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Original Research Article

Disseminated Intravascular Coagulation in Obstetrics: A Retrospective Study

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ABSTRACT

Disseminated intravascular coagulation is a life threatening condition in obstetrics with varied aetiology. Its diagnosis, prompt referral to a tertiary care centre and management with multidisciplinary care plays a key role in reducing the morbidity and mortality associated with it. In this retrospective study we have looked into the causes, complications, management aspects of DIC and also the perinatal outcome.

Keywords: Disseminated intravascular coagulation (DIC).

INTRODUCTION

As per the definition of International Society on Thrombosis and Haemostasis DIC is defined as: an acquired syndrome characterized by the intravascular activation of coagulation with loss of localization arising from different causes. It can originate from and cause damage to the microvasculature, which if sufficiently severe, can produce organ dysfunction. DIC is estimated to be present in as many as 1% of hospitalized patients. [1]

DIC is always a secondary phenomenon and ranging from obstetrical accidents to malignancy. [2]

Obstetrical conditions associated with DIC include amniotic fluid embolism, placental abruption, placenta previa, severe preeclampsia/ eclampsia, HELLP syndrome, retained dead fetus, delayed miscarriage, hypovolemia, septicemia, and acute fatty liver of pregnancy. [3,4]

The pathophysiology of DIC involves a systemic activation of coagulation followed by widespread fibrin deposition, microvascular thrombosis and organ failure.

Clinically, DIC can present anywhere along the spectrum from thrombosis and microvascular damage to overt and uncontrollable hemorrhage. By identifying antecedents associated condition with obstetrical DIC, clinicians may be better prepared to diagnose and initiate early management of this life-threatening condition. [5]

The objectives of this retrospective study were to determine the antecedent factors, morbidity, and mortality associated with DIC in a BMJH over an 8 year period.

MATERIALS AND METHODS

The patient's database was used to identify all pregnant women with the diagnosis of DIC from 2007 to 2014 in Bhagwan Mahaveer Jain Hospital which is a tertiary care center.

The underlying clinical diagnosis was based on the clinical findings and laboratory results. Abruptio placenta was diagnosed by ultrasound or clinical signs of bleeding PV and abdominal pain; with the finding of a blood clot at the placental surface after delivery. Amniotic fluid embolism was diagnosed according to the following criteria: acute hypotension or cardiac arrest, acute hypoxia and coagulopathy with onset during labor or the cesarean section or within 30 minutes of delivery with no other clinical condition or potential explanation for the symptoms and signs. Patients with HELLP syndrome had the clinical diagnosis of preeclampsia and evidence of the following laboratory abnormalities: hemolysis, elevated liver enzymes and low platelets. Patients with AFLP had clinical symptoms and laboratory evidence of acute hepatic dysfunction, increased serum transaminase. Patients with acute fulminant viral hepatitis had high fever, malaise, jaundice, rapid deterioration with encephalopathy and high SGOT.

The adverse obstetrical event that caused the DIC was identified from each patient. Demographic variables of the affected women were collected, including age, parity, and gestational age at delivery, mode of delivery, and days in hospital. Maternal death and a composite outcome of severe maternal morbidity were assigned including blood transfusion ≥ 5 units, required uterine artery embolization, emergency hysterectomy, pulmonary edema, CNS complications renal failure and multiorgan failure. Neonatal outcomes were birth weight, NICU admission and death.

Data are expressed as number (percentage), mean with standard deviation and median with range.

Ethical approval was obtained from hospital ethics.

RESULTS

During the study period, 76 cases of DIC were diagnosed and most of the patients were referred from other hospitals.

The average maternal age was 27.9 years; 38% were primiparous; average gestational age at delivery was 34 weeks; average stay in hospital was 7.4 days.

DIC was present in 45 patients (59.21%) antepartum and 31 patients (40.79%) postpartum.

The identified causes of obstetrical DIC (Table1) were Abruptio placentae in 19 patients (25%), Eclampsia in 31 (41%), Amniotic fluid embolism in 1 (1.3%), Acute fatty liver of pregnancy (AFLP) in 2 (2.6%), PPH in 25 (33%), HELLP syndrome in 24 (31%), Sepsis 8 (10%), Intrauterine death (IUD) 17 (22%), Jaundice 13 (17%), Acute pancreatitis 1 (1.3%), Diabetes 5 (7%).

Table 1: Causes of DIC

Etiology	No.	Percentage
Sepsis	8	10.52
Eclampsia	31	40.78
HELLP	24	31.58
AFNL	2	2.63
IUD	17	22.36
PPH	25	32.89
Abruption	19	25
Jaundice	13	17.1
AFE	1	1.31
Acute pancreatitis	1	1.31

Severe maternal morbidity was high among pregnant women with DIC. All patients received blood component replacement. The associated maternal morbidity included transfusion ≥ 5 units (86%), Hysterectomy (8%), Renal failure (17%), Pulmonary edema (7%), Cardiac arrest (3%) (Figure 1)

Fifty eight patients (76%) had undergone surgical treatment during the present study period. The most common procedures were cesarean section 65%, hysterectomy 8% and Uterine artery embolization 4%. Hysterectomy done in 6 patients (8%) and Uterine artery embolization in 3 patients (4%). All hysterectomies performed were in the group with DIC caused by postpartum hemorrhage. Thirty six women had postpartum hemorrhage, either as the inciting cause for DIC or as a result of the coagulopathy. Medical and surgical treatment and blood product replacement were used in these cases.

Nine patients died, giving a case mortality rate of 12%. Three were associated with Preeclampsia, two with Sepsis, two with Shock, one with ALFP, one with Hepatic encephalopathy.

Cesarean section was performed in 49 patients (65%) and Vaginal delivery in 27 (35%).

The perinatal outcomes included stillbirth (3%), neonatal death (5%), and NICU admission (37%). 22 fetuses (29%) died, most related to abruptio placentae (13/22, 60%), Eclampsia (11/22, 50%), HELLP (8/22, 37%), AFPL (2/22, 10%) and amniotic fluid embolism (1/22, 5%).

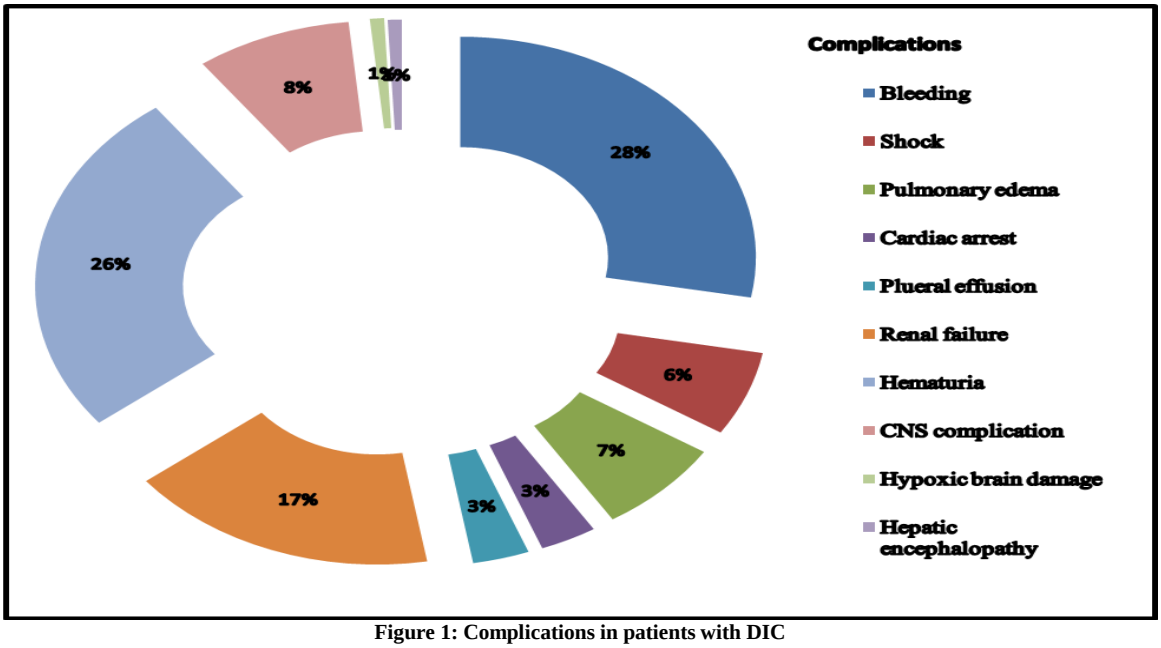

Figure 1: Complications in patients with DIC

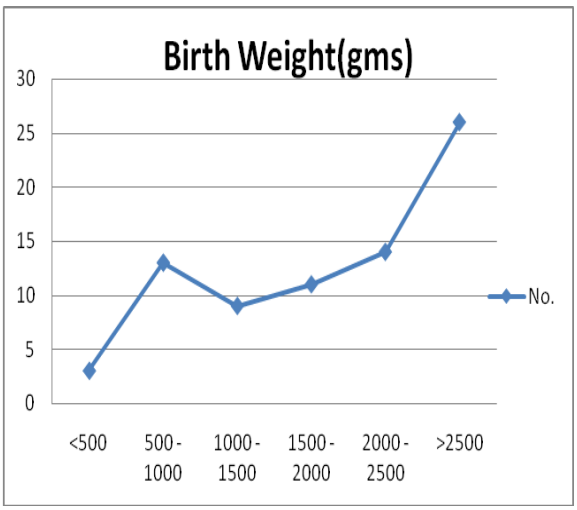

Figure 2: Birth weight in DIC patients

DISCUSSION

Our retrospective patients' database review identified 76 cases of obstetrical DIC.

All cases were clinically diagnosed and partially confirmed by laboratory results.

Even with full facilities to manage these patients with prompt and appropriate surgical and medical treatment to remove the cause or stop the pathological process, the mortality was still high.

The various obstetrical antecedent causes of DIC were Abruptio placentae in 25%, Eclampsia in 41%, Amniotic fluid embolism in 1.3%, Acute fatty liver of pregnancy (AFLP) in 2.6%, PPH in 33%, HELLP syndrome in 31%, Sepsis in 10%, Intrauterine death (IUD) in 22%, Jaundice in 17%, Acute pancreatitis in 1.3%.

As per the study done by Cunningham et al in 2015 causes for DIC were abruption - 1:200; AFE - 2-3: 1, 00,000; Acute Fatty Liver of pregnancy 1:10,000; Massive Obstetric hemorrhage - 25-30% and sepsis. [6]

DIC was reported to be the second most common severe maternal morbidity indicator - 32 per 10,000 delivery

hospitalizations. It was associated with nearly 1/4th of maternal deaths. [6]

Our study highlights the high levels of maternal and perinatal mortality and morbidity associated with this obstetrical emergency. During the 8 year period of this study there were nine maternal deaths in DIC patients giving a case mortality rate of 12% (Table 2)

In a study done by Rattray et al in 2012 the associated maternal morbidity included transfusion≥5 units (59%), hysterectomy (18%), ICU admission (41%), and ATN requiring dialysis (6%). There were three maternal deaths, giving a case fatality rate of 1 in 16. The perinatal outcomes included stillbirth (25%), neonatal death (5%), and NICU admission (72.5%). [7]

In our study fifty eight patients (76%) had undergone surgical treatment during the present study period. The most common procedures were cesarean section 65%, hysterectomy 8% and uterine artery embolization 4%. Hysterectomy was done in 6 patients (8%) and uterine artery embolization in 3 patients (4%). All hysterectomies performed were in the group with DIC caused by postpartum hemorrhage.

Table 2: Findings in DIC patients with mortality

No	GA/ Postpartum	Clinical presentation	Lab findings	Event prior to referral	Fetal outcome
1	Postpartum	Sepsis, Multiorgan failure, Shock, ARF, Anemia	Platelet- 38000, PT- 49.9, PTT- 110, SGOT/ SGPT- 328/123, Creatinine- 4.1	Patient referred after CS	good
2	Postpartum	sepsis, Multiorgan failure, Shock, ARF	platelet- 18000, PT-15.2, PTT-39.4, SGOT/ SGPT- 77/32, Creatinine-3.9	Patient referred after vaginal delivery	good
3	Postpartum	PPH, Shock, ARF, cardiac arrest	platelet- 129000, PT-33.4, PTT-64.4, Creatinine-1.3	Patient referred after vaginal delivery	good
4	Postpartum	PPH, Shock, multiorgan failure, cardiac arrest	platelet- 38000, PT-44.7, PTT- 115	CS + Hystrectomy	good
5	Postpartum	PPH, Shock, ARF, severe preeclampsia	platelet- 234000, PTT- > 3minute, SGOT/ SGPT- 121/84, creatinine- 2.5	Patient referred after vaginal delivery	good
6	37 weeks	Jaundice, HELLP, Hepatic encephalopathy, Shock, Hepatitis, AFNL, ARF	platelet- 56000, PT- 21.1, PTT- 52.2, SGOT/SGPT- 121/140, creatinine- 3.1	CS	IUD
7	Postpartum	PPH, shock, ARF, hypoxic brain damage	platelet- 100000, PT- 15.5, PTT- >3minute, creatinine- 2.1	Patient referred after CS	good
8	21 weeks	Severe preeclampsia, shock, APH	platelet- 89000, PT- 88, PTT- 120, SGOT/ SGPT- 84/86, creatinine- 2.2	-	IUD
9	Postpartum	HELLP, Shock, Sepsis, ARF, Cardiac arrest	platelet- 73000, PT- 30.7, PTT- 98, SGOT/ SGPT- 375/320, creatinine- 2.0	Patient referred after CS	good

The perinatal outcomes as stillbirth (3%), neonatal death (5%), and NICU admission (37%). 22 fetuses died, most related to abruptio placentae 60%, Eclampsia 50%, HELLP 37%, AFPL 10% and amniotic fluid embolism 5%.

All of the presented patients required treatment with blood components. Replacement of blood loss with packed red

blood cells is the first priority in order to maintain oxygen delivery to tissue. Plasma components and platelet concentration are given to replace the coagulation factors. Cryoprecipitate may be useful in circumstances where fibrinogen is low and volume overload is a concern. The therapy should be guided by the clinical condition of the patient and laboratory evidence of a coagulopathy.

The present study had several limitations, including that the data were collected retrospectively and there was selection bias because the presented setting was in a tertiary medical care center and most of the presented severe cases had been transferred from other hospitals.

Conflict of interest: No conflict of interest among the authors in the study.

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