

UNIVERSITY OF KHARTOUM

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**Risk factors, maternal complications and neonatal outcome of  
major placenta praevia**

**By**

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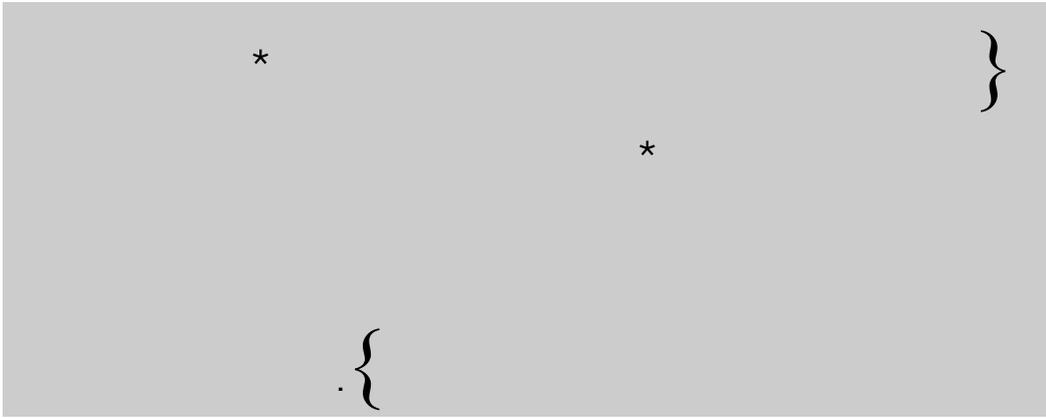
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(14-12)

# **Dedication**

*To.... !!!!*

*My wife !!!*

*Our sons " Waiel & Moaz" ..!!*

*for their support.*

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*Thank you all.*

## **ABBREVIATIONS**

<b><u>Abbreviation</u></b>	<b><u>Meaning</u></b>
<b>APH</b>	Antepartum haemorrhage
<b>AKMICH</b>	Al Kharj Military Industries Corporation Hospital
<b>BT</b>	Blood transfusion
<b>C.T</b>	Computerized tomography
<b>C/S</b>	Caesarean section
<b>FHR</b>	Fetal heart rate
<b>gm/dl</b>	Gram/deciliter
<b>GIT</b>	Gastrointestinal tract
<b>Hb</b>	Haemoglobin
<b>ICU</b>	Intensive Care Unit
<b>IVH</b>	Intraventricular haemorrhage
<b>IUFD</b>	Intrauterine fetal death
<b>KTH</b>	Khartoum Teaching Hospital
<b>Kgm</b>	Kilogram
<b>MRI</b>	Magnetic resonance imaging
<b>NICU</b>	Neonatal Intensive Care Unit
<b>NND</b>	Neonatal death
<b>NEC</b>	Necrotizing enterocolitis
<b>OMH</b>	Omdurman Maternity Hospital
<b>PPH</b>	Postpartum haemorrhage
<b>PP</b>	Placenta praevia
<b>PPA</b>	Placenta praevia accreta
<b>RR</b>	Relative risk
<b>RCOG</b>	Royal College of Obstetrician and Gynaecologist
<b>RDS</b>	Respiratory distress syndrome

<b>RKH</b>	Riyadh AlKharg Hospital
<b>SCBU</b>	Special Care Baby Unit
<b>SUH</b>	Soba University hospital
<b>TVS</b>	Trans-vaginal scan
<b>TAS</b>	Trans-abdominal scan
<b>U/S</b>	Ultrasound
<b>UTI</b>	Urinary tract infection
<b>Vs</b>	Versus

## **ABSTRACT**

This is a prospective, descriptive study conducted among two different groups of patients in two different countries.

The first group was carried at AKMICH in K.S.A during the period between June 1999 to July 2003. The second group was at three big hospitals in Khartoum State (SUH, KTH, OMH) in the period between January 2005 to August 2005.

The aim of the study was to assess the risk factors of PP, maternal complications and neonatal outcome and to perform a comparison between the two groups of the study.

In the first group of the study the incidence of PP and PA were 5 in 1000 and 0.5 in 1000 pregnancies respectively, while in the second group the incidence were 2.8 per 1000 pregnancies and 0.3 per 1000.

An association between PP and high parity was found in both studied ( $P = 0.006$  in the first group and  $P = 0.000$  in the second group). Also the incidence of PP was directly proportional to the maternal age in the first and second groups ( $P = 0.001$ , and  $P = 0.004$  respectively).

Previous C/S was found to be a risk factor for PP in the second group ( $P = 0.038$ ), while high percentage of the first group had previous one or more C/S (48.4%).

In both groups there was high rate of maternal complications. In the first group obstetric haemorrhage (32.8%), caesarean hysterectomy (6.3%), BT (32.8%), hemoglobin less than 10 gm/dl (53.1%), prolonged hospital stay (mean  $6.52 \pm 1.76$

days). In the second group the rate was 63.5%, 13.5%, and 61.5% and mean was  $10.0 \pm 1.12$  respectively. There was one maternal death in the second group (1.9%), while in the first group no maternal death was found.

In both studies PP was associated with adverse perinatal outcome. In the first group there was a significantly higher rates of prematurity, admission to SCBU, NICU, Apgar score less than 7 in 5 minutes ( $P = 0.000$ ;  $P = 0.001$  and  $P = 0.001$ ) respectively.

There was no significant difference in perinatal mortality in this group ( $P = 0.089$ ).

The second group also showed significantly higher rates of prematurity, admission to SCBU, NICU, Apgar score  $<7$  at 5 minutes and increased perinatal mortality ( $P = 0.000$ ;  $P = 0.000$ ;  $P = 0.007$  and  $P = 0.000$ ) respectively.

The study concluded that PP is associated with adverse maternal and neonatal outcome. Increased maternal age, high parity and previous C/S were risk factors.

. 2003

1999

. 2005

2005

(5)

0.3

2.8

39 – 29

%48.4

(%1.9)

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## INTRODUCTION AND LITERATURE REVIEW

Placenta praevia (P.P) exists when the placenta is inserted wholly or in part into the lower segment of the uterus at or after 24 weeks gestation, if covers the cervical os, it is considered a major or complete praevia. The term praevia should be restricted to cases where placental edge is  $\leq 2$  cm from the internal cervical os.<sup>(1)</sup>

According to its relation with the uterine cervix, placenta praevia is classified into:

- Complete placenta praevia; the placenta completely covers the internal cervical os.
- Partial placenta praevia; the placenta partially covers the internal cervical os.
- Marginal placenta praevia; the placenta is implanted at the margins of the internal os.

The exact cause of placenta praevia is unknown, and the lower implantation of the placenta may be only by chance. The incidence of P.P at term is in the range of 3 to 6 per 1000 pregnancies.<sup>(2)</sup>

Risk factors for placenta praevia include:

- Advanced maternal age.
- High parity.
- Multiple pregnancy (large placental size).
- Previous induced and spontaneous miscarriages.
- Previous uterine scars (hysterotomy, myomectomy, and lower segment caesarean scar), this may be attributed to:
  - Alteration of the blood supply to the area.
  - Change in the depth and quality of the endometrium.
  - Change in the contour and shape of the uterine cavity.

Diagnosis is determined by ultrasonic imaging techniques. Transabdominal ultrasound scan (TAS) is the conventional but recently transvaginal ultrasound scan (TVS) and translabial scan (TLS) are found to be more accurate and reliable.<sup>(3)</sup> TVS compared to TAS is more reliable, does not need full bladder and is of special advantage with posterior situated placenta. In the situation of TAS the ultrasound waves may be rejected back by the culvarum and may be difficult to delineate the lower edge of the placenta. TVS makes visualization of posterior low lying placenta very easy and

the relation of the placental edge to internal os can be determined accurately. Additional benefit is reduced scanning time in TVS.

Another condition related with P.P. is vasa praevia. This rare condition can cause antepartum haemorrhage (APH) and its diagnosis is usually missed. It occurs when there is velamentous insertion of the cord and the vessels lie on the membranes covering the internal os in front of the presenting part. It causes vaginal bleeding when the membranes rupture. The blood loss is foetal, and this when suspected can be confirmed by testing for foetal haemoglobin (FHb). There are few reports of diagnosing this condition by TVS with color Doppler in women with risk factors such as bilobed or succenturiate placenta, low lying placenta, multiple pregnancy or pregnancy resulting from in vitro fertilization (IVF).<sup>(4)</sup>

### **Placenta accreta:**

Placenta accreta occurs when there is a defect of the decidua basalis resulting in abnormally invasive implantation of the placenta and morbid adherence into the myometrium. The resultant incomplete separation of the placenta may lead to massive haemorrhage. Furthermore, placenta accreta is associated

with high maternal mortality and morbidity. The incidence of P.A has increased 10 fold in the past 50 years and now occurs with a frequency of 1 per 2,500 deliveries. Women who had two or more caesarean deliveries with anterior or central placenta praevia have nearly a 40% risk of developing placenta accreta.<sup>(5)</sup>

Evidence suggests that magnetic resonance imaging (MRI) and grey scale ultrasound may be useful to define an abnormally implanted placenta.<sup>(6)</sup> Still these methods are not conclusive and diagnosis may not be reached even after applying these methods. If the diagnosis or strong suspicion of placenta accreta is formed before delivery, the patient should be counseled about the likelihood of hysterectomy and blood transfusion. Blood products and clotting factors should be available as well as appropriate location and timing for delivery to allow access to adequate surgical personnel and equipment. A preoperative anaesthesia assessment should be obtained.

Normally spontaneous detachment of the placenta occurs in 90% of patients within 15 minutes, 95% within 30 minutes. Any further delay in its delivery should be considered either due to retention or morbid adherence. The exact causes of placenta

accreta are not known, but both trophoblastic invasion and defective or missing decidual layer have been suggested as possible causes of its morbid adherence.

Risk factors associated with placenta accrete include:-

- Previous lower segments caesarean section (C/S).
- Placenta praevia.
- Grandmultiparity.
- Previous vigorous curettage.

The grading of this condition is related to the depth of invasion, and the terms used are:<sup>(7)</sup>

- Placenta accreta: the placenta is partially or completely adherent to the uterus with penetration of the villi into the superficial part of the myometrium.
- Placenta increta: the villi penetrate deeply through the deciduous into the myometrium.
- Placenta percreta: penetration can even be seen on the serosal surface.

Placenta accreta also can be classified according to the amount of placental involvement into:<sup>(8)</sup>

- Focal adherence; a single cotyledon is involved.
- Partial adherence; several cotyledons are involved.
- Total adherence; the entire placenta is involved.

Lower segment C/S is the most identifiable risk factor and there is a well-documented association between placenta praevia, previous C/S and the development of placenta praevia accreta.

Mellor et al found the risk of placenta accreta ranged 2% in women < 35 years with no previous C/S deliveries to almost 39% in women with two or more C/S deliveries.<sup>(9)</sup>

In a retrospective study by Clerk *et al*<sup>(10)</sup> to assess the relationship between increasing number of previous C/S and the development of placenta praevia and placenta accreta, they found that in women with one uterine incision, the risk of placenta praevia was 0.26% compared with 10% in women with four or more uterine incisions.<sup>(7)</sup> In the same study they found that, the effect of advancing age and parity on the incidence of placenta praevia was less significant. Zaki *et al*<sup>(11)</sup> have conducted a retrospective study in Abha Maternity Hospital in Saudi Arabia to assess the risk factor and morbidity of placenta praevia accreta. The records of all patients delivered by c/s for placenta praevia

were reviewed in the period from 1990-1996, out of 23070 deliveries, 110 (0.48%) had placenta praevia, 12 (0.05%) had placenta praevia accreta. They found that there was no significant difference in age and parity. In the study they found also that the incidence of placenta praevia accreta increased linearly from 4.1% in patients with no scars to 60% in patients with 3 or more C/S. Emergency hysterectomy and PPH were significantly higher among the praevia accreta patients compared with praevia alone.

In contrast Lyasu et al found the incidence of PP to be higher in women aged 35 years or more than in women less than 20 years.<sup>(12)</sup> If the likelihood of placenta praevia increases with the greater number of caesarean deliveries, this finding would support the idea of the causal relationship between prior C/S delivery and PP.

Ananth et al in a study to determine the incidence of PP and to identify the risk of its development based on the presence and number of C/S deliveries and history of induced or spontaneous miscarriages<sup>(13,2)</sup>. They reported the incidence of PP ranged between 0.28% and 2%. In the same study they found that women with at least one prior C/S delivery were 2.6 times at greater risk

for development of PP in a subsequent pregnancy. In another study women with history of spontaneous or induced miscarriages had a relative risk of PP of 1.6 and 1.7 respectively.

Johnson et al in a retrospective study to assess the effect of curettage on PP concluded that, the risk of PP may be increased in a close response fashion by multiple sharp curettage miscarriages.<sup>(14)</sup> However, vacuum aspiration does not confer on increased risk, and may be a better alternative. Einola *et al* also found a similar relation.<sup>(15)</sup>

Benirschke and others have theorized that patients with twin gestations are at increased risk of development of PP because of limited uterine space and increased placental mass.<sup>(16)</sup>

Brenner *et al* reported a significantly higher rate of PP in women carrying twin pregnancy.<sup>(17)</sup> Strong and Barr<sup>(18)</sup> supported this but Spellacy et al found no increased risk of PP among twin gestations.<sup>(19)</sup> In addition an English Language Medline Search failed to identify any study that has evaluated whether high order multiple gestations are at increased risk for PP development.

Francois *et al* found that, outcome and complications of PP do not differ between singleton and multiple gestation.<sup>(20)</sup>

## **Clinical presentation:**

### **Vaginal bleeding:**

Placenta praevia is much more common in early pregnancy than at term. PP classically is characterized by painless vaginal bleeding in the late 2<sup>nd</sup> or 3<sup>rd</sup> trimester. However, uterine pain and/or contraction do not exclude the diagnosis in women with vaginal bleeding. The first haemorrhage usually is not severe (the warning haemorrhage), although this is not invariable and sometimes it may be so profuse.<sup>(8)</sup>

- ***Asymptomatic:*** during the routine 2<sup>nd</sup> trimester U/S, the placenta is observed to cover the cervix in 5-20% of pregnancies. However, because of the growth of the uterus throughout the pregnancy, more than 90% of early PP convert to a normal location by the time of delivery. Conversion to a normal location is less common in centrally located complete PP.
- ***Abnormal fetal presentation:*** is observed in up to 30% of cases. As the placenta occupies the lower uterine segment, thus preventing the presenting part from getting engaged, high head, breech presentation, transverse or oblique lie are

encountered. In asymptomatic cases they become more significant in suspecting the presence of PP, the longer they persist in late pregnancy. Lam CM et al<sup>(21)</sup> from Princess Margaret Hospital, Hong Kong conducted a retrospective study to evaluate the maternal and neonatal outcomes of women with PP and APH, compared with women with a diagnosed PP who did not bleed. They found the majority of women with bleeding had an emergency C/S for APH and more delivered early because of fetal distress. The mean birth weight was lower in women with APH. More infants in the bleeding group had a low Apgar score at the first minute, respiratory distress syndrome (RDS) and admission to Special Care Baby Unit (SCBU) and Neonatal Intensive Care Unit (NICU). It is concluded that there is an increased risk of premature delivery in women with APH and PP.

- ***Clinical examination:*** the general condition of the patient is usually good, as the first attack of bleeding is usually slight. Abdominal examination shows the uterus to be soft and not tender. The foetal heart rate (FHR) is usually normal.

- **Placenta accreta:** PA should be suspected in all women with PP. 9-10% of cases of PP are associated with PPA. In the majority of cases, PA remains asymptomatic until delivery. Although bleeding prior to labour is not uncommon, it is more likely to be related to PP than accreta. A definitive diagnosis of accreta is not possible prior to delivery. However, it may be possible to detect accreta with TVS. In cases delivered vaginally they may present either as a retained or partially separated placenta with severe PPH. Placenta praevia accreta may present as severe intraoperative bleeding due to difficulty in its removal and may necessitate caesarean hysterectomy as a life saving procedure.

## **Management:**

### **Symptomatic PP:**

Management depends on the stage of pregnancy and the extent of haemorrhage. The aim of conservative treatment for such cases is prolongation of pregnancy to achieve maturity whenever possible. Macafee (1945) proposed a regime required adherence to several principles which are: <sup>(22)</sup>

- Admission of the patient once the diagnosis was made.

- Blood to be available and ready for transfusion whenever needed.
- Anaemia to be looked for and corrected with blood transfusion (BT).
- Facilities for emergency C/S to be available.

Several attempts have been tried to prolong pregnancy by the use of tocolytics, which theoretically reduce the likelihood of bleeding by inhibiting uterine contractions and their impact in the lower uterine segments.

Drugs used were:-

- $\beta$ -sympathomimetics (such as ritodrine) which was found to have side effects as maternal tachycardia, hypoglycaemia and myocardial ischaemia.
- Antiprostaglandins (Indomethacin) were used instead of ritodrine but, they have side effects of causing maternal gastrointestinal (GIT) bleeding and in the foetus premature closure of ductus arteriosus (DA).
- Magnesium sulphate ( $MgSO_4$ ) also found to be cardiotoxic and may cause adult RDS. Besinger et al( ) in a prospective study found that, the use of tocolytics in cases of

symptomatic PP may be associated with clinically significant prolongation of pregnancy and increased birth weight.

Sharma A *et al*<sup>(23)</sup> to study the effect of retrodrine therapy on maternal and perinatal outcome in a prospective randomized controlled clinical trial in a total of 60 women whose pregnancies ranged from 28 through 34 menstrual weeks. Prolongation of pregnancy and birth weight of the newborn were evaluated. They found the use of tocolysis in symptomatic PP was associated with significant prolongation of pregnancy and difference in birth weight.

Cervical cerclage; also was tried by Arias (1988)<sup>(24)</sup> who in a randomized controlled trial of cervical cerclage in women presenting with APH due to PP before 30 weeks of gestation, found the cerclage resulting in longer mean gestational age at delivery and in consequence less neonatal morbidity from immaturity.

Cabo *et al*<sup>(25)</sup> in a case control study to assess the role of cervical cerclage in prolongation of pregnancy found no statistically significant difference between the two groups studied.

The use of cervical cerclage to reduce bleeding and prolong pregnancy is not backed up by sufficient evidence to recommend this practice.<sup>(26)</sup>

**Asymptomatic placenta praevia:**

What to advise women with asymptomatic apparent PP, diagnosed at routine U/S examination is usually a great dilemma.<sup>(8)</sup> In terms of timing of antenatal admission during the 3<sup>rd</sup> trimester for those women with major PP, who have not bled, there is no evidence to dictate at what gestation this should occur, if at all. Current practice is variable, with conservative policies admitting women at around 34 weeks of gestation, while others are left till much later and some units admit only for delivery.<sup>(26)</sup>

PP diagnosed by routine 2<sup>nd</sup> trimester U/S is managed expectantly. The likelihood of spontaneous resolution is greater than 90%. Strenuous activity may provoke bleeding and should be avoided.

Placental localization should be re-evaluated at 28-30 weeks. If PP is still present, the same precautions should be followed. If PP persists beyond 32-34 weeks, resolution by term is uncommon. C/S is usually scheduled at a gestational age that will

maximize the likelihood of foetal maturity and minimize the risk of haemorrhage that may result from the normal onset of uterine contractions. In patients who are not experiencing bleeding, amniocentesis may be performed at 34-36 weeks to assess foetal lung maturity. If the baby's lungs are mature delivery is usually indicated. Otherwise, management is individualized based on the condition of the mother and the baby. Waiting beyond 37 weeks is not likely to benefit the mother or the baby. If the following are present, immediate C/S is usually necessary:-

- Deterioration of the condition of the mother.
- Persistent heavy bleeding.
- Gestational age > 36 weeks.
- Estimated foetal weight (EFW) > 2500 gm.
- Foetal distress in a viable foetus.
- Contractions that do not respond to medication.

If the initial bleeding episode resolves, the mother and baby remain stable, and the foetus is premature, it is reasonable to delay delivery. The goal of this approach is to improve newborn outcome by allowing additional time for the baby to develop inside the uterus. Bed rest is usually prescribed, steroids are

given to hasten the development of the baby's lung if needed. In women of negative blood type, an injection of Rh-immune globulin is administered. In patients who remain stable for a period of days after an initial episode of bleeding, the need for continued hospitalization is controversial. In selected patients outpatient management is reasonable following the first episode of bleeding. If bleeding recurs, prolonged hospitalization may be necessary.

C/S is the recommended method of delivery in nearly all cases of PP; When possible the procedure should be performed electively. Rarely, in the case of low-lying or marginal placenta praevia, the descending foetal head may 'tamponade' the bleeding placental edge and permit vaginal delivery. In the past, this possibility was assessed using a 'double set-up' examination in which the patients were taken to the operating room and prepared for C/S. A careful examination was undertaken to determine whether placental tissue could be seen or felt near the cervix, and the method of delivery determined by the findings.

Today the 'double set-up' examination largely has been replaced by U/S evaluation of placental location. C/S for PP can

be very difficult and this is why it should be dealt with the most senior staff member. If there is an anterior PP it is better to avoid incising through the placenta, and it is almost possible to pass around the margins of the placenta. It is easier usually to bring down a foot and perform breech extraction than to try to deliver a very high head past the placenta, which occupies the uterine wound. Whatever done, it should be done quickly and efficiently as there often foetal blood loss; Delay in delivery may lead to foetal compromise.<sup>(8)</sup>

After delivery of the baby, removal of the placenta from the lower segment may prove difficult. Because there is a relative lack of decidua, an abnormal degree of placental adherence often occurs. Sometimes the placenta has to be removed piece meal and the bleeding can be profuse. An abnormal amount of bleeding can also occur because of poor retraction of the less muscular lower segment. Insertion of a continuous locked suture in the site of placental attachment may be efficacious. If the bleeding is not greatly excessive, closing the uterine wound often seems to aid retraction. If control of bleeding proves inadequate despite precise suturing, direct pressure with warm packs and the

administration of oxytocins are necessary. Consideration will need to be given to ligation of the internal iliac arteries and, ultimately to hysterectomy. The choice of anaesthetic technique for C/S for PP must be made by the anaesthetist conducting the procedure. General anaesthesia (GA) is easy and quick to perform. Studies from USA suggests that regional anaesthesia can be safe. Fredrikson *et al* found in a comparative study done in USA about the best type of anaesthesia for C/S due to PP, that, GA increased the intraoperative blood loss and the need for BT, and regional anaesthesia to be a safer alternative.<sup>(27)</sup>

Hong JY *et al*<sup>(28)</sup> in a prospective comparison of GA and epidural anaesthesia in elective C/S for PP totalis to assess maternal haemodynaemic, blood loss and neonatal outcome found that GA resulted in lowering immediate postoperative haematocrit level. The patients in the general group received a significantly larger transfusion than the epidural group. The Apgar scores at 1 and 5 minutes were similar in the two groups. They concluded that epidural anaesthesia is superior to GA in elective C/S for grade 4 PP with regard to maternal

haemodynaemics and blood loss. There was no difference in neonatal outcome.

**Placenta praevia accreta (PPA):**

Attempts in removing placental tissues may provoke massive and fatal haemorrhage. Management depends on the parity and the patient's desire for future childbearing. It is either conservation in the form of:-

- Simple excision of the trophoblastic site with over sewing of the area.
- Pelvic and uterine artery angiographic embolization, this had been shown to control otherwise intractable haemorrhage.
- Uterine artery ligation.
- Internal iliac artery ligation; bilateral internal iliac artery ligation is successful in avoiding hysterectomy in 50% of patients with uterine atony and PPH. An experienced obstetrician in performing such procedure or a vascular surgeon is needed. Fertility is often preserved and subsequent pregnancies are not compromised.
- Medical therapy with methotrexate has been tried with success.

In these cases placenta (or portions of it) may be left in situ and

will later slough off. Subsequent pregnancies have been reported, although the risk of recurrence may be high.

- There are several case reports of PA in which all or part of the placenta was left inside the uterus and managed expectantly. This is possible only in patients who are stable. It should be considered in those who understand and accept the risks of delayed bleeding and infection. Conservative options may provide alternatives to hysterectomy in carefully selected patients. In the majority of cases however, hysterectomy remains the procedure of choice.

### **Hysterectomy:-**

Emergency hysterectomy is a life saving procedure in cases of massive uncontrollable bleeding and where the options of conservative management have failed. It is the definitive method to control PPH and in 50% of cases it will be the only way to achieve haemostasis.

Yamani Zamzami TY from King Abdelaziz, University Hospital in Jeddah, Saudi Arabia, in a review of 17 cases who had emergency peripartum hysterectomy among 34,379 deliveries to assess the incidence, indications, associated risk factors and

complications with emergency peripartum hysterectomy, found an incidence of 0.5 per 1000. Uterine atony 11 (64.7%) (9 without praevia and 2 with praevia), morbid adherent placenta with praevia 6 (35.5%) (one complete placenta accrete and five partial adherent placenta) to be the most common indication of hysterectomy. In morbid adherent placenta group the gravidity, previous miscarriages and prior caesarean deliveries were higher compared to the atonic group and were statistically significant. He concluded that uterine atony is the leading cause of primary PPH and the main indication of emergency peripartum hysterectomy. The combination of high parity, C/S, prior caesarean delivery and current placenta praevia were identified as risk factors.<sup>(29)</sup>

Selo *et al*<sup>(30)</sup> to review all emergency peripartum hysterectomies performed at a tertiary hospital in London, UK, and to identify the risk factors for emergency peripartum hysterectomy found an incidence of 0.48 per1000. Women who had emergency peripartum hysterectomy were significantly older and multiparous. More of the cases had a history of uterine surgery, placenta praevia, and were delivered by C/S.

Haemorrhage due to PP was the main indication for emergency peripartum hysterectomy (47%).

**Risks and hazards:-**

- Haemorrhage; massive hage either antepartum, intrapartum or postpartum associated with PP and PPA is a genuine risk and may lead to maternal death. Although complete praevia and accreta cases tend to be associated with earlier and more severe bleeding, lesser degree of PP may cause life threatening haemorrhage thus the degree of placenta is only a factor in the prognosis and management. Blood transfusion with all its hazards, namely the infection with human immunodeficiency virus (HIV and viral hepatitis are a real problem. Anaemia as a consequence of severe haemorrhage is seen in a high percentage of these patients.

Crane JM *et al*<sup>(31)</sup> from Canada, in a population based retrospective cohort study including all women delivered in the Province of Nova Scotia, Canada, from 1988 to 1995 to determine the maternal complications of PP. During the 8-year period, 308 deliveries (0.33%). Maternal complications included hysterectomy (RR=33.26), antepartum bleeding (RR=9.81), intrapartum

(RR=2.84) and postpartum (RR=1.86) haemorrhages as well as BT (RR=10.05) septicaemia (RR=5.55) and thrombophlebitis (RR.4.85). The risk factors for need of hysterectomy in women with PP include the presence of PA and previous caesarean delivery.

Anaesthetic complications are more frequent in patients with PP and PPA. Ashton *et al* <sup>(32)</sup> found that cardiac arrest, atelectasis and other anaesthetic complications were frequently reported among these patients.

Postoperative infections; urinary tract infection (UTI), respiratory tract infection, and pelvic abscesses are not uncommon.

Pelvic organ injury; because of the emergency nature of the procedure and sometimes due to unskilled intraoperative manipulation or to invasion by PPA. The incidence of injury to ureter and bladder is 0.3% and 0.1% respectively at the time of C/S. The risk to the bladder is increased 3 fold in repeated C/S, and the risk of injury to the ureter can rise 6 fold when caesarean hysterectomy is performed.

Caliskan *et al*<sup>(33)</sup>in a case report of 26-year-old woman, with one previous delivery and two uterine curettage with the

diagnosis of partial P.P at 35 weeks of gestation repeat C/S was performed due to profuse bleeding. Placenta praevia percreta invading the bladder trigone was confirmed with cystotomy. Dilatation of the left ureter was noticed on the second postoperative day. Re-laparotomy was performed, and placental invasion of the distal left ureter was noticed. Ureteroneocystostomy was performed.

Uterine inversion; this may occur during trial to remove the morbidly adherent placenta.

Torsion of the pregnant uterus; Mendling W<sup>(34)</sup> reported a 29-year-old woman with C/S 5 years before, hospitalization in the 23<sup>rd</sup> gestational week bleeding by a placenta praevia totalis. In the 26 mid gestational week a caesarean re-section was necessary because of heavy acute abdominal symptoms. The uterus presented torquated for 180 degrees to right.

## OBJECTIVES

- To determine the incidence, define the risk factors and to evaluate maternal and foetal outcome of major placenta praevia.
- To compare between two studies conducted among two different groups of patients in two different countries.

## METHODOLOGY

### **Study design:**

This is a prospective, hospital based case-control study.

### **Study period:**

The first group was conducted from July 1999 to June 2003.

The second group was carried from 1<sup>st</sup> January 2005 to 31<sup>st</sup> August 2005.

### **Study area:**

The study was carried in two different countries, At Al Kharj Military Industries Corporation Hospital (AKMICH), Kingdom of Saudi Arabia (KSA) and the three teaching hospitals in Khartoum State (Sudan), which are Khartoum Teaching Hospital (KTH) and Omdurman Maternity Hospital (OMH) and Soba University Hospital (SUH).

AKMICH is a general hospital in the central part of KSA with all specialties. The Obstetric and Gynaecology Department consists of 40 beds, including obstetric ward, Gynaecology ward and labour ward, which is run by three consultants, three senior registrars and five registrars. The total number of deliveries is 2500 per annum.

Soba University Hospital (SUH) in Soba town, South-east Khartoum city, the capital of Sudan.

The hospital provides health services in all branches of medicine for the patients in the town of Soba and its surrounding towns and villages as well as patients with high risk pregnancies referred by consultants from other hospitals. The hospital is in run by Khartoum University staff.

It has an Obstetric and Gynaecology Unit, 30 beds for antenatal admission, 12 beds for vaginal deliveries and 12 beds for gynaecology. The total annual deliveries are between 2500 - 4000 deliveries.

Omdurman Maternity Hospital (ONH): covers a wide area urban and rural parts of Khartoum State, it accept booked, referred and casualty patients. The Department of Obstetric and Gynaecology in this hospital is covered by senior consultants, junior consultants, registrars and house-officers. The activities of this obstetrics and gynaecology unit involve causalities, in patient wards, labour room, major and minor theatres and referred clinics. The number of deliveries is  $10 - 12 \times 10^6$  per year.

Khartoum Teaching Hospital (KHT) is the largest hospital in Sudan. It receives all sorts of patients not only from Khartoum city and the surrounding area, but also from all over Sudan. It accepts booked, referred and casualty patients.

The Department of obstetric and Gynaecology in KTH consists of six units covered by senior consultants from both Ministry of Health and from Faculty of Medicine, University of Khartoum, and by resident registrars and house-officers. Each of the six units covers the causality and the labour room for 24 hours and Fridays by rotation. Every working day of the weeks except Friday, each unit covers one day referred clinic and one day theater for cold obstetric and gynaecological cases.

Both the referred clinic and the theater are attended by consultants, registrars and house-officers. In the labour room the intrapartum care is provided by the registrars and house-staff on duty. The majority of vaginal deliveries are performed by well trained midwives and attended by the registrars. In the hospital there is a good Neonatal Care Unit covered by resident pediatrics registrars, house-officers and well-trained sisters under the supervision of a senior pediatrician.

In the hospital there are blood bank facilities available 24 hours a day and a well equipped theater with three operating rooms for elective and emergency obstetric and gynaecological operations.

The operating room has a caesarean section response capability from decision to incision of about 30 minutes. In the theater the anesthesia is conducted by 24 hours resident anaesthetic registrars and by anaesthetic medical assistants and on call consultants.

**Study population:-**

The study population were two groups of patients. The first group were 64 women with major placenta praevia recruited from Kingdom of Saudi Arabia (KSA). The second group were 52 women with major placenta praevia recruited from hospitals in Khartoum State.

**Inclusive criteria:**

- 1- Women with antenatal ultrasound diagnosis of major placenta praevia.
- 2- Women discovered to have major degree placenta praevia intraoperatively.

### **Data collection and analysis:-**

A questionnaire was designed to include:-

- Patient's name, age, residence.
- Patient's obstetric & gynaecological history (parity, previous scar, previous miscarriages, previous D & C).
- History of current pregnancy (GA at delivery, APH, BT, PPH).
- The mode of delivery (emergency, c/s or elective c/s).
- Maternal complications and outcome.
- Neonatal outcome (weight, sex, Apgar Score, neonatal infection, admission to SCBU & NND).

Data was collected and analyzed by the computer using Statistical Package for Social Sciences (SPSS) for window.

### **Key words:-**

Placenta praevia, placenta accreta, risk factors, caesarean section, maternal and neonatal complications.

## RESULTS

In the first group of this study, the total number of patients delivered during the period of the study between 10/07/1999 and 30/06/2003 were 12600. During the same period a total of 1810 C/S were performed (14.4%).

Sixty four patients had C/S due to placenta praevia major, giving an incidence of 0.5% of the total deliveries.

The control group of this study was based on labour ward register of 128 patients delivered before and after the index pregnancy and did not have P.P.

Caesarean section for P.P accounted for 3.2% of all the C/S. Out of these who had P.P major, 15 (23.3%) patients were operated on electively and 49(76.6%) were done as an emergency (**Table 1**).

Sixty-two (96.9%) of the C/S due to major P.P were lower segment C/S, while only two (3.1%) patients had classical C/S (**Table 2**).

In the second group of the study, the total number of deliveries during the period between 01/01/2005 to 31/08/2005

were 18390, and the total number of C/S during the same period were 4958 (27%).

Fifty two patients had C/S due to P.P major, giving an incidence of 0.28% of the total deliveries.

The control of this group were 104 patients delivered by C/S during the period of the study and had no P.P.

In this group 17 (32.7%) patients were operated on electively, while 35 (67.3%) were done as an emergency (**Table 1**).

Out of these 52 C/S, one was done as a classical C/S, while the other (51 cases) were lower segment C/S (**Table 2**).

The majority of patients, 39(60.9%) with P.P in the first group were in the parity group 4-8, whereas the majority, 68 (53.1%) of the control group were in the parity group 1-4. The mean parity was  $4.7 \pm 3.2$  and  $3.4 \pm 2.5$  respectively. This shows that there is a significant association between parity and the risk of P.P ( $P= 0.006$ ).

In the second group of the study, 18(34.6%) patients of the study cases were in the parity group  $>4$ , compared to only 8(7.7%) patients of the study control. The mean parity of this group was  $2.12 \pm 0.758$  and  $1.80 \pm 0.564$  respectively.

This association between increasing parity and development of P.P was statistically highly significant ( $P=0.000$ ) (**Table 3**).

Forty (62.5%) patients from the first group of the study were in the age group 30-39 years, with the mean age of  $32.6 \pm 5.9$  year, while the majority of the control group lie in the age group 20-29 years with the mean age of  $29.3 \pm 6.1$  years, 71(55.5%).

The study cases were significantly older than their control counterparts ( $P= 0.001$ ). This statistically significant association between elder age and P.P was also confirmed in the second study, 34(65.4%) of the study cases were in the age group 30-39 years, while the majority of the control 57(54.8%) were in the age group 20-29 years ( $P=0.004$ ) (**Table 4**).

In the first group a total of 31 (48.4%) patients had one or more previous C/S, while 33(51.6%) patients had no previous C/S.

In the second group a total of 30(57.7%) patients had one or more previous C/S, while 22 (42.3%) patients had no previous C/S. Previous C/S was statistically significant as a risk factor for P.P in this group ( $P = 0.038$ ) (**Table 5**).

Concerning the relationship between previous miscarriages and/or sharp curettage and P.P, 26(40.6%) patients in the first group had one or more previous miscarriages and/or sharp curettage compared to 43(33.5%) of the control group. In this group the relationship was not significant (P=0.212).

The second study also did not find significant statistical correlation between previous miscarriages and/or sharp curettage and the development of P.P, 12 (23.1%) patients had one or more previous miscarriages and/or sharp curettage. Compared to 25 (24.0%) of the control (P= 0.531) (**Table 6**).

Concerning the gestational age at delivery in the first study group, there was significant difference in the mean gestational age at delivery between the cases and control ( $35.72 \pm 3.73$  vs  $39.10 \pm 2.25$ ) years (P = 0.000). This significant difference was also found in the second group. The mean gestational age for the cases were  $35.12 \pm 2.61$  compared to  $38.40 \pm 1.54$  for the control (P = 0.000). In both groups, patients with P.P deliver earlier than their control counterparts (**Table 7**).

The incidence of placenta accreta was 0.05% (7 cases) in the first group. Five (71.4%) of them had previous two or more C/S, 4

(57.1%) patients from this group had caesarean hysterectomy. In the other 3 (42.9%) patients, the placenta was removed in pieces.

In the second group the incidence of P.A was found to be 0.03% (6 cases), all of them had previous two or more C/S, and all of them undergone caesarean hysterectomy. One more patient from this group had C. hysterectomy because of severe PPH with P.P (**Table 8**).

One patient from the second group died as a result of massive haemorrhage (1.9%) (Table 8), this was a para 4 with a history of two previous caesarean sections. She presented with vaginal bleeding at 35 weeks gestation, when she was admitted as a case of major placenta praevia. She has been in the hospital until she bled at 38 week gestation. An emergency lower segment caesarean section was performed. Placenta praevia percreta invading the bladder wall was only detected at the time of the operation. She developed severe postpartum haemorrhage and emergency caesarean hysterectomy was performed. She had to be opened twice for uncontrollable haemorrhage and eventually died having received 17 units of blood.

Regarding obstetric haemorrhage (ante partum, intrapartum, postpartum), 21 (32.8%) patients in the first group had massive obstetric haemorrhage, all of them received BT, one needed admission to ICU. Whereas in the second group 33(63.5%) patients had massive obstetric haemorrhage and needed transfusion (**Tables 9 and 10, Figures 1, 2**).

**Table 11** shows the distribution of postpartum Hb in both studies of major P.P. In the first study patients who had postpartum Hb less than 10 gm/dl were 34(53.1%) compared to 14(10.9%) of their control.

The study cases had significant lower postpartum Hb than has their control (P= 0.000). This significant reduction in postpartum Hb was also shown in the second study, 32(61.5%) of the study cases had postpartum Hb less than 10 gm/dl compared to only 12(11.5%) of the control (P = 0.000).

**Table 12** shows the female, male distribution in both studies. In the first group of the study, the female/male ratio was 35(52.9%) to 32 (47.8%) compared with 68(53.1%) to 60 (46.9%) for the control (P= 0.480). In the second group the ratio was 29 (51.8%)

to 27(48.2%) and 50(48%) to 54 (52%) respectively (P= 0.389). There was no statistically significant difference in both studies.

**Table 13** shows the methods of anaesthesia used in both studies. In the first study, 42(65.6%) operations were done under general anaesthesia and 22(34.4%) operations were done under spinal anaesthesia, whereas in the second study general anaesthesia was used in 16 (30.8%) patients, and spinal anaesthesia in 36 (69.2%) patients (**Fig. 3**).

**Table 14** shows foetal presentation in P.P, P.A cases. In the first study cephalic presentation was found in 48 (75%) of the study cases and 16 (25%) were non-cephalic presentation compared to 122 (95.3%) and 6 (4.7%) respectively in the control group. This difference was statistically highly significant (P = 0.000).

In the second study, cephalic presentation was found in 38 (73.1%) of cases and 14 (26.9%) were non-cephalic presentation compared to 90 (86.5%) and 14(13.5%) in the control group. There is a significant correlation between non-cephalic presentation and P.P (P = 0.035).

**Table 15** shows the perinatal outcome in both studies. In the first group of the study 22 (32.8%) babies were premature (delivered before 37 weeks gestation) compared to 5 (3.9%) in the control group. This difference was statistically significant ( $P = 0.000$ ).

Regarding admission to SCBU, NICU, 22 (32.8%) of the study cases were admitted to SCBU, NICU for varying indications compared to 6 (4.7%) in the control group. Fifteen (22.4%) babies were born with Apgar score  $<7$  at 5 minutes in the study cases compared to 7 (5.55) in the control group.

There was a significant difference between the cases and controls regarding admission to SCBU, NICU and Apgar score  $< 7$  at 5 minutes ( $P = 0.000$  and  $0.001$ ) respectively.

There was no significant difference in perinatal mortality between the study cases and control, 5 (7.5%) vs 3 (2.3%) ( $P = 0.089$ ).

In the second group of the study there were 24 (42.9%) babies born prematurely ( $<37$  weeks gestation ) compared to only 3 (2.9%) cases in the control group. This difference was statistically highly significant ( $P = 0.000$ ).

Regarding admission to SCBU, NICU, 23 (41.1%) babies needed admission compared to 7 (6.7%) of the control. This difference was statistically highly significant ( $P = 0.000$ ).

Fifteen (26.8%) babies had Apgar score  $<7$  at 5 minutes, compared to 11 (10.6%) of the control. This difference was statistically significant ( $P = 0.007$ ).

Regarding perinatal loss 13(23.2%) babies were died either in utero or in early neonatal period, compared to only 3 (2.9%) of the control. This difference was statistically highly significant ( $P = 0.000$ ).

**Table 1: Distribution of the study population according to the time of C/S in placenta praevia cases**

<b>C/S</b>	<b>First group</b>		<b>Second group</b>	
	<b>n</b>	<b>(%)</b>	<b>n</b>	<b>(%)</b>
Emergency	49	(76.6%)	35	(67.3%)
Elective	15	(23.4%)	17	(32.7%)
<b>Total</b>	<b>64</b>	<b>(100%)</b>	<b>52</b>	<b>(100%)</b>

**Table 2: Distribution of the study population according to the type of C/S in placenta praevia cases**

<b>C/S</b>	<b>First group</b>		<b>Second group</b>	
	<b>n</b>	<b>(%)</b>	<b>n</b>	<b>(%)</b>
Lower segment C/S	62	<b>(96.9%)</b>	51	<b>(98.1%)</b>
Classical C/S	02	<b>(3.1%)</b>	01	<b>(1.9%)</b>
<b>Total</b>	<b>64</b>	<b>(100%)</b>	<b>52</b>	<b>(100%)</b>

**Table 3: Correlation between parity and placenta praevia**

Parity group	First group		Second group	
	Case	Control	Case	control
Nullipara	04 (6.3%)	13 (10.2%)	12 (23.1%)	29 (27.9%)
1 - 4	21 (32.8%)	68 (53.1%)	22(42.3%)	67 (64.4%)
> 4	39 (60.9%)	47 (36.7%)	18 (34.6%)	8 (7.7%)
<b>Total</b>	<b>64 (100%)</b>	<b>128 (100%)</b>	<b>52 (100%)</b>	<b>104 (100%)</b>

P = 0.006

P= 0.000

**Table 4: Correlation between maternal age and placenta praevia**

Age group (in years)	First group		Second group	
	Case	Control	Case	control
< 20	02 (3.1%)	02 (1.6%)	01 (1.9%)	08 (7.7%)
20 - 29	16 (25%)	71 (55.5%)	17 (32.7%)	57 (54.8%)
30 - 39	40 (62.5%)	47 (36.7%)	32 (61.6%)	37 (35.6%)
>40	06 (9.4%)	08 (6.3%)	02 (3.8%)	02 (1.9%)
<b>Total</b>	<b>64 (100%)</b>	<b>128 (100%)</b>	<b>52 (100%)</b>	<b>104 (100%)</b>

P = 0.001

P= 0.004

**Table 5: Incidence of major placenta praevia cases in relation to previous C/S**

<b>Previous C/S</b>	<b>First group n (%)</b>	<b>Second group n (%)</b>
No	33 (51.6%)	22 (42.3%)
One	15 (23.4%)	08 (15.4%)
Two	06 (9.4%)	12 (23.1%)
Three	03 (4.7%)	08 (15.4%)
Four	04 (6.3%)	02 (3.8%)
Five	03 (4.7%)	0 (0.0%)
<b>Total</b>	<b>64 (100%)</b>	<b>52 (100%)</b>

P= 0.038

**Table 6: Previous miscarriage and/or sharp curettage  
in relation to placenta praevia**

Miscarriage + D & C	First group		Second group	
	Case	Control	Case	control
No	38 (59.4%)	85 (66.5%)	40 (76.9%)	79 (76%)
Previous one or more	26 (40.6%)	43 (33.5%)	12 (23.1%)	25 (24%)
<b>Total</b>	<b>64 (100%)</b>	<b>128 (100%)</b>	<b>52 (100%)</b>	<b>104 (100%)</b>

P = 0.212

P= 0.531

**Table 7: Distribution of gestational age at delivery in relation to placenta praevia**

Gestational age (in weeks)	First group		Second group	
	Case	Control	Case	control
< 32	10 (15.6%)	0 (0.0%)	05 (10.6%)	02 (1.9%)
32 - 36	21 (32.8%)	07 (5.5%)	31 (69.6%)	09 (8.7%)
≥ 37	33 (51.6%)	121 (94.5%)	16 (30.8%)	93 (89.4%)
<b>Total</b>	<b>64 (100%)</b>	<b>128 (100%)</b>	<b>52 (100%)</b>	<b>104 (100%)</b>

**Table 8: Distribution of accreta cases in relation to previous C/S**

<b>Previous C/S</b>	<b>First group</b>		<b>Second group</b>	
	<b>n</b>	<b>(%)</b>	<b>n</b>	<b>(%)</b>
No	02	<b>(28.6%)</b>	01	<b>(16.7%)</b>
One	0	<b>(0.0%)</b>	0	<b>(0.0%)</b>
Two	01	<b>(14.3%)</b>	01	<b>(16.7%)</b>
Three	01	<b>(14.3%)</b>	02	<b>(33.4%)</b>
Four	02	<b>(28.6%)</b>	02	<b>(33.4%)</b>
Five	01	<b>(14.3%)</b>	0	<b>(0.0%)</b>
<b>Total</b>	<b>07</b>	<b>(100%)</b>	<b>06</b>	<b>(100%)</b>

**Table 9: Incidence of obstetric haemorrhage in relation to placenta praevia**

<b>Blood loss</b>	<b>First group</b>		<b>Second group</b>	
	n	(%)	n	(%)
Mild (500 - 1000)	10	(15.6%)	24	(46.2%)
Moderate (1001 - 1500)	07	(10.9%)	08	(15.4%)
Severe (>1500)	04	(6.3%)	01	(1.9%)
<b>Total</b>	21	(32.8%)	33	(63.5%)

**Table 10: Rate of blood transfusion in placenta praevia**

<b>Rate</b>	<b>First group</b>		<b>Second group</b>	
	n	(%)	n	(%)
No transfusion	43	(67.1%)	19	(36.5%)
1- 2 unit	12	(18.8%)	19	(36.5%)
3- 4 units	06	(9.4%)	09	(17.4%)
> 4 units	03	(4.7%)	05	(9.6%)
<b>Total</b>	64	(100%)	52	(100%)

**Table 11: Distribution of postpartum haemoglobin  
in placenta praevia**

<b>Hb (g/dl)</b>	<b>First group</b>		<b>Second group</b>	
	<b>Case</b>	<b>Control</b>	<b>Case</b>	<b>control</b>
8 - 9	07 (10.9%)	0 (0.0%)	13 (25%)	0 (0.0%)
8.1 - 10.0	27 (42.2%)	14 (10.9%)	19 (36.5%)	12 (11.5%)
10.1 - 11	20 (31.3%)	62 (48.5%)	20 (38.5%)	51 (49%)
>11	10 (15.6%)	52 (40.6%)	0 (0.0%)	41 (39.5%)
<b>Total</b>	<b>64 (100%)</b>	<b>128 (100%)</b>	<b>52 (100%)</b>	<b>104 (100%)</b>

P = 0.000

P= 0.000

**Table 12: Female, male distribution in relation to placenta  
praevia**

<b>Sex</b>	<b>First group</b>		<b>Second group</b>	
	<b>Case</b>	<b>Control</b>	<b>Case</b>	<b>control</b>
Female	35 (52.9%)	68 (53.1%)	29 (51.8%)	50 (48.1%)
Male	32 (47.1%)	60 (46.9%)	27 (48.2%)	54 (51.9%)
<b>Total</b>	<b>67 (100%)</b>	<b>128 (100%)</b>	<b>56 (100%)</b>	<b>104 (100%)</b>

P = 0.480

P= 0.389

**Table 13: Methods of anaesthesia used in C/S for  
placenta praevia**

<b>Method of anaesthesia</b>	<b>First group</b>		<b>Second group</b>	
	<b>n</b>	<b>(%)</b>	<b>n</b>	<b>(%)</b>
Spinal	22	(34.4%)	16	(30.8%)
General	42	(65.6%)	36	(69.2%)
<b>Total</b>	<b>64</b>	<b>(100%)</b>	<b>52</b>	<b>(100%)</b>

**Table 14: Foetal presentation in placenta praevia**

<b>Presentation</b>	<b>First group</b>		<b>Second group</b>	
	<b>Case</b>	<b>Control</b>	<b>Case</b>	<b>control</b>
Cephalic	48 (75%)	122 (95.3%)	38 (73.1%)	90 (86.5%)
Non-cephalic	16 (25%)	6 (4.7%)	14 (26.9%)	14 (13.5%)
<b>Total</b>	<b>64 (100%)</b>	<b>128 (100%)</b>	<b>52 (100%)</b>	<b>104 (100%)</b>

P = 0.00

P = 0.035

**Table 15: Perinatal outcome in placenta praevia**

Perinatal parameters	First group		Second group	
	Case	Control	Case	control
Age < 37 weeks	22 (32.8%)	05 (3.9%)	24 (42.9%)	3 (2.9%)
Admission to SCBU, NICU	22 (32.8%)	06 (4.7%)	23 (41.1%)	07 (6.7%)
Apgar Score < 7 at 5 min.	15 (22.4%)	07 (5.5%)	15 (26.8%)	11 (10.6%)
NND	04 (6.0%)	1 (0.9%)	10 (17.9%)	03 (2.9%)
IUFD	01 (1.6%)	02 (1.6%)	03 (5.4%)	0 (0.0%)

**Table 16: Complications related to placenta praevia**

<b>Complications</b>	<b>First group</b>		<b>Second group</b>	
	<b>n</b>	<b>(%)</b>	<b>N</b>	<b>(%)</b>
No complications	27	<b>(42.2%)</b>	19	<b>(36.5%)</b>
Obstetric haemorrhage	21	<b>(32.8%)</b>	33	<b>(63.5%)</b>
Anaemia	18	<b>(28.1%)</b>	32	<b>(61.5%)</b>
Caesarean hysterectomy	04	<b>(6.3%)</b>	06	<b>(13.5%)</b>
Abruptio placenta	02	<b>(3.1%)</b>	03	<b>(5.8%)</b>
IUFD	01	<b>(1.6%)</b>	03	<b>(5.4%)</b>
NND	04	<b>(6.0%)</b>	10	<b>(17.9%)</b>
Maternal deaths	0	<b>(0.0%)</b>	1	<b>(1.9%)</b>







## DISCUSSION

The study was designed to assess the risk factors and to identify the maternal complications and neonatal outcome.

The incidence of FF in this study was 5 per 1000 (1 in 200) in the first group and 2.8 per 1000 (1 in 357) in the second group.

The explanation for this low incidence of PP in the second group of the study compared to the first group could be the high parity status in Saudi Arabia (mean parity was  $4.7 \pm 3.2$  vs  $3.4 \pm 2.5$ ).

Lyasu and Co-workers (1993) also found the PP complicated 5 in 1000 deliveries (1 in 200).<sup>(12)</sup>

Frederiksen and colleagues (1999) reported an incidence of 5.5 per 1000 (1 in 180) deliveries.<sup>(28)</sup>

Crane and associates (1999) found the incidence to be 3.3 per 1000(1 in300).<sup>(36)</sup>

At Parkland Hospital in USA, the incidence was 2.6 per 1000 (1 in 390) for more than 169000 deliveries over 12 years.<sup>(37)</sup>

The incidence of accreta in our study was 0.5 per 1000 in the first group and 0.3 per 1000 in the second group. It occurred in 109

per 1000 of patients with major PP in the first group and 115 per 1000 patients with PP in the second group.

Khouri and Sultan in 1996 reported an incidence of 96 per 1000 patients with major PP.<sup>(38)</sup>

Clark et al<sup>(11)</sup> reported an incidence of 101 per 1000 patients with major PP.

### **Parity:**

Both study groups show significant correlation between high parity and PP (P = 0.001 in the first group and P = 0.004 in the second group). This was consistent with what has been found by Archibong, et al who found that increasing parity was associated with increased risk of development of PP, but Clark et al found that the effect of parity was much less dramatic.<sup>(39,10)</sup> Gilliam *et al* demonstrated that the joint effect of parity and prior C/S was greater than that of either variable alone.<sup>(40)</sup>

### **Age:**

In both studies there was highly significant correlation between elder maternal age and PP (P = 0.001 for the first group and P = 0.004 for the second group), this finding was supported by Lyasu et al who found the incidence of PP to be higher in women

aged 35 years or more the in women less than 20 years, in contradiction to Zaki et al who found no significant association between advanced maternal age and the development of PP, PA.<sup>(11,12)</sup>

### **Previous C/S:**

In both groups of the study, the occurrence of PP was found among those with one or more previous C/S (48.4% and 47.7%).

In the accreta group 71.4% and 83.5% had more than two previous C/S (Tables 5 & 8). The explanation could be the uterine scarring associated with caesarean section delivery has resulted in endometrial and myometrial damage, defective implantation mechanism, and failure of differential growth of the scarred lower uterine segment, all of which predispose to low implantation of the placenta.<sup>(41)</sup>

Pregnancies complicated with PP and history of C/S are well known to be at increased risk for PA.<sup>(11)</sup>

Lydon- Rochelle et al,<sup>(41)</sup> found a 40% increased risk of PP at second birth for women with first birth caesarean delivery compared with women with prior vaginal deliveries.

Meller et al, found the risk of PA ranged from 2% in women < 35 years with no previous C/S deliveries to almost 39% in women with two or more C/S deliveries.<sup>(10)</sup>

Our study also confirmed the findings of others, that prior C/S is an independent risk factor for PP and PA.

**Previous miscarriages and/or sharp curettage:**

In our series we did not find any significant relationship between previous miscarriages or previous sharp curettage with PP and PA.

Einola *et al* found a relation.<sup>(15)</sup> Johnson et al<sup>(14)</sup> found that, the risk of PP may be increased in close response fashion by multiple sharp curettage miscarriages.

**Presentation:**

In this study abnormal presentation was an obvious findings in both groups (25% and 26.9%) respectively compared to 4.7% and 13.5% for the controls. This could be explained by prematurity and placental location. Layasu *et al*<sup>(12)</sup> found an association between PP and foetal malpresentation.

**Sex:**

Regarding sex ratio of fetuses in association with PP, PA there was no difference from their controls in both groups of the study. Female : male was 52.9% : 47.8% vs 51.8% : 48.2% for the cases and 48.0% : 52.0% vs 51.8 : 48.2% for the controls.

The sex of the babies was not found to have any significant relation with PP, PA in our study.

Jakobovits and Zubek<sup>(42)</sup> found preponderance of male babies with PP.

Wen SB *et al*,<sup>(43)</sup> reported that pregnant women with male babies carry a higher risk of PP.

**Anaesthesia:**

General anaesthesia was the preferred method of anaesthesia for patients with PP in both groups of the study (65.6% and 69.2%) compared to (34.4 and 30.8%) for spinal anaesthesia.

Frederiksen *et al*, found no difference in anaesthetic or operative complications with regional as comparing with GA, but they found the mean number of units of blood transfused was significantly more for the C. hysterectomy group under GA as compared with group under regional anaesthesia.<sup>(28)</sup>

Recent UK and American retrospective studies have compared regional and general anaesthesia for C/S with placenta praevia.

Regional anaesthesia was associated with reduced estimated blood loss and transfusion requirements. The commonly held obstetric view that placenta praevia dictates general anaesthesia was not supported. However, anterior placenta praevia in a woman over 35 who has undergone previous C/S suggests a particularly high risk of placenta accreta and massive haemorrhage. General anaesthesia with previous for postoperative ICU admission might be considered prudent.<sup>(46)</sup>

### **Maternal complications:**

The most important maternal complications encountered in our series were antepartum haemorrhage and postpartum haemorrhage, caesarean hysterectomy, need for BT, prolonged stay in the hospital and low postpartum Hb (Tables 9, 10,11 & 16). It was found that obstetric haemorrhage and mean units of blood given per patient were higher in cases of PA when compared to PP alone.

All the accreta cases in both studies developed obstetric haemorrhage and required BT compared to 21.8% and 51.9% of praevia alone in the first and second groups respectively, 71.4% in the first group and 100% in the second group of accreta cases had Caesarean hysterectomy, while only one (1.7%) in the second group from praevia alone cases had C. hysterectomy due to intractable PPH and non of the first group.

The second important complication was anaemia, it was detected in 28.1% patients in the first group and 61.5% in the second group. The mean Hb at discharge was  $9.1 \pm 1.2$  and  $10.0 \pm 1.12$  respectively.

Postpartum hospital stay was longer in the second group than the first (mean =  $10.52 \pm 5.20$  and  $6.52 \pm 1.76$  days) respectively. This is in part because mother of the preterm babies in the second group stay longer in the hospital to breastfeed their babies, while this is not the case in the first group.

#### **Neonatal outcome:**

In both studies PP was associated with adverse perinatal outcome. Prematurity was significantly higher in cases of PP

compared to the control. This could be partly iatrogenic due to elective termination by elective C/S.

The high perinatal mortality encountered in this group of patients was mainly due to prematurity. This was also confirmed by Ananth *et al*,<sup>(2)</sup> who found neonatal mortality rate that associated with PP to be 2 to 4 fold higher compared with mortality rate among non-placenta praevia births. In spite of that Salihu *et al*<sup>(44)</sup> found improvement in perinatal survival among neonates that are complicated by PP, in general, comparing studies conducted in 1970s which showed PNMR of 120 – 370 per 1000 neonates, to studies that covered deliveries in 1990s which showed a PNMR of 23 per 1000 neonates with their study in year 2003 which observed PNMR to 11.8 per 1000 neonates complicated with PP (Fig. 4).

Babies born to women with PP are more likely to have Apgar score less than 7 at 5 minutes and to be admitted to SCBU, NICU.

This independent contribution of early delivery on neonatal death that is associated with PP remain unexplored and further studies are needed to control this confounding factor.

Still the rate of perinatal loss among the neonates of the second group of the study is high compared to neonates of the first group. This can be improved by providing better neonatal facilities, resources and good training for the neonatologists and nursing staff.

## CONCLUSION

The following points may serve as conclusion to this study:

- The majority of patients are of middle age and old age with grand-multiparity.
- Caesarean section scar seems to be a predisposing factor in a considerable number of patients.
- Diagnosis of accreta cases is sometimes difficult and only confirmed at operation.
- Maternal complications rest mainly on caesarean hysterectomy and on PPH.
- Perinatal mortality and morbidity are higher in cases complicated with placenta praevia and is due to prematurity and its complications.

## RECOMMENDATIONS

The following recommendations were derived in view of the results of this study:

- Patients with placenta praevia and placenta praevia accreta should be considered high risk, compatible blood should always be available for such cases before considering C/S.
- Strategies and protocols should be settled to reduce the rate of C/S as its association with subsequent development of PP, PA was confirmed.
- Senior obstetric staff should always be available and involved in the management of cases of PP especially those at high risk of PA.

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**Postgraduate Medical Studies Board**

**Questionnaire to assess the risk factor of Major PP maternal complication and neonatal outcome**

Serial No.:..... Name:.....

- 1- Age (in years):** i- < 20  ii- 20-29  iii- 30 -39   
ii- 40-49
- 2- Residence:** i- Rural  ii- Urban

**Antenatal factors**

- 3- Parity:** i- Nulliparous  ii. 1- 4  iii. > 4
- 4- Order of pregnancy:** i- Single  ii. Multiple
- 5- Gestational age at delivery:** ..... (weeks)
- 6- History of APH:** i- Yes  ii- No
- If "Yes" blood loss:**..... (ml)
- Blood transfusion:** ..... (units)
- 7- Previous C/S:** i- Yes  ii- No
- If "Yes" Number:** - 1  - 2  -  $\geq 3$
- 8- Previous miscarriage:** i- Yes  ii- No
- 9- Previous D & C:** i- Yes  ii- No
- 10- Anemia with pregnancy:** i- Yes  ii- No
- Antenatal haemoglobin:** ..... (g/dl)

**Intrapartum and postpartum factors**

- 11- Mode of delivery:** i- Emergency C/S  ii. Elective C/S
- 12- History of PPH:** i- Yes  ii- No
- If "Yes" blood loss:**..... (ml)

**Blood transfusion:** ..... (units)

**13- Type of anaesthesia:**

i. General  ii. Spinal  iii. Others

**14- Postpartum Hb:** .....(gm/dl)

**15- Postpartum hospital stay:** ..... (days)

**16- Intra and postoperative complication:**

- Hysterectomy  - Pelvic organ injury  - Infection   
- Admission to ICU  - Maternal death

**Neonatal outcome**

**17- Birth outcome:** i- Alive  ii. Stillbirth  iii. NND

**18- Birth-weight (kg):** .....

**19- Apgar score:**  
i. 1 min  ii. 5 mins

**20- Sex:** i. Male  ii. Female

**21- Admission to NICU:** i. Yes  ii. No

**22- Duration of stay in NICU (days):**.....

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