CHANGES IN FIBRINOLYTIC ACTIVITY OF BLOOD IN ABRUPTIO PLACENTAE

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SUMMARY

Bleeding tendency due to premature separation of placenta (Abruptio placentae) is wellknown. The cause of bleeding in such cases has been attributed to clotting failure, which may be due to hypofibrinogenemia or increased fibrinolytic activity. The present study was conducted to find out which of them is the cause of bleeding. Blood samples from 32 Abruptio placentae patients and 20 controls were collected before delivery and after delivery. The following tests were carried out on these blood samples. (1) Euglobulin lysis time; (2) Plasminogen assay; and (3) Fibrinogen estimation. The results indicate that there is a marked Hypofibrinogenemia in blood samples of Abruptio placentae patients, before delivery, when compared with control and after delivery. There is also an increase in fibrinolytic activity of blood as shown by the results of Euglobulin lysis time and Plasminogen assay, wherein the clot lysis time is markedly decreased in Predelivery blood samples when compared with post delivery and control. This shows that, plasminogen activators are increased in the predelivery blood when compared with post delivery and control samples. The results of the present study suggest that there is a significant increase in fibrinolytic activity of blood along with hypofibrinogenemia in Abruptio placentae.

Introduction

Over the years Dieckmann (1936), Moloney *et al* (1949) and a host of others have reported bleeding in Abruptio Placentae. The bleeding was attributed to some clotting defects. Hypofibrinogenemia and afibrirogenemia were observed in these cases. But it was not until recently that the role of fibrinolytic system in these cases, dawned upto some workers. Even though all agreed that there is hypofibrinogenemia, they differed ed as to the mechanism behind it.

Moloney *et al* (1949) attributed it to the increased fibrinolytic activity, while the second group consisting of Dieckmann

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(1936), Page *et al* (1957), and Stouffer and Ashworth (1958) gave the reason of widespread intravascular clotting stating that there is no increase in fibrinolysis and a third group (Philips *et al* (1957) and Revol *et al* (1952)) believed in disseminated intravascular clotting followed by increased fibrinolytic activity.

Even in obstetrical practice, to determine hypofibrinogenemia clinicians are using fibrindex test which is more or less a bedside clinical test and fibrinolysis is determined simply by clot observation test. Both tests are bed side clinical tests.

Therefore in our present study, we have made an effort to carry out qualitative as well as quantitative tests to determine whether there is really hypofibrinogenemia and increase in fibrinolytic activity.

Methods and Material

Blood samples were collected from controls as well as from abruptio placentae cases from Lady Goschen Hospital, Mangalore before and after delivery and following three tests were carried out.

1. Euglobulin lysis time shows plasminogen activator level (by Todd, Sanford and Davidson—Clinical Diagnosis and Management).

2. Plasminogen assay shows plasmin level (Gradwohl's Clinical Lab. Methods and diagnosis).

3. Fibrinogen estimation (Varley's practical clinical Biochemistry).

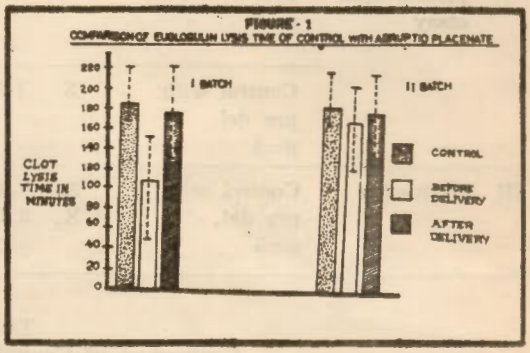
The 20 controls were normal pregnant women who had more than 28 weeks of amenorrhoea and were admitted in the hospital for delivery.

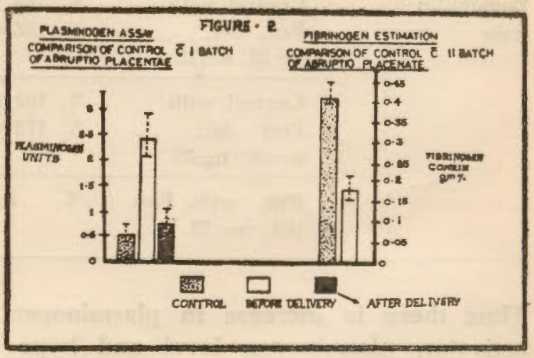
In 5 controls only plasminogen assay and fibirnogen estimation were carried out.

Thirty-two cases of abruptio placentae were studied and in all of them Euglobulin lysis time was done, before and after delivery. Among the 32 cases, 9 were of severe variety. In 5 of them plasminogen assay and fibrinogen estimation were carried out. Clinically severe variety were grouped as batch I and moderate variety as batch II.

Results and Analysis

The statistical analysis shows that in all the three tests when predelivery results of Batch I is compared with control and post delivery results, shows significant difference ($t = < 0.05$) as seen in Table I (Figs. 1 and 2).





The results of Batch II also show the same changes as far as Euglobulin lysis test is concerned. However, the results of control when compared with post delivery results, the difference was insignificant (Tables I and II).

TABLE I

Comparison of Results of Control with those of Batch I

Test	Comparison of results	Pooled mean	Pooled S.D.	't' Value at 5% Significant level
I Euglobulin lysis time	Control with pre del. n=20, n=9	X_1 183.1 X_2 102.78	18.11	t=<0.05 Highly significant
	Control with post del. n=20, n=9	X_1 183.1 X_2 176.67	17.89	t=>0.05 Insignificant
	Pre with Post n=9	X 62.22	37.09	t=<0.05 Highly significant
II Plasminogen assay	Pre with Post n=5	X 1.76	0.3	t=<0.05 Highly significant
	Control with pre del. n=5	X 1.92	0.25	t=<0.05 Highly significant
III Fibrinogen	Control with pre del. n=5	X_1 0.42 X_2 0.19	0.0139	t=<0.05 Highly significant

TABLE II

Comparison of Control with those of Batch II

Euglobulin lysis	Control with Pre. del. n=20, n=23	X_1 184.1 X_2 168.6	17.62	t=<0.05 Highly significant
	Control with Post. del. n=20, n=25	X_1 183.1 X_2 172.48	18.69	t=>0.05 Insignificant
	Pre. with Post del. n=23	X 5.03	5.50	t=<0.05 significant

Thus there is increase in plasminogen activator, plasminogen level and hypofibrinogenemia.

Discussion

Abruptio placentae was one of the important causes of maternal mortality due to severe bleeding. Bleeding was attributed to some clotting defects like hypofibrinogenemia along with increased fibrinolysis. Although workers agreed to decreased fibrinogen level in this condition they all differed as to the causation of hypofibrinogenemia.

Our results on abruptio placentae, showed decreased fibrinogen level with increased levels of plasminogen and plasminogen activators (Figs. 1 and 2).

We agree to the theory of intravascular clotting because, due to the premature separation of placenta which is due to a retroplacental clot, there will be liberation of thromboplastin materials into the circulation resulting in widespread intravascular clotting. This fibrin deposition in the vessels along with the elements of stress, anoxia and shock bring about a powerful response from fibrinolytic system (supported by Coleman *et al* 1970, Kawaan *et al* 1956 and Thorsen *et al* 1972). Uterus itself is rich in extrinsic activators of plasminogen (Lack and Ali 1964), which are released into the blood stream due to trauma and damage to uterine tissue. That will explain the high activator level we got in our results (Fig. 1). The activators are supposed to be localised in the lysosomal fraction of cells (Lack and Ali 1964).

Once these activators are released they convert the plasminogen to plasmin and this will digest the fibrin. The activators and plasminogen along with antiplasmins are adsorbed on to the surface of fibrin deposits and fibrin is digested resulting in removal of the thrombus. This then lead to an increased level of fibrinolytic activity in the blood in this condition. The clotting defect could be due to low fibrinogen level or could be due to collection of fibrin/fibrinogen degradation products themselves as they will change the nature of fibrinogen available so that fibrinogen will act poorly with thrombin thus adding to the clotting defect.

Thus the sudy of fibrinolytic activity will foretell the clinician about the impending danger of haemorrhage in such cases and keep him alert with suitable course of treatment if and when such danger arises.

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