Coagulation Abnormalities in Intrauterine Fetal Death More than 2 Weeks Duration

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A total of 60 subjects were divided into two groups. Group A included 30 pregnant females with normal pregnancy as control from 20 weeks of gestation onward. Group B included 30 pregnant females with intrauterine fetal death > 2 weeks duration. Routine hematological investigations i.e. Hb, TLC and platelets were done by hematology analyzer and specific tests i.e. PT, APTT and Fibrinogen were performed by commercially available kits. Results were analysed by using student's 't' test and level of significance was done. PT and APTT were prolonged in females of IUFD > 2 weeks duration. Fibrinogen level was significantly increased in females of IUFD. Platelets count is decreased significantly in females of IUFD.
Key words: IUFD, fibrinogen

Intrauterine fetal death (IUFD) refers when there is death of fetus at any time before birth. It is usually applied to an antepartum death after the first trimester, but more often after mid-pregnancy (20 weeks)[1]. Following intrauterine death, thromboplastic substances may be released into the maternal circulation. These fetal products may precipitate intravascular coagulation[2] The pregnancy leads to a change in both coagulation cascade and fibrinolytic system. It is a hypercoagulable state and presents unique triggering mechanism for DIC. There is a haemostatic alteration with intrauterine retention of dead fetus[3].

There is a consumptive coagulopathy with a haemorrhagic picture and increase in soluble fibrin monomer complexes as well as cross linked fibrin oligomers [4]. IUFD is related to intravascular coagulation and increase in FDPs[5]. When there is IUFD, there is a state of chronic consumptive coagulopathy with a prolonged prothrombin time (PT) due to release of thromboplastic substances that initiate DIC. There is also release of plasminogen activators along with these tissue factors. These lead to activation of plasminogen into plasmin, which when acts on fibrinogen brings about fibrinogenolysis. During release any one process may take the upper hand and hence a state of DIC or fibrinogenolysis may initiate accordingly[6].

When there is retention of fetus after intrauterine death, it leads to significant alterations in coagulation system [7]. IUFD leads to a wide spectrum of haemostatic disturbances ranging from an increase in platelet count and a raised level of FDPs and fibrin monomers, depending upon the duration of retention of dead fetus [8]. Plasma D-dimer are the specific derivatives of cross-linked fibrin, which are produced when fibrin is degraded by plasmin and concentrations are raised by thrombolysis [9]. Plasma D-dimer represents a significant advance over current and historical FDP assays. Firstly it identifies specifically, the presence of cross-linked fibrin derivatives without interference from fibrinogen and non-cross-linked fibrin, and therefore, indentifies intravascular thrombosis and fibrinolysis as distinct from fibrinogenolysis. Because of high specificity of D-dimer, the monoclonal antibody can be used with plasma samples, thereby differentiating fibrinolysis from fibrinogenolysis and conferring an advantage over most standard assays for FDP[10].

The purpose of the present study is to assess the coagulation abnormalities associated with IUFD.

Methodology:

Sixty subjects were included in this study and were divided into two groups :-

Group A = Pregnant women with normal pregnancy as control.

Group B= Pregnant females with IUFD > 2 weeks.

3 ml citrated blood with 1:9 ratio for PT, APTT and fibrinogen and 2ml EDTA blood for Hb, TLC and platelets was collected.

Results were analyzed by using student's 't' test and level of significance was done[11].

Results:

Results and level of significance of different groups are given in tables 1 and 2.

Table 1: Routine Haematological Investigations in Groups A & B

Tests	Group A (Control)	Group B (subjects of IUFD>2weeks	A vs B
Hb (g/dl)	11.0±1.01	10.2 ± 2.85	NS
TLC (10^9/L)	10.2± 1.99	13.2 ± 6.5	S
Platelets Count	240±64.8	177.3 ± 93.1	HS

Table 2 Specific Haematological Investigations in Group A and B

Tests	Group A (Control)	Group B (subjects of IUFD>2weeks	A vs B
PT (Sec)	12.4 ± 0.1	13.8 ± 2.63	S
APTT (Sec)	32.7 ± 2.6	35.1 ± 2.95	HS
Fibrinogen (mg/dl)	333.3±36.8	357.5±117.1	S

Discussion:

Routine Haematological Investigations : In the present study, the Hb was found to be non-significant in females of IUFD > 2 weeks duration (Group B) as compared to control group. TLC was found to be increased in females of IUFD > 2 weeks duration (Group B) as compared to control group (A) and difference was found to be significant (P<0.05) statistically. This study is in favour of the results of Falanga & Rickles (1999)[12], Duchniski (1993)[8] and Strauss (1999)[6], who also observed increase TLC in subjects of IUFD >2 weeks duration. The platelet count was found to be decreased in females of IUFD >2 weeks duration as compared to control group and difference was highly significant (P<0.01) statistically. The findings are consistent with the results of Duchnski (1993) [8], Strauss (1997) [6] and Falanga & Rickles (1999) [12] who also observed decreased platelets count in their study. This decreased platelets count in females of IUFD may be due to chronic DIC going on in the body as also reported by Wintrobe (2003)[13] & Gilabert (1985) [4].

Special Haematological Investigations:

Prothrombin Time (PT): In the present study, PT was found to be prolonged in females of IUFD >2 weeks duration as compared to the control group and the difference was significant (P<0.05) statistically. This study is in favour of the results of strauss (1997)[6], Falanga & Rickles (1999)[12] who also observed prolonged PT in females of IUFD >2 weeks duration when comparing with controls. This prolonged PT in females of IUFD may be due to consumptive coagulopathy going on during retention of dead fetus.

Activated Partial Thromboplastin Time (APTT): APTT was found to be prolonged in the study group >2 weeks duration as compared to control group and difference was found to be significant statistically. This study is in favour of the study done by Strauss (1997)[6] and Duchnski (1993 [8] who also observed similar findings in their study. APTT is an indicator of intrinsic & common pathway and during DIC, APTT may be prolonged because of consumption of coagulation factors as also reported by Wintrobe (2003)[13] and Falanga & Rickles (1999)[12].

Fibrinogen Level: Fibrinogen level was found to be increased in females of IUFD > 2 weeks duration (group B) and difference was found to be significant ($p < 0.05$) statistically when compared with control group. The results are in agreement with the results of Duchnski (1993)[8], Visentin et al (1996)[7] and Strauss (1997)[6], who also observed increased fibrinogen levels in their study. This increased fibrinogen level may be due to chronic DIC. When there is IUFD, there is a state of chronic consumptive coagulopathy due to retention of dead fetus and release of thromboplastic substances.

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