

Evaluation of prothrombin time, international normalized ratio and platelet counts among women presenting with vaginal bleeding in first trimester of pregnancy

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Abstract

Introduction: Pregnancy is associated with substantial changes in the tissue factor pathway and in the hemostatic system.⁽¹⁾ It is also characterised by impressive changes in the activating and inhibitory pathways of coagulation and fibrinolysis resulting in an accelerated but well balanced process of thrombin formation and resolution.⁽²⁾ These changes serve to protect the mother from the hazards of bleeding imposed by placentation and delivery, but they also carry the risk of an exaggerated response localised or generalised to coagulation stimuli.⁽³⁾

Aim: The aim of our study was to evaluate prothrombin time, International Normalised Ratio and Platelet count among women presenting with vaginal bleeding in first trimester of pregnancy.

Materials and Method: A retrospective study of females with vaginal bleeding in the first trimester of pregnancy was carried out in the Post Graduate Department of Pathology, Acharya Shri Chander College of Medical Sciences (ASCOMS) and Hospital Sidhra in collaboration with Department of Obstetrics and Gynaecology for a period of two years i.e. from 1st January 2015- 31st December 2016, after obtaining the due clearance from Institutional Ethics committee.

Conclusion: Coagulation abnormalities are rarely the cause of vaginal bleeding in the first trimester of pregnancy among the women with no previous symptoms of bleeding disorders.

Keywords: Prothrombin Time, International Normalised Ratio, Coagulation, Hemostasis.

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Introduction

The coagulation and haemostatic system undergo significant changes during pregnancy. These changes are thought to occur in order to prepare the mother for the hemostatic challenge of delivery.⁽⁴⁾ The physiology of hemostasis involves a delicate balance between coagulation and fibrinolytic activity to maintain the integrities of vasculature and an inhibition or exaggeration of either may lead to either thrombosis or haemorrhage.⁽⁵⁾ There is an increase in the majority of clotting factors, decrease in the quantity of natural anticoagulants and reduction in fibrinolytic activity.⁽⁶⁾ These changes result in a state of hypercoagulability. As most coagulation factors increase in pregnancy, the prothrombin time may be shortened.⁽⁷⁾

The platelet counts decrease in pregnancy due to increased destruction and hemodilution.⁽⁸⁾ Hemorrhage occupies an important position in the etiology of maternal and fetal mortality. The most common cause of vaginal bleeding in first trimester is complete miscarriage followed by threatened miscarriage.⁽⁹⁾ Bleeding affects 20 to 30% of all pregnancies and increases the risk of miscarriage.⁽¹⁰⁾ The etiology of miscarriage includes both thrombotic and hemorrhagic defects. Thrombotic defects are extremely common where as hemorrhagic defects are rare. Fetal wastage peaks in first trimester due to thrombotic defects in early placental vessels.⁽¹¹⁾

Aims and Objectives

To find the values of prothrombin time (PT), International Normalised Ratio (INR) and Platelet counts in patients presenting with vaginal bleeding in first trimester of pregnancy.

Materials and Method

A retrospective study of females with vaginal bleeding in the first trimester of pregnancy was carried out in the Post Graduate Department of Pathology, Acharya Shri Chander College Of Medical Sciences (ASCOMS) and Hospital Sidhra in collaboration with Department of Obstetrics and Gynaecology for a period of two years i.e. from 1st January 2015-31st December 2016, after obtaining the due clearance from Institutional Ethics committee.

The data was analysed from the records of Post Graduate Department of Pathology and Department of Obstetrics and Gynaecology ASCOMS and Hospital Sidhra.

PTI, INR and platelet counts of the patients were recorded.

Relevant history and other investigations were also recorded.

Inclusion Criteria

The study group comprised of pregnant females

1. In the age group 20 -35 years
2. Presenting with vaginal bleeding in the first trimester.

Exclusion Criteria

1. Elderly primigravidas above 35 years.
2. Cases of bleeding in second and third trimester.
3. Cases with known history of liver diseases and those on antiplatelet and anticoagulant drugs.

Results

A retrospective study of 120 females presenting with vaginal bleeding in the first trimester of pregnancy was carried out and the results of prothrombin time ((PT), International Normalised Ratio (INR) and platelet counts were recorded.

The results of PT and INR are given in Table 1 and 2.

Table 1

Prothrombin Time Nr PT = 13 secs			
	Normal	Prolonged	Shortened
Number of Patients n=120	102	10	8
% age of patients	85%	8.4%	6.6%

Table 2

INR [Normal is below 1]			
	0.8 - 1.0	1 - 2	<0.8
Number of Patients n=120	102	10	8
%age of patients	85%	8.4%	6.6%

Prothrombin time was normal in 102 patients (85%), prolonged in 10 patients (8.4%) and shortened in 8 patients (6.6%).

INR of 102 patients (85%) was between 0.8 – 1, in 10 patients (8.4%) it was between 1 -2 and in 8 patients (6.6%) the value was <0.8.

The result of platelet counts are given in Table 3.

Table 3

Platelet Count (Normal 1.5 - 4 lac/cumm)			
	Normal	Thrombocytopenia	Thrombocytosis
Number of Patients n=120	95	20	5
%age of patients	79.2%	16.6%	4.2%

Platelet counts were normal in 95 patients (79.2%) thrombocytopenia was seen in 20 patients (16.6%) and thrombocytosis in 5 patients (4.2%)

Discussion

The physiology of a normal pregnancy involves major changes in the haematological parameters and coagulation system. These changes appear to be related to the development of the uteroplacental circulation and provide a protective mechanism during delivery.^(12,10)

In this study we have focussed on the changes in PTI, INR and platelet counts in pregnant females presenting with vaginal bleeding in the first trimester. In the present study prothrombin time was normal in majority of the patients i.e. 102 (85%), prolonged in 10 patients (8.4%) and shortened in 8 patients (6.6%).

INR of 102 patients (85%) was between 0.8 -1.0, in 10 patients (8.4%) the value was between 1-2 and in 8 patients (6.6%) the value was <0.8.

The results of our study are in concordance with those done by Kovac V and Vlasisavljevic V⁽¹³⁾ who also found that blood coagulation parameters showed insignificant changes in pregnant women with vaginal bleeding. One study by Szecsi PB, Jorgensen M, et al⁽¹⁴⁾ also showed that prothrombin time remains unchanged in pregnancy.

In study done by Hui C, Lili M, et al,⁽¹⁵⁾ PT and INR showed a tendency to decrease in pregnant women. Pannala S, Inayatulla K and Puli Sree Hari,⁽⁷⁾ in their study found that the prothrombin time was decreased in 98% of healthy pregnant females (n=25) whereas in our study it was decreased in 8 patients (6.6%). This discrepancy could be due to their small sample size. Shortening of prothrombin time in 8 patients (6.6%) could be due to hypercoagulable state of pregnancy.

Prolongation of prothrombin time in a small percentage (8.4%) of our patients could be attributed to nutritional (protein) deficiencies associated with pregnancy, since prothrombin time assay assesses the functions of the proteins in extrinsic pathway 2, 5, 7, 10.⁽¹⁵⁾

The INR was not significantly affected in 85% of our patients which is in concordance with the study done by Pannala S, Inayatulla K and Puli Sree Hari.⁽⁷⁾

We observed that in the present study the platelet counts were normal in 95 patients (79.2%). These findings are in concordance with the study done by Kovac V and Vlasisavljevic V.⁽¹³⁾ Alkhansa O.M et al⁽¹⁶⁾ also found platelet counts to be within normal range in pregnant females. Also, this study agrees with the study done by Amar Tariah et al,⁽¹⁷⁾ among Nigerian women in which platelets showed no significant differences in pregnant females. Adekefe AM et al⁽¹⁸⁾ in their study found no significant effect of pregnancy on the hemostatic parameters studied.

Thrombocytopenia was seen in 20 patients (16.6%) in our study which could be attributed to hemodilutional changes seen in pregnancy. Hoffbrand et al⁽¹⁹⁾ described a 10% fall in platelet count during pregnancy as a result of hemodilution. The study done by Erhabor et al⁽²⁰⁾ also showed that the platelet count were low in patients during pregnancy.

In our study, thrombocytosis was seen in 5 patients (4.2%). Bremme KA⁽⁶⁾ also found reactionary thrombocytosis in 2% of their patients.

The result of the present study reveal that Prothrombin Time, International Normalised Ratio and

Platelet Counts show insignificant changes in majority of the pregnant females with vaginal bleeding.

Conclusion

1. Coagulation abnormalities are rarely the cause of vaginal bleeding in the first trimester of pregnancy among the women with no previous symptoms of bleeding disorders.
2. Prolongation of prothrombin time in small percentage of patients 8.4% could be due to protein deficiencies associated with pregnancy.
3. Shortening of prothrombin time in 6.6% of patients could be due to hypercoagulable state of pregnancy.
4. INR is a better indicator of the coagulation profile of an individual, therefore prothrombin time should always be read with INR ratio.
5. Platelet counts show insignificant changes in pregnancy associated with vaginal bleeding.
6. Thrombocytopenia in 16.6% of patients could be due to hemodilutional changes in pregnancy.
7. Thrombocytosis in 4.2% patients could be attributed to reactionary process associated with anemias in pregnancy.

References

1. F.I. Buseri, Z A Jeremaiah and F.G Kalio-Influence of pregnancy and gestation period on some coagulation parameters among Nigerian Antenatal Women. Research journal of medical sciences 2(6),2008:275-281.
2. Hellgren M Hemostasis during normal pregnancy and puerperium *semin Thromb Hemost*, 2003 April 29(2);125-30.
3. Uchikova EH, Ledjev H- Changes in hemostasis during normal pregnancy. *Eur J. Obstet Gynecol reprod. Biol.* 2005 April;119(2):185-8
4. Holmes, VA and Wallace, JMW Hemostasis is normal pregnancy: A Balancing Act. *Biochemical Society Transactions*, Vol. 33(2005) P.428.
5. Patrick T, Joanne D. Coagulation in pregnancy. *Best practice & Research clinical obstetrics and Gynaecology* 24 (2010), 339-352.
6. Bremme KA. Haemostatic changes in pregnancy. *Best Pract. Res. Clin Haematol* 2003;16:153-168.
7. Pannala S, Inayatulla K, Puli S H. Estimation of prothrombin time in pregnancy compared with normal controls. *Journal of Evolution of Medical and Dental sciences.* 2013:72-77.
8. Boeheen F, Honefeld P, Extermann P. Platelet count at term pregnancy: A reappraisal of the threshold. *Obstet Gynecol.*2000;95:29-33.
9. Bick RL, Hoppensteadt D. Recurrent Miscarriage syndrome and infertility due to blood coagulation protein (platelet defects: a review and update. *Clin. Appl Thromb Hemost.* 2005;11(1):1-13.
10. Gris JC, Ripart-Nevcu S, Maugard C. Retrospective evaluation of the prevalence of haemostasis and abnormalities in unexplained primary early recurrent miscarriages. The Nimes Obstetricians and Haematologists study. *Thromb Haemost.*1997;77(6):1096-1103.
11. Mccrae KR. Thrombocytopenia in pregnancy differential diagnosis pathogenesis and management. *Blood RCV.*2013;17:7-14.
12. Katz D, Disorders of coagulation in pregnancy. *Br J Anaesth.*2015;ii75-ii88.
13. Kovac V, Vlasisavljevic V, Reljic M. Evaluation of coagulation abnormalities among women with vaginal bleeding in the first trimester of pregnancy. *Int J Gynaecol Obstet* 2012 Sep;118(3):202-4.
14. Szecsi PB, Jorgensen M. Haemostatic reference intervals in pregnancy, *Thromb Haemost.* 2010 Apr;103(4):718-27.
15. Hui C, Lili M. Changes in coagulation and hemodynamics during pregnancy: A prospective longitudinal study of 58 cases. *Arch Gynecol Obstet.*2012 May;285(5):1231-6.
16. Alkhansa O M, Khalda M H, Assad M ,Physiological changes in some hematological and coagulation profile among Sudanese healthy pregnant women. *Int J of Medical Science and Public Health* 2016;Vol.5:1-4.
17. Amah-Tariah F S, Ojeka S O, Dapper D V. Haematological values in pregnant women in Port Harcourt, Nigeria: Serum iron and transferrin, total and unsaturated iron binding capacity and some red cell and platelet indices. *Niger J Physiol Sci* 2011;26(2):,173-8.
18. Adekeye A M, Anaele O, Oluwatayo B O, Kinjir H J ,Chidozie V N, Okeke C O and Salako Y I. Investigation of some haemostatic parameters in pregnant women in Jos South LGA, Plateau state. *Global Journal of Life Sciences and Biological Research* 2016;Vol2(1):1-8.
19. Hoffbrand, AV, Petit, JE and Moss, PAH(2001), *Essential Haematology* 4th edn. Blackwell Science, Oxford, pp.319-321.
20. Erhabor O, Isaac I Z, Muhammad A M, Abdulrahman Y, Ezimah A C and Adias TC. Some hemostatic parameters in women with obstetric hemorrhage in Sokoto, Nigeria. *Int J Womens Health*,2013;5:285-91.