STUDY OF HAEMOSTATIC ABNORMALITIES IN SOME COMPLICATED PREGNANCIES

by

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SUMMARY

A prospective study of haemostatic abnormalities in 50 women with normal and complicated pregnancies was carried out using eleven conventional laboratory tests. Following conclusions have been drawn from this study:

Haemostatic abnormalities are common in the later stages of both normal and complicated pregnancies;

These haemostatic abnormalities are usually manifested either as compensated form of ICF or as decompensated form of ICF;

FDP estimation is the most sensitive parameter for the diagnosis of ICF;

The prognostic value of FDP estimation is greatly enhanced if it is combined with fibrinogen estimation and platelet count.

Introduction

Pregnancy induces subtle changes in haemostatic sytem. These changes become markedly pronounced when the pregnancy is associated with obstetric complications. It is documented that defects of haemostasis account for nearly 28 per cent of maternal deaths (Bonnar, 1977). In most of these cases the basic pathology is disseminated intravascular coagulation (DIC) with secondary fibrinolysis (Graeff and Kuhn, 1980). In this article, we present a prospective study of haemostatic abnormalities observed in a series of pregnant women. The objective was to ascertain the incidence and the types of coagulation defects encountered in normal and complicated pregnancies. Besides the estimation of the level of fibrin/fibrinogen degradation products (FDP) which is considered to be the most sensitive parameter for determining the existence of DIC, ten other conventional tests were performed to evaluate the coagulation system. We adopted Owen and Bowie's

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(1977) concept of intravascular coagulation and fibrinolysis syndrome (ICF) and modified it according to Sun *et al* (1979) to classify the various haemostatic abnormalities observed.

Material and Methods

This study was carried out on 50 pregnant women admitted to Kasturba Gandhi Hospital for Women and Children, Triplicane, Madras. Six of these patients were in second trimester while the rest were in third trimester. Seven cases had uneventful antenatal periods. In the rest, the pregnancy was complicated by the presence of one or more of the following conditions: pre-eclamptic toxaemia (PET), antepartum haemorrhage (APH), intrauterine death (IUD), missed abortion and bad obstetric history (BOH). The break up of the cases along with pertinent clinical details is given in Table I.

Following tests were performed on all these patients to evaluate haemostatic system: bleeding time (BT), clotting time (CT), platelet count (PTC), prothrombin time (PT), thrombin time (TT), partial thromboplastin time with kaolin (PTTK), ethanol gelation test (EGT), protamine sulphate serial dilution test (PSSDT), euglobulin clot lysis (ECL), fibrinogen estimation and estimation of fibrin/fibrinogen degradation products (FDP). The FDP levels were estimated using a kit based on staphylococcal clumping test supplied by M/s. Sigma Chemical Co., U.S.A. All other tests were carried out according to well established techniques (Dacie, 1969; Brown, 1980; Denson, 1976). We adopted the concept of intravascular coagulation and fibrinolysis syndrome of Owen and Bowie (1977) and classified it further into three groups using FDP levels and platelet counts as indicators: patients with no ICF (normal FDP); those with compensated ICF (elevated FDP, but normal platelets); and those with decompensated ICF (elevated FDP and decreased platelet count).

Results

Forty-one out of the total 50 cases had one or more abnormal coagulation test results. Only one test was abnormal in 12 cases, 2 in 11 cases, 3 in 2 cases, 4 in 6 cases, 5 in 5 cases, 6 in 3

TABLE I

Pertinent Clinical Findings in the Cases Studied

Clinical condition	No. of cases	Age in years	Trimester		Gravida	
			II	III	P	M
Normal	7	18-28	—	7	4	3
PET	24	18-45	3	21	12	12
APH	7	19-35	—	7	1	6
IUD	7	18-32	2	5	3	4
Misc.						
Missed abortion	1	24	1	—	—	1
PET ẽ APH	1	33	—	1	—	1
FTP ẽ BOH	1	26	—	1	—	1
FTP ẽ Treated PET	1	28	—	1	1	—
FTP ẽ FITS	1	24	—	1	1	—
Total	50		6	44	22	28

cases, 7 in 1 case and 8 in 1 case. One case of severe antepartum haemorrhage (APH) had seven abnormal test results while a case of severe pre-eclamptic toxaemia (PET) with intrauterine death (IUD) had eight abnormal test results. All the tests were normal in 9 women. Six of these had uneventful antepartum period while the rest had grade I PET complicating the pregnancy. The details of the tests performed and the pattern of the results observed are given in Table II.

Bleeding time and clotting time were normal in all cases. Prothrombin time was prolonged in only 1 case. Most frequent abnormality was elevated FDP which was observed in 78 per cent of the cases. Abnormal EGT was next in frequency and it was observed in 38 per cent of the cases. It was followed by abnormal ECL, TT and PTTK each of which were observed in 20 per cent of cases. Platelet count was low in only 8 cases (i.e., 16 per cent), 7 of which also showed abnormalities of atleast four other test results. As nearly all our patients were in the third trimester of pregnancy, the plasma fibrinogen levels were expected to be on the higher side of the normal (Bonnar *et al* 1977). Hence a fibrinogen concentration of 300 mg/dl was taken as the lower limit of the normal. It was decreased in 12 cases (i.e., 24 per cent).

It was found that 32 patients (i.e., 64 per cent) had compensated ICF and seven patients (i.e., 14 per cent) had decompensated ICF (Table III). The latter group included 4 cases of APH, 2 cases of IUD and 1 case of severe PET with APH. Significantly 6 of the 7 patients with decompensated ICF had four or more abnormal test results including low fibrinogen levels, low platelet count and elevated FDP (Table IV).

TABLE II
Tests Performed

Total No. of cases		Normal 7	PET 24	APH 7	IUD 7	MISC. 5	Total % of abnormality
Types of tests	Normal range						
BT	6 mts.	—	—	—	—	—	—
CT	10 mts.	—	—	—	—	—	—
PIC	1.4-4.0 lacs/cm.	—	—	57.2	42.8	20	16
PT	C ± 3 secs.	—	—	14.5	—	—	2
TT	C ± 2 secs.	—	12.5	28.5	71.3	—	20
PTTK	35-48 secs.	—	20.5	42.8	28.5	—	20
EGT	—ve	—	45.5	42.8	42.8	40	38
PSSDT	—ve	—	20.5	28.5	14.5	20	20
ECL	2 hrs.	—	33.3	57.2	28.5	40	32
Fib.	300 mgm%	—	8.5	57.2	57.2	40	24
FDP	10 ug/ml Fib. eq.	14.3	87.5	100	71.3	100	78

The figures represent percentage of cases showing abnormality.

TABLE III
Break Up of Cases Showing Various Types of ICF

	No. ICF	Com. ICF	Decom. ICF
Normal	6	1	—
Pet	3	21	—
Aph	—	3	4
Iud	2	3	2
Miscellaneous			
Missed Abortion	—	1	—
Severe Pet With Aph	—	—	1
Ftp With Epilepsy	—	1	—
Ftp With Boh	—	1	—
Ftp With Treated Pet	—	1	—
Total (50 Cases)	11	32	7

TABLE IV
Comparison of Laboratory Data Among Different Groups of Patients

	NO ICF FDP—NORMAL PLATELETS—NORMAL	COMPENSATED ICF FDP—INCREASED PLATELETS—NORMAL	DECOMPENSATED ICF FDP—INCREASED PLATELETS—DECREASED
TOTAL NO. OF CASES	11	32	7
PROTHROMBIN TIME	N	N	14.3
PTTK	N	18.5	43
TT	N	7	57
EGT	N	37.5	85.6
PSSDT	N	15.5	57
ECL	N	25	57
FIB. ESTIM.	N	15.5	85.6
FDP	N	100	100

Figures represent percentage of cases.

Discussion

A variety of coagulation abnormalities are known to occur during the later stages of complicated pregnancies. Such abnormalities have been observed even in normal pregnancies albeit in milder forms (Bonnar *et al* 1977; Graeff and Kuhn, 1980). The principal abnormalities documented include elevated concentration of certain clotting factors (Bennett and Ratnoff, 1972; Bonnar, 1977), increased activity of the thrombin (Bonnar *et al*) 1976), decreased antithrombin III (Bonnar, 1977) and decreased fibrinolytic activity. Besides these platelet levels are significantly decreased in pregnant women (O'Brien, 1977). Overall the changes of coagulation system during pregnancy are consistent with the generation of thrombin and low grade process of intravascular coagulation. These pro-

cesses are amplified in obstetric complications.

In this study, elevated level of FDP was found to be the most frequent abnormality followed by abnormal EGT and ECL respectively. Though it has been claimed by some workers that prolonged TT is one of the principal abnormalities observed in DIC (Sun *et al* 1979; Graeff and Kuhn, 1980). It was found to be prolonged in only 20 per cent of the cases in our study. Thrombin time was more consistently abnormal only in cases of IUD (71 per cent). Similarly we could not substantiate the claims made for PSSDT (Sanfelippo *et al* 1971). Fibrinogen levels were reduced in 24 per cent of the cases. In all these cases abnormality of atleast two or more other tests were observed.

It is clear from our study that compensated ICF is a common phenomenon during the later stages of normal and complicated pregnancy. But it may not be associated with dramatic clinical manifestations in most cases. Often the only evidence for the existence of compensated ICF is elevated FDP. In these cases there was also no significant correlation between FDP levels and the results of other tests. Decompensated ICF was observed in 14 per cent of the cases. All these patients were in serious clinical condition and five of them exhibited haemorrhagic tendency. In these patients significant correlation was observed among fibrinogen levels, platelet count and FDP levels (Table IV). These observations lead us to conclude that although the FDP level is the most sensitive parameter for the diagnosis of ICF, its prognostic value is greatly enhanced if it is combined with fibrinogen estimation and platelet count.

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