



## Maternal And Fetal Outcome In Pregnancy Complicated By Abruption Placentae

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### Abstract

**Background:** Despite advances in modern medicine, obstetric hemorrhage remains one of the leading causes of maternal morbidity and mortality in both developed and developing countries. 2 – 5% of all pregnancies are complicated by it. Antepartum hemorrhage is a medical emergency and accidental hemorrhage, or abruption placenta, accounts for 15% of all cases of APH leading to significant not only maternal but perinatal morbidity and mortality also. This study aimed at identifying high risk factors for abruption placenta and its consequences on maternal and fetal parameters.

**Methods:** Observational, non-interventional, cross-sectional study conducted in the department of obstetrics and gynecology at Seth G.S Medical College and Kem Hospital over a period of two years from January 2016 to December 2017. 100 patients diagnosed with abruption placenta, meeting the inclusion criteria were recruited in the study. Percentages and proportions were calculated. Data was collected both retrospectively and prospectively after ethics committee approval.

**Results:** Incidence of abruption placenta was found to be 0.7%. Preeclampsia was present in 58% of cases, 16% having history of preeclampsia in past pregnancy also. 60% cases were unbooked. Emergency caesarean section rate was 69%. Preterm deliveries were 72% and 83% babies were low birth weight. Out of 79 live births, 51 (64%) needed NICU admission. Perinatal mortality was found to be 37.5%. DIC was the most common maternal complication observed followed by PPH and hypovolemia.

**Conclusion:** Incidence of abruption can be decreased by increasing antenatal registrations, regular antenatal care, picking up and treating high risk factors, timely diagnosis, availability of blood transfusion, prompt action at the time of occurrence.

**Keywords:** abruption placenta, maternal morbidity, perinatal morbidity, perinatal mortality

### Introduction

Abruption placentae, Latin meaning ‘rending asunder of the placenta’ [1], is the premature separation of a normally implanted placenta from the uterine wall after the age of viability but before the foetal delivery, resulting in haemorrhage [2,3]. It is one of the major causes of obstetric haemorrhage, contributing to a one third of cases of antepartum haemorrhage and a common cause of maternal

morbidity and mortality globally, especially in the developing countries.[4] Around 1 % of pregnancies are complicated by abruption placentae, [1] incidence being higher, up to 4.5% in developing countries [5, 6] and much lower, about 0.4 – 1% in developed countries [7,8]. It has serious consequences such as haemorrhagic shock, disseminated intravascular coagulation, acute kidney injury, multiple organ failure, intensive care admissions in the mother and

even maternal mortality. In the foetus, it is one of the major causes of prematurity leading to severe perinatal morbidity and mortality [6]. Perinatal mortality from abruption placentae has been reported from as low as about 1 in 830 (0.12%), to as high as 65% and a fatality rate of up to 3% [4, 9]. Over 50% of all perinatal deaths related with abruptio placentae in pregnancy are accompanied with premature delivery [10]. Exact aetiology of placental abruption remains unknown, however, impaired placentation, hypoxia, under perfusion of placenta leading to uteroplacental insufficiency are some of the proposed mechanisms [6]. Multiple predisposing risk factors associated with this catastrophe include pregnancy induced hypertension (PIH), advanced maternal age, polyhydramnios, preterm labour, premature rupture of membranes, sudden decompression of uterus, maternal trauma, retroplacental bleed post procedure or fibromyoma, anaemia, chorioamnionitis, smoking, short umbilical cord, previous caesarean section and velamentous cord insertion [6].

Depending upon the degree of placental separation, abruptio placentae can be complete or partial and the haemorrhage can be revealed, concealed or mixed. When more than 50% of the placenta separates, foetal death becomes inevitable. Despite many advances in the field of obstetrics, diagnosis of abruption is essentially clinical, hallmarks being vaginal bleeding, tetanic uterine contractions, uterine hypertonicity, uterine tenderness, a non-reassuring foetal heart rate pattern or foetal death [11]. In most scenarios abruption placentae can neither be predicted nor prevented, it can only be managed according to the best of our abilities. Hence a thorough knowledge about abruption and more of a high index of suspicion is required to diagnose it early.

Purpose of our study was to know the incidence of abruptio placentae in our institute and highlight on high risk factors which should be picked up on time, eliminated or at least controlled to reduce the maternal and perinatal morbidity & mortality due to this serious obstetric problem. Maternal and foetal outcomes were assessed to emphasize on serious consequences associated with abruption.

## Materials And Methods

This was an observational, non-interventional, cross-sectional study conducted in the department of obstetrics and gynaecology at Seth G.S Medical

College and Kem Hospital. Total confinements from January 2016 to December 2017 were 13000. A total of 100 patients diagnosed with abruptio placentae either pre delivery or immediate post-delivery based on the clinical features, presence of retroplacental clot on examination of the placenta, were recruited in the study provided they fulfilled the inclusion criteria. The study was initiated only after approval by the Institutional ethics committee and Maharashtra University of Health and Sciences. The demographic features, clinical presentation, neonatal and maternal outcome of abruptio placentae and complications were studied.

## Inclusion Criteria

Pregnant women above 28 weeks of gestation diagnosed with abruptio placentae irrespective of the underlying cause were included in the study.

## Exclusion Criteria

Antepartum haemorrhage due to any cause other than abruptio placentae and patients who were not willing to participate in the study were excluded.

As data was collected both retrospectively and prospectively with respect to ethics approval, consent was taken only from the patients who were followed up prospectively to observe outcome. Retrospective data was collected from the available hospital records of patients who were diagnosed as abruption placentae. If patients fell short of aforementioned criteria, they were omitted from the study. As this was a purely observational cross-sectional study wherein our objective was not to compare between two groups or to find any association between risk factors and outcome, descriptive statistics i.e., percentages and proportions were calculated and no statistical test has been applied.

## Outcomes Measured

Proportion of Abruptio placentae in women presenting to a tertiary care hospital, gestational age and parity at which abruption placentae was commonly seen.

Presence of any known risk factors, complications of abruptio placentae like disseminated intravascular coagulation, hypovolemia and shock, postpartum haemorrhage, acute kidney failure, maternal morbidities such as need for intensive care unit admission, blood products, operative interventions,

maternal mortality, neonatal outcomes like low birth weight, need for intensive care unit admissions, APGAR, still birth rate and neonatal mortality were assessed.

## Results

Table 1. shows demographic variables of study population. Majority of the women were in the age group of 25 to 29 years. 60% of the cases were transferred from other centres to our tertiary care centre. Most common gestational age at presentation was 31 – 33 weeks (33%) followed by more than 37 weeks – 25 %. Only 7% of cases were diagnosed postnatally by examining placenta after delivery for retroplacental clots.

Table 2. depicts risk factors associated with abruptio placenta. Although exact etiology of abruptio placenta is not clearly known, there are many risk factors for developing this complication. The most common risk factor observed in our study was pre-eclampsia (58%), followed by multiparity (50% cases). There were 6 cases which had no risk factors at all and 8 cases which had more than 4 risk factors. 40% of them had at least two risk factors. 16 and 15 cases had history of pre-eclampsia and abruptio placenta in past pregnancy, respectively, ascertaining the association between hypertension and abruptio. Presentation on admission is depicted in Fig. 1. Severe Abdominal pain with tonically contracted uterus was the commonest presenting factor (55%) followed by vaginal bleeding (46%). 13% had fetal distress on admission. Abruptio is more commonly revealed or mixed where blood tracks through membranes and decidua escaping from the os with passage of clots, seen in more than 2/3<sup>rd</sup> of cases. Concealed variety of accidental hemorrhage occurs when there is bleeding or formation of retroplacental clot which is not seen externally. It is more dangerous than other two varieties and leads to more complications in mother and fetus and is one of the reasons why blood loss estimation in abruptio should not be based upon the amount of bleeding observed. Fig 2. Shows that 46% cases in our study had revealed variety of abruptio placenta and 28% had concealed hemorrhage. Around 82% cases had retroplacental clot which was significant, about 100-200gms, in 24% cases and about 50 – 100 g in 30 % clot. More than 500 g clot was seen in 10% patients. Antenatal ultrasound could pick

retroplacental clot in only 25 cases confirming that abruptio placenta is mainly a clinical diagnosis.

Table 3. shows maternal outcome variables. 72% were preterm deliveries out of which 36.1% were vaginal deliveries. Labour was induced in 17 patients. Rate of caesarean section was high (69%) which included 33.3% full term and 66.7% pre term LSCS. None of the patients needed instrumental delivery, which could be due to our protocols of directly preferring caesarean section in viable foetus and in first recording of foetal distress evidenced by non-reassuring foetal heart rate patterns. Maternal mortality was seen in only 2 cases. One was due to myocarditis and another due to acute fatty liver of pregnancy. 5% ICU admissions were mainly due to hypovolemic shock. Blood products were needed in 77% cases, PCV being the most commonly transfused product in 67 out of 77 cases, followed by FFP. Disseminated intravascular coagulation was most common complication observed, 16 out of 100 cases, followed by hypovolemia (15/100) and PPH (12/100). PPH cases were successfully managed medically, none patient underwent obstetric hysterectomy.

Table 4. shows neonatal outcome variables. There were total 104 births as four were twin gestation. Of them 25 were still births (24%) . In the 25, 18 were macerated and 7 were fresh still birth. There were 79 live births (75.9%) of which 14 neonatal deaths occurred( 17%). In the 79 live births, APGAR 7/10 or less was found in 24 babies (30%) and NICU admission was required in 51 babies (64%). Total perinatal mortality was 37.5%. There were 87 babies with low birth weight (less than 2.5 kg) i.e., 83%.

## Discussion

The incidence of abruptio placenta in our study was found to be 0.7%, consistent with global incidence rates of 0.4-1% in singleton births, and 1 to 2% among twin pregnancies [12]. In India, it ranges from 2.5 % to 3.8% [13], however some studies have reported it to be as high as 4.5% [5,6]. The difference could be due to study designs, study populations and diagnostic criteria. The most common maternal age at presentation in our study (21 – 29 years) was comparable to a study conducted by CV Ananth *et al* where women with mild abruptio and severe abruptio were compared, though the incidence of severe abruptio in their study was more in age above

35 years [14]. Referrals from rural areas was seen in 60% cases in our study, similar to study conducted by Bibi.S et al [5] where 64% patients were referred from rural areas. Association between previous caesarean delivery and increased risk of abruptio placentae is reported in many studies [15,16], 18% and 3% cases in our study had history of previous one and two caesarean sections respectively, comparable with studies conducted by Pariente G et al [7], with 19.4 % prior caesarean section rates and Getahun D et al, [15], who concluded a 30% increased risk of abruption following previous two caesarean births. In our study, the occurrence of abruptio placentae was higher in women with high parity and multigravida as compared to nulliparous or primigravid women. These results are consistent with many previous studies [17,18], but was in contrast with findings of Sanchez and colleagues [19]. Pre-eclampsia, both, in past and index pregnancy, threatened abortion and premature rupture of membranes were found to be high risk factors for abruptio placenta in our study consistent with conclusions of a meta-analysis conducted by Ananth CV et al [14] where odds ratio of 1.73, threefold higher risk and strong association of placental abruption was found in hypertensives, premature and prolonged rupture of membranes and threatened abortion, respectively [20]. Pariente G. et al [7], in a comparison of women with abruption and without abruption also found a higher incidence of hypertension, premature rupture of membranes and habitual abortions in women with abruption. Diagnosis of abruption is always clinical [12]. Ultrasonographically, abruption may show a variety of appearances depending upon the size, location of bleed and also the time between the abruption and when ultrasonography was performed. Ultrasonographic criteria for diagnosis of placental abruption include preplacental collection under chorionic plate, jelly-like movement of chorionic plate with fetal activity, retroplacental collection, marginal haematoma, subchorionic haematoma, increased placental thickness >5 cm and intra-amniotic haematoma. We performed ultrasound on 34 patients out of which retroplacental clot could be picked up in 25 cases, while the rest 9 cases had evidence of retroplacental clot after delivery despite negative USG findings.

Mode of delivery in abruptio placenta gets influenced by gestational age, severity of abruption and live or dead foetus on presentation. In our study emergency Caesarean section rate of 69% was comparable with studies conducted by Abasi et al [21] 56%, Igwegbe et al. [22] 75.4%, somewhat lower than studies conducted by Coleman et al. [23] 83%, Macheku et al [24] 85% and higher than some other studies [9, 25, 26]. Comparison of mode of delivery with some studies is shown in Table 5. These differences are attributed to differing management protocols although caesarean delivery is a better option for women with abruptio placentae with a live foetus as this mode of delivery could reduce the perinatal death rate by 20 to 50% [27]. Vaginal delivery is the preferred mode when the foetus is dead and the mother is haemodynamically stable [2,3,23].

Perinatal mortality in our study was found to be 37.5% which is considerably lesser than other studies Hossain et al [9], 65%, Kapadia et al [26], 72%, Behran et al [28], 50%, which could probably be explained by prompt transfer to neonatal intensive care unit and immediate and extensive resuscitation efforts. The lower still birth rate could be explained by the higher caesarean rate on diagnosis of abruptio placentae with a live foetus. The high risk of low-birth-weight delivery among women with abruptio placentae may be explained by the effect of preterm birth due to premature termination of pregnancy performed by clinicians due to severity of abruptio placentae or effect of intrauterine foetal growth retardation [24]. It has been previously reported that the magnitude of stillbirth is dependent on the degree of separation of placentae, particularly when it exceeds 50 %. An increased risk of preterm birth among women with abruptio placentae in our study was consistent with previous investigators [25,26,29]. Abruptio placentae have been found to be the most common cause of consumptive coagulopathy in pregnancy [4, 23]. Tissue damage, anoxia and shock activate the coagulation system which in turn activates fibrinolysis. This results in consumption of platelets and coagulation factors and continuing bleeding causes further depletion of these haemostatic constituents from the circulation [2, 4, 23]. Maternal morbidities are compared in Fig 3. Most common complication observed in this study was DIC, followed by Hypovolemia and PPH [5,26,30]. Easy, timely and prompt availability and



administration of blood products can remarkably improve outcome and prognosis. PCV is the most commonly required blood product followed by FFP and PRP. Significant number of cases usually require more than one type of blood product.

There have been multiple clinical and epidemiological studies to determine the etiology of abruption. Table 6. shows strength of association between some common and well described high risk factors and abruptio placenta [31]. Despite all of that, the etiology remains yet to be precisely determined. There have been many theories and studies proving association with multiple risk factors but more than 40% of abruption cases have no demonstrable causes.

### Conclusion

Although awareness in regards to abruptio placentae has increased, it remains unpredictable and unfortunately unavoidable. In spite of the many known risk factors, the exact etiopathogenesis remains largely unknown. Hence a high clinical index of suspicion, early diagnosis and prompt management remain cornerstone in managing abruptio placentae. An effective patient education program coupled with good family planning services can help in decreasing the incidence of abruption. Patients have to be educated for early antenatal booking. With early booking, risk factors can be treated and controlled. In our country most women are anaemic to begin with hence their requirement of blood during emergency condition like abruption is higher. We recommend early registration, regular hematinic consumption from early pregnancy itself.

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**Table 1: Demographic Characteristics Of Study Population**

Characteristics	N (%)
<b>Maternal age(yrs)</b>	
<19	2 (2)
20-24	27 (27)

25-29	42 (42)
30-34	18(18)
>35	11 (11)
<b>Registration status</b>	
Unbooked (referred to our centre)	60 (60)
Booked	40 (40)
<b>Gravidity</b>	
Primi gravida	38 (38)
Multigravida	61 (61)
Grand multipara (>5)	1 (1)
<b>Prior caesarean section</b>	
Previous one LSCS	15 (15)
Previous two LSCS	3 (3)
<b>Gestational age(weeks)</b>	
28-30	18 (18)
31-33	33 (33)
34-36	24 (24)
>36	25 (25)
<b>Time of diagnosis</b>	
Pre delivery	93 (93)
Post delivery	7 (7)

**Table 2: Risk Factors Associated With Abruption Placenta**

<b>Index pregnancy</b>	<b>N (%)</b>
Pre-eclampsia	58 (58)
Multiparity	50 (50)
Threatened abortion	38 (38)
Premature rupture of membranes	34 (34)
Advanced maternal age	11 (11)
Polyhydramnios	5 (5)
Multiple gestation	4 (4)
History of trauma	1 (1)
Renal disease	2 (2)
Essential hypertension	2 (2)
<b>Previous pregnancy</b>	
Preeclampsia	16 (16)
Eclampsia	1 (1)
Abruptio placenta	15 (15)
Postpartum haemorrhage	3 (3)

**Table 3: Maternal Outcome Variables**

<b>Variables</b>	<b>N (%)</b>
Induced labour	17 (17)
For Abruption	8 (47)
Other indications	9 (53)
<b>Mode of delivery</b>	
<b>LSCS</b>	69 (69)
Full term	23 (33.3)
Pre term	46 (66.7)
<b>Vaginal delivery</b>	31 (31)
Full term	5 (16.12)
Pre term	26 (83.8)
Maternal mortality	2



<b>Need for blood products</b>	77 (77)
PCV	67
FFP	18
Cryoprecipitate	9
PRP	5
All four	9
<b>Maternal complications</b>	
DIC	16
PPH	12
Acute tubular necrosis	5
Hypovolemia	15
ICU admission	5

**Table 4. Neonatal Outcome Variables**

<b>Variables</b>	<b>N (%)</b>
<b>Total births</b>	104
Male	47 (45)
Female	57 (55)
<b>Live births</b>	79 (75.9)
Male	36 (45.5)
Female	43 (54.4)
<b>Still births</b>	25(24)
Male	11
Female	14
Macerated still births	18
Fresh still births	7
NICU admissions	51 (64)
<b>Neonatal deaths</b>	14 (17.7)
Male	8
Female	6
APGAR 7 or less	24
<b>Birth weight</b>	

< 1kg	13
1-1.5kg	28
1.5-2kg	25
2-2.5kg	21
2.5-3kg	6
>3kg	11

**Table 5. Comparison Of Mode Of Delivery**

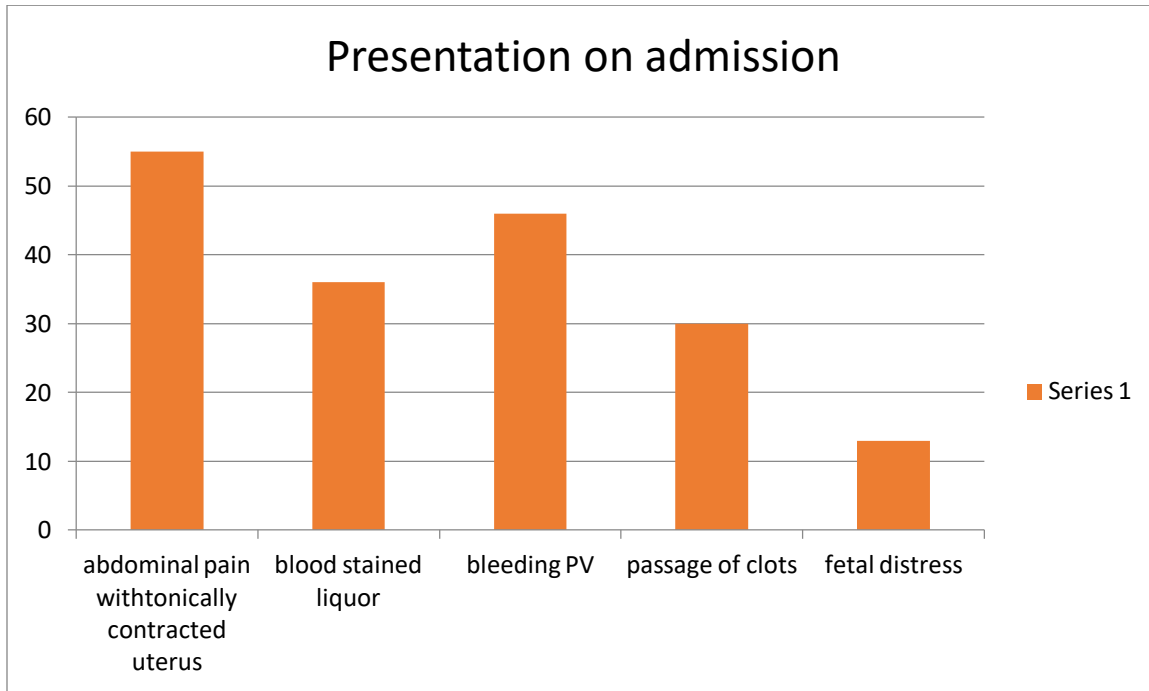
Study	LSCS	Vaginal delivery	Preterm births
My study	69%	31%	70%
Hossain N et al [9]	45%	50%	
Chaudhary V et al [25]	45%	55%	80%
Kapadia et al [26]	34%	66%	76%
Macheku et al [24]	85%	27%	

**Table 6: Evidence And Strength Of Association Between Abruptio And Its Proposed Risk Factors [31]**

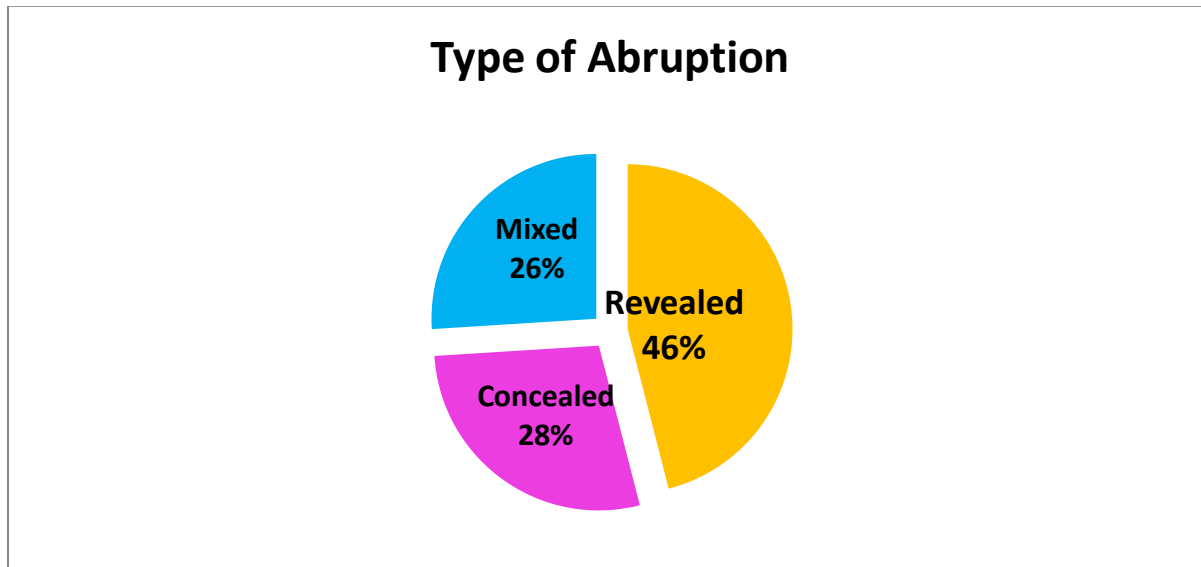
	Evidence
Risk factors	Relative risk or Odds Ratio
Chronic hypertension + Pre-eclampsia	7.8
Cocaine drug use	5 – 10
Chronic hypertension	1.8 – 5.1
Mild and severe pre-eclampsia	0.4 – 4.5
Premature rupture of membranes	1.8 – 5-1
Maternal age and parity	1.1 – 3.7
Cigarette smoking	1.4 – 2.5
Multiple gestation	1.5 – 3.0
Oligohydramnios	2.5 – 10
Chorio amnionitis	2 – 2.5

Nutritional deficiency	0.9 – 2.0
Male fetus	0.9 – 1.3

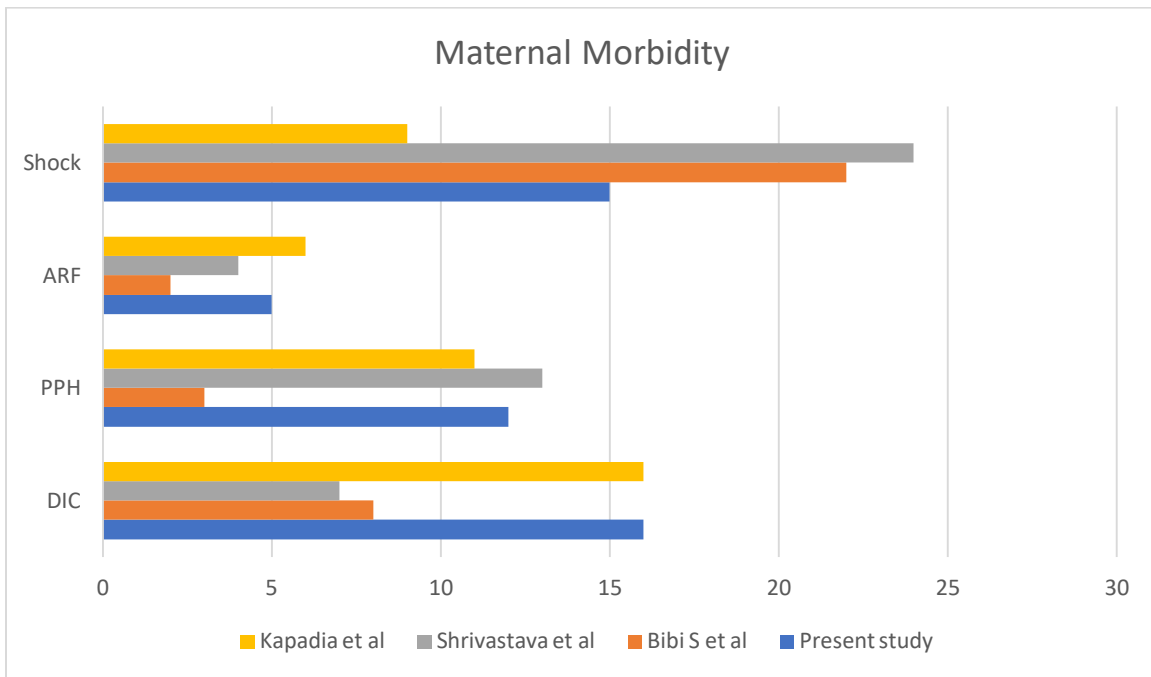
**Fig.1. Clinical Features At Presentation**



**Fig 2: Type Of Abruption**



**Fig 3. Comparison Of Maternal Morbidities**



**DIC = Disseminated intravascular coagulation**

**PPH= post-partum haemorrhage**

**ARF= acute renal failure**