a baby who dies shortly after birth; untreated syphilis in pregnant women results in infant death in upto 40% of cases. Any woman who delivers a stillborn infant after 20 weeks gestation should also be tested for syphilis.

Investigation of blood for Rh and ABO grouping becomes almost a routine during the first antenatal visit in first trimester. If the women is found Rh negative, Rh grouping of the husband is to be done to find out compatible making. If the husband is also Rh negative i.e compatible making, there is no problem so far as Rh factor is concerned. But if the husband is found to be Rh positive further investigations are to be carried out which aim at :- a) To detect whether the woman has already immunized to Rh Ag. b) To forecast the likely affection of the baby. c) To anticipate and formulate the line of management of a likely affected baby.

Pregnancy confers a state of insulin resistance and hyperinsulinaemia that may predispose some women to develop diabetes. Gestational diabetes mellitus (GDM) occurs when a woman's pancreatic function is not sufficient to overcome the diabetogenic environment of pregnancy. GDM is defined as glucose intolerance that was not present or recognised prior to pregnancy (Beckmann CRB et al, 2005).

GDM is defined as carbohydrate intolerance of variable severity with onset or first recognition in pregnancy. The incidence varies from 3% to above 8%. (Tan YY et al, 1996; Hoffman et al, 1998). GDM is associated with increased perinatal morbidities and mortality. Long term effects of GDM of affected pregnancies are still uncertain, (Rumbold AR et al, 2001), although Pettitt and colleagues suggested in their early studies that maternal diabetes may increase the risk of type 2 diabetes and obesity of their offsprings (Pettit DJ et al, 1983). Also, women with GDM have a 40-60% increased risk of developing type 2 diabetes mellitus within 10-15 years (Wein P et al, 1997). Thus, early detection of the modifiable risk characteristics in GDM women may prevent or delay the disease process, thereby improving their quality of life.

The prevalence of GDM in India varied from 3.8 to 21% in different parts of the country. GDM has been found to be more prevalent in urban areas than in rural areas (Sheshaih V et al, 2009).

Women diagnosed to have GDM are at increased risk of future diabetes predominantly type 2 diabetes mellitus as are their children. Thus, GDM offers an important opportunity for the development, testing and implementation of clinical strategies for diabetes prevention. Timely action taken now in screening all pregnant women for glucose intolerance, achieving euglycaemia in them and ensuring adequate nutrition may prevent in all probability, the vicious cycle of transmitting glucose intolerance from one generation to another. Compared to selective screening, universal screening for GDM detects more cases and improves maternal and neonatal prognosis. Hence, universal screening for GDM is essential, as it is generally accepted that women of Asian origin and especially ethnic Indians are at a higher risk of developing GDM and subsequent type 2 diabetes.

Anaemia is the most common nutritional deficiency disorder in the World. WHO has estimated that prevalence of anaemia in developed and developing countries in pregnant women is 14% in developed and 51% in developing countries and 65-75% in India (Demayer et al, 1998). About one-third of the global population (over 2 billion) are anaemic (WHO, 2004).

Prevalence of anaemia in all the groups is higher in India as compared to other developing countries. Prevalence of anaemia in South Asian countries is among the highest in the world. WHO estimates that even among the South Asian Countries, India has the highest prevalence of anaemia. India contributes to about 80% of the maternal deaths due to anaemia in South Asia. It is obvious that India's contribution both to the prevalence of anaemia in pregnancy and maternal deaths due to anaemia is higher than warranted by the size of its population (Ezzati M et al, 2002).

As MCH services are patchy. That means the services are different for mothers and children at different places and at different timings resulting in lot of inconveniences, drop-outs and failure in these services. Thus, to reduce the drop-outs and to improve the quality of MCH services, an assessment regarding the magnitude of various infections and conditions occurring during antenatal period among the mothers attending antenatal clinic in the Gwalior region has to be made.

AIMS AND OBJECTIVES

1. To find out prevalence of Hepatitis B, Hepatitis C and HIV & VDRL in antenatal patients of greater Gwalior region coming to outdoor and indoor of J.A. Group of Hospitals.
2. To study the other routine pathological tests and find out pattern of ABO Rh blood groups incidence and gestational diabetic tendency and incidence of anemia and its type.

The following are the values which the American Diabetes Association considers to be abnormal during the 100 g of glucose

OGTT:
- Fasting blood glucose level ≥95 mg/dl (5.33 mmol/L)
- 1 hour blood glucose level ≥180 mg/dl (10 mmol/L)
- 2 hour blood glucose level ≥155 mg/dl (8.6 mmol/L)
- 3 hour blood glucose level ≥140 mg/dl (7.8 mmol/L)

An alternative test uses a 75 g glucose load and measures the blood glucose levels before and after 1 and 2 hours, using the same reference values. This test will identify fewer women who are at risk, and there is only a weak concordance (agreement rate) between this test and a 3 hour 100 g test (Mello G et al, 2006).

Diagnosis of anaemia

A WHO Expert Group proposed that "anaemia or deficiency should be considered to exit" when hemoglobin is below the following levels (Table).

TABLE: Cut off points for the diagnosis of anaemia

	g/dl (Venous blood)	MCHC (per cent)
Adult males	13	34
Adult females, non -pregnant	12	34
Adult females, pregnant	11	34
Children, 6 month to 6 year	11	34
Children, 6 to 14 year	12	34

At all ages the normal MCHC should be 34; values below that indicate that red cells are hypochromic, which occurs in iron deficiency anaemia. A haemoglobin level of 10 to 11 g/dl has been defined as early anaemia; a level below 10 g/dl as marked anaemia .

MATERIAL AND METHODS

Background Information- The present study (2013) was conducted among the Antenatal mothers who were attending OPD as well as IPD and then referred to Central pathology Lab and Blood Bank of J A Group of Hospitals of G. R. Medical College Gwalior. The laboratory investigation regarding status of Hep B, Hep C, Syphilis was done among Antenatal mothers along with this status of gestational diabetes, antenatal anemia and routine blood grouping pattern was also done. The over all aim of this study was to find out the prevalence of Hepatitis B, Hepatitis C and HIV & VDRL(SYPHLIS) in antenatal patients along with the routine blood grouping and aneamia typing among the Antenatal mothers of Greater Gwalior region coming to outdoor and indoor of J.A. Group of Hospitals Of G.R. Medical College Gwalior.

Study Design- The present study was a cross sectional (observational) study which was conducted in Central Pathology Laboratory & Blood Bank of G.R. Medical College Gwalior associated J.A. Group of Hospitals. The study was with both quantitative and qualitative sections.

Study Area- The study was conducted among the Antenatal women reported from the Greater Gwalior Region to OPD (Madhav Dispensary) and IPDs and then referred to Central pathology Lab and Blood Bank of J. A. Group of Hospitals of G. R. Medical College Gwalior.

Study Duration- September 2012 to October 2013.

Sampling Method: The overall method adopted was random sampling.

Sample: The study population was 300 Antenatal women

Sample size calculation- It was cumulated as 30 Antenatal mothers were enrolled per month up to 10 months

Study Tool: A predesigned & pretested questionnaire (Close ended and Open ended) based, semi structured proforma was used to collect the information

The following laboratory tests are being carried out during pregnancy/ANC visit.
- Complete Blood Picture
- Aneamia Typing with Hemoglobin.
- Blood Grouping and cross matching along with Rh status.
- Hepatitis B,C.investigation
- Syphlis-VDRL test.
- HIV-ELISA etc.

Laboratory testing methods applied during investigation of cases.-

ELISA kits for HBsAg, HIV & HCV was used to detect the incidence.

Screening for syphilis was done by Rapid Reagin kit (RPR VDRL).

All the reactive samples were selected to confirm before labelling them seropositive.

Blood grouping was done by conventional method.

Hb% was done by automatic hematology analyser ,blood sugar was done by automatic biochemistry analyser. Anemia typing was done by automatic hematology analyser and by and peripheral blood smear examination of slides stained by conventional Leishmann stain.

OBSERVATIONS

Present study (2013) was conducted in Department of Pathology, J.A. Group of Hospitals, Gwalior from Sept. 2012 to October 2013. In this study total 300 antenatal women were studied for prevalence of hepatitis B, hepatitis C, HIV and VDRL and for detection of blood group pattern, gestational diabetes mellitus (GDM) and anemia. The results of present study (2013) are described as follows:

Table 1 : Age-wise distribution of the antenatal women

Age-groups	Number	%
<20	43	14.33
20-25	123	41.00
26-30	98	32.67
31-35	35	11.67
>35	1	0.33
Total	**300**	**100.00**

Table 2 : Association of age and the gestational diabetes in the antenatal women

Age-groups	Gestational diabetes		Total
	Yes	No	
<20	0 (0%)	43 (14.9%)	43 (14.3%)
20-25	1 (8.3%)	122 (42.4%)	123 (41%)
26-30	8 (66.7%)	90 (31.3%)	98 (32.7%)
31-35	3 (25%)	32 (11.1%)	35 (11.7%)
>35	0 (0%)	1 (0.3%)	1 (0.3%)
Total	12 (4%)	288 (96%)	300 (100.0%)

Table 3: Association of age and the HIV & HBV positive status in the antenatal women

Age groups	HIV Positive		Total	HBV		Total
	Yes	No		Yes	No	
<20	0 (0%)	43 (14.5%)	43 (14.3%)	1 (25%)	42 (14.2%)	43 (14.3%)
20-25	2 (66.7%)	121 (40.7%)	123 (41%)	1 (25%)	122 (41.2%)	123 (41%)
26-30	0 (0%)	98 (33%)	98 (32.7%)	2 (50%)	96 (32.4%)	98 (32.7%)
31-35	1 (33.3%)	34 (11.4%)	35 (11.7%)	0 (0%)	35 (11.8%)	35 (11.7%)
>35	0 (0%)	1 (0.3%)	1 (0.3%)	0 (0%)	1 (0.3%)	1 (0.3%)
Total	3 (1.0%)	297 (99%)	300 (100.0%)	4 (1.33%)	296 (98.67%)	300 (100.0%)

Table 4: Results of HCV ELISA & VDRL test in antenatal women

Age-groups	Number of subjects	HCV & VDRL	Percentage
<20	43	0	0
20-25	123	0	0
26-30	98	0	0
31-35	35	0	0
>35	1	0	0
Total	300	0	0

Table 5 : Age wise distribution of various morphological types of anemia in antenatal women

Age-groups	Number of subjects	Dimorphic anaemia N (%)	Macrocytic anaemia N (%)	Microcytic Anaemia N (%)	Hemolytic anaemia N (%)
<20	43	8 (20%)	3 (20%)	13 (14.44%)	2 (25%)
20-25	123	12(30%)	6 (40%)	47 (52.22%)	2 (25%)
26-30	98	16 (40%)	5 (33.33%)	25 (27.78%)	4 (50%)
31-35	35	4 (10%)	1 (6.67%)	5 (5.56%)	0 (0%)
>35	1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total	300	40 (13.33%)	15 (5%)	90 (30%)	8 (2.67%)

Table 6 : Distribution of different types of blood groups in antenatal women

Type of Blood group	Number	Percentage
A	72	24.00
B	99	33.00
AB	21	7.00
O	108	36.00
Total	300	100.00

SUMMARY AND CONCLUSION

The present study (2013) was conducted in Department of Pathology, J.A. Group of Hospitals, and G.R. Medical College, from Sept. 2012 to Oct. 2013. In this study total 300 antenatal women were tested for prevalence of HBV, HCV, HIV and VDRL and for detection of blood groups pattern, gestational diabetes and anemia. The salient findings of present study (2013) are summarised as follows:

1. Out of total 300 cases, total 12 cases (4%) were found to be of gestational diabetes. Out of total 12 cases 8 cases (66.67%) were seen in 26-30 years age group followed by 3 cases (25%) in 31-35 years age group, while only 1 case (8.33%) was found in 20-25 years age group.
2. Out of total 300 antenatal women, total 3 cases (1%) of HIV sero positivity was seen, total 4 cases (1.33%) were recorded as HBV seropositive, none of the case was seropositive for hepatitis C & VDRL (0%).
3. Out of 300 antenatal women 153 cases 51% were having anemia. Most common morphological type of anemia was microcytic anemia found in 90 cases (58.82%) followed by dimophic anemia in 40 cases (9.81%) and least 8 cases (5.23%) were of heamolytic anemia.
4. Out of 300 antenatal women most common blood group found was O group in 108 cases (36%) followed by B group in 99 cases (33%) A group was seen in 72 cases (24%) and least common group was AB groups in 21 cases (7%) and total 6 cases (2%) were Rh negative.

Findings of present study (2013) had provided the important laboratory data regarding antenatal women of greater Gwalior region and data regarding HBV, VDRL, anemia and gestational diabetes, prevention and management of hepatitis B, syphilis, anemia and gestational diabetes present study (2013) had provided the base line data of year 2013 and these can be utilized to prevent Hep. B by vaccination, anemia and gestational diabetes can be corrected by dietary supplement and adjustments related complications to mother & child. Findings of blood group pattern will help hospital authorities and blood bank to be aware of blood demands of particular blood group.

In present study (2013) though seroreactivity of hepatitis C and VDRL were nil in all 300 antenatal women but due to small sample size it can only show trend of there two diseases in Greater Gwalior region which indicates the low incidence of syphilis and hepatitis C in this part of India.

Since the trends of disease are known to change with relation to time and places it is recommended to continue such studies in future in order to update the most recent data of possible antenatal diseases. Later on possible data of such studies will help health authorities for making effective strategies to prevent control, manage and treatment of various problems of pregnant women of greater Gwalior region.

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