

ORIGINAL ARTICLE

DISSEMINATED INTRAVASCULAR COAGULATION

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Background: Disseminated Intravascular Coagulation (DIC) is a complex systemic thrombohaemorrhagic disorder characterised by widespread endothelial damage. Aim of this study was to assess the prevalence of DIC in different obstetrical conditions. **Methods:** This descriptive study was carried out in the Department of Obstetrics and Gynaecology Unit 'A', Ayub Medical College, Abbottabad from January 2010 to December 2011. All 40 diagnosed cases of DIC were included, and their risk factors and maternal/foetal outcome were evaluated. **Results:** Out of 4,334 obstetrical admissions, DIC was diagnosed in 40 (0.92%) patients. Risk factors noted were eclampsia 28 (70%), abruptio placentae 7 (17.5%), septicaemia 3 (7.5%), pancytopenia 1 (2.5%), and 1 (2.5%) patient had DIC secondary to haemorrhagic shock due to placenta previa. Mean age range of patients was 31 ± 6.69 (19–48) year, and parity was 3.17 ± 2.56 (0–10). Mode of delivery of 34 (85%) patients was by caesarean section, and vaginal delivery occurred in 3 (7.5%) patients. Eleven (27.5%) patients had caesarean hysterectomy. Maternal mortality was 25% and perinatal mortality was (47.5%). Majority of our patients were critical and were managed in ICU. **Conclusion:** DIC is serious life threatening condition secondary to any underlying pathology. There is spontaneous resolution of DIC after correction of pathology.

Keywords: DIC, Eclampsia, Abruptio placentae, placenta previa, haemorrhagic shock

INTRODUCTION

Disseminated Intravascular Coagulation (DIC) is a complex systemic thrombohaemorrhagic disorder characterised by widespread endothelial damage which activates endogenous coagulation cascade resulting in severe coagulopathy characterised by widespread micro-vascular thrombosis.¹ It is an explosive and life-threatening disorder. Three major mechanisms trigger DIC: release of tissue factor into the circulation, widespread injury to endothelium, and phospholipid exposure.¹ DIC is always secondary to an underlying disorder which include emergencies such as placental abruption, amniotic fluid embolism, complications like preeclampsia, eclampsia, retained dead foetus, thrombocytopenic purpura, jaundice in pregnancy, haemolysis, elevated liver enzymes and low platelet count (HELLP) syndrome, septicaemia hypovolaemic shock, and vesicular mole.¹⁻³

DIC exists in both acute and chronic forms. Acute DIC usually occurs after massive placental abruption, amniotic fluid embolism, and eclampsia. The clinical and laboratory changes occur rapidly and are easily identified; and can cause multiple organ failure. In case of chronic form, i.e., its development in retained dead foetus and retained product of conception, the compensatory mechanism comes into action obscuring clinical and laboratory picture.¹

The objective of the current study was to see the frequency of DIC in critically serious patients received in emergency.

MATERIAL AND METHODS

This descriptive study was carried out in the Department of Obstetrics & Gynaecology Unit 'A' of Ayub Medical

College, from January 2010 to December 2011. All patients diagnosed with DIC were included and different risk factors were evaluated. Data were collected on a questionnaire after informed consent. Data included detailed history including age, parity, gravidity, gestational age, detail of physical examination and results of investigations like complete blood picture, platelet count, prothrombin time (PT), activated partial thromboplastin time (APTT) and fibrin degradation products (FDPs). Patients were diagnosed as DIC on the basis investigation results and clinical presentation. Patients were managed according to management protocol and maternal and foetal condition. Those with different risk factors like eclampsia and abruptio placentae, in case of any obstetrical indications, were delivered by caesarean section. Some of the patients even needed hysterectomy for obstetrical reasons. All data analysis was done on SPSS-10.

RESULTS

Total numbers of obstetrical admissions from January to December 2011 were 4334. Forty (0.9%) patients were diagnosed with DIC. Out of 40, 28 patients (70%) presented with eclampsia, 7 (17.5%) with abruptio placentae, and 3 (7.5%) had septicaemia. Two patients had septic induced miscarriage and one patient had septicaemia secondary to obstructed labour with ruptured uterus. One patient had DIC secondary to hemorrhagic shock (placenta previa major degree) and another presented in labour with pancytopenia.

The ages ranged from 19 to 48 years with mean age 31 ± 6.69 year. Majority of the patients were between 26–30 years of age. Parity of patients was from zero to 10 (mean 3.17 ± 2.56). Majority of patients were para 4–7.

Mean gestational age was 33.03±6.109 (10–43) weeks. Majority of patients' gestation was 31–40 weeks.

Out of 40 patients, 3 (7.5%) were postnatal, among them one had delivery at home and 2 had septic induced miscarriage. In remaining 37 patient, 3 (7.5%) had vaginal delivery and 34 (85%) had caesarean section. Eleven (27.5%) patients had caesarean hysterectomy with indications of uterine atony in 7 (58.3%) and secondary to septicaemia in 3 (25%). One patient (8.3%) had placenta previa.

All patients were anaemic including 3 (7.5%) with Hb 2–4 gm/dl, 12 (30%) with 4–6 gm/dl, 18 (45%) with 6–8 gm/dl, and 7 (17.5%) with 8–10 gm/dl. Platelet count of the patients was compromised. Out of 40 patients, 15 (37.5%) had platelet count 20,000–60,000/mm³, 20 (50%) had 60,000–100,000/mm³, and 5 (12.5%) had platelet count 100,000–150,000/mm³. Fibrin degradation products of most of the patients were raised. Prothrombin time (PT) in 35 (87.5%) patients was >15 second, and 5 (12.5%) had <15 second. Activated partial thromboplastin time (APTT) in 32 (80%) patients was >35 second, and 8 (20%) had normal APTT.

All patients were transfused whole fresh blood. Thirty-eight (95%) patients received platelet concentrate apart from fresh blood and 6 (15%) were also transfused fresh frozen plasma. Maximum blood transfusion was 15 units and on an average patients received 2–4 units of whole fresh blood. Maximum platelet concentrates given to a patients was 22 bags.

Ten (25%) patients died. In 7 patients the cause of death was eclampsia, 1 had DIC secondary to abruptio placentae, and two died of septicaemia. Perinatal mortality was 19 (47.5%) out of that 15 (78.9%) were received dead on admission. Seven (46.6%) foetuses died secondary to abruptio placentae, 6 (40%) secondary to eclampsia, and 2 (13.3%) secondary to septicaemia. There were 4 (21%) early neonatal deaths. There were two foetuses having gestational age <28 weeks, 6 between 28 and 32 weeks, 4 between 32 and 36 weeks, and 3 between 36 and 40 weeks. Majority of the patients were critical and were managed in ICU with an average stay of 2–5 days. (Tables-1–4).

Table-1: Risk factors in DIC patients (n=40)

Risk Factors	Patients	Percentage
Eclampsia/Pre-eclampsia	28	70.0
Abruptio placentae	7	17.5
Septicaemia	3	7.5
Others	2	5.0

Table-2: Mode of delivery (n=40)

Mode of Delivery	Patients	Percentage
Received Postnatal	3	7.5
Vaginal Delivery	3	7.5
Caesarean Section	34	85

Table-3: Transfusion of blood and blood products

Type of Fluid	Patients	Percentage
Whole fresh blood	40	100
Fresh frozen plasma	6	15
Platelet concentrate	38	95

Table-4: Haematological data of patients (n=40)

Investigation	Patients	Percentage
Haemoglobin		
2–4 gm/dl	3	7.5
4–6 gm/dl	12	30
6–8 gm/dl	18	45
8–10 gm/dl	7	17.5
Platelet		
20,000–60,000	15	37.5
60,000–100,000	20	15
100,000–150,000	5	12.5
PT		
<15 sec	5	12.5
>15 sec	35	87.5
APTT		
<35 sec	8	20.0
≥35	32	80.0

DISCUSSION

DIC is a syndrome characterised by increase turnover of coagulation factors, platelet destruction, activation of fibrinolytic system, formation of thrombi in the microvasculature and uncontrolled thrombi activity.² In our study DIC was found in (0.92%) patients compared to study done by Joseph U Backer where incidence was 1% in hospitalised patients.¹

The commonest cause in our study was eclampsia in 70% of DIC patients, while its incidence was 6% in a study done at Mayo Hospital Lahore.⁴ DIC with HELLP syndrome was observed in 62.5% cases in a study done at Fatima Memorial Hospital Lahore.⁵ A similar study in Norway reported the incidence of 5–56% in patients of DIC and HELLP syndrome.⁷ An Indian study reported incidence of 38% in DIC patients with eclampsia.⁶ The reason for higher incidence of DIC in eclampsia is that we receive most of the patients with eclampsia in a very critical condition. Delayed arrival and relay-racing of patients before arrival to tertiary care hospital aggravates their problem.

Abruptio placentae is second common cause of DIC (17.5%) in our study. This also represents one of complicated presentation of hypertensive disorders of pregnancy. Its incidence was 5.8% and 7% respectively in studies done in Mirpur Khas, and Jinnah Postgraduate Medical Centre Karachi.^{8,9}

Septicaemia was third major cause of DIC in our study, including septic induced miscarriage in 2 patients and septicaemia secondary to obstructed labour in 1 patient. In contrast, DIC with septicaemia was 30–50% in an American study.¹ One patient (2.5%) had DIC secondary to haemorrhagic shock (placenta previa major degree) as haemorrhage is still a very common cause of morbidity in our setup. One patient presented in labour and pancytopenia.

Majority of our patients were young and with average parity of 4. Similarly, in different studies from Lahore, Mirpur Khas, and Karachi the age range and parity was similar to our study.^{4,8–10}

Mode of delivery in majority (85%) of our patients was caesarean section as most of the patients

were received in critical condition with poor Bishop score in eclampsia and abruptio placentae. This is in contrast to studies from Sind, and Jinnah Postgraduate Medical Centre Karachi where most of the patients delivered vaginally.^{8,9}

In our study 27.5% of DIC patients needed hysterectomy to save the lives of patients as atonic and infected uterus of abruptio placentae and septicaemia respectively failed to contract despite all conservative measures. New recommendations for treatment of DIC are recombinant factor VIIa in patients with DIC related amniotic fluid embolism and DIC following massive postpartum haemorrhage. Recombinant factor VIIa reduces red cells transfusion, avoidance of uterine artery embolism and need for hysterectomy in patients with massive postpartum haemorrhage.

In our study maternal mortality was (25%) and most of the patients were eclamptic, this is alarmingly high rate and reason is that we received eclamptic patients in very critical condition with multiple fits at home with multi-organ failure and DIC. It is comparable to the study at Mayo Hospital, Lahore where mortality rate was 24% secondary to eclampsia.⁴ It is in contrast to study from Fatima Memorial Hospital, where maternal mortality was 6.2% secondary to pre-eclampsia and HELLP syndrome.⁵ In a study at Hyderabad, maternal mortality secondary to postpartum haemorrhage and DIC was reported to be 19%.¹¹ In another study at Mirpur Khas one patient died of abruption and DIC.⁸ In an Indian study mortality rate was 62.5% in DIC patients.¹² Maternal mortality was 3.3% and 1.1% respectively with HELLP syndrome and DIC in two different studies done at University School of Medicine Cayiralan State Hospital, Yozgate and Narway.^{7,13}

Perinatal mortality was quite high in our study. The reason for higher perinatal mortality is that most of the foetuses were compromised on admission and secondly prematurity was also a risk factor. In a study at Fatima Memorial Hospital, Lahore perinatal mortality secondary to eclampsia was 10–60% and mostly due to prematurity.⁵ In another study at JPMC Karachi, Perinatal mortality was quite high (85.7%) secondary to abruption with DIC.⁹ Similarly in a study conducted at Dow University Karachi, perinatal mortality was 66%

secondary to abruptio placentae and DIC.¹⁰ While perinatal mortality in a study done in Norway was 7.4–34% secondary to abruptio placentae with DIC.⁷

CONCLUSION

DIC is serious life threatening condition secondary to any underlying pathology. There is spontaneous resolution of DIC after correction of pathology. Blood bank services should provide rapid availability of fresh blood FFPs and platelet concentrate. Doctors and Nursing staff should be adequately trained to manage critically serious patients.

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