

Evaluation of pregnancy outcomes and different management options used in Morbid Adherent placenta

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Abstract

Introduction: MAP is defined as invasion of the placental chorionic villi in to the myometrium, either invading myometrium superficially (accreta), or deeply (increteta), or fully and or neighbouring organs (percreta) .The management of MAP is caesarean hysterectomy. Conservative uterine sparing approaches are performed in patients with strong desire for future fertility& hemodynamic stability. The aim of this work is the evaluation of different management options for MAP & its effect on pregnancy outcomes to find the best approach to decrease MAP associated morbidity & mortality. **Methods:** Study included 42 MAP Previa patients Who underwent history taking, examination, investigations, different management operative options. Maternal and fetal outcome were recorded. **Results:** The postoperative complications are DIC, reoperations, postpartum collapse in 2 patients (4.8%), ICU admission in 5 cases (11.9%), wound infection, retained products of conception, chorioamnionitis & pulmonary embolism in 1 patient (2.4%). **Conclusion :** Management of MAP may be individualized, according to the hemodynamic stability & desire for future fertility. **Key words:** Placental disorders, Placenta accreta , Morbidly Adherent Placenta, Management of placenta accreta, postoperative complications of placenta accreta **Abbreviations:** MAP: Morbidly Adherent Placenta, CS: caesarean section. —————

1. Evaluation of pregnancy outcomes & different management options used in Morbid Adherent placenta

2. Introduction

3. Morbidly adherent placenta (MAP) is defined as placental chorionic villi adherence either whole (total) or part (partial) to the myometrium ; superficially (accreta), deeply (increteta) & fully (percreta)& . While focal adherence (when part of the cotyledon is involved) **(1)**.
4. MAP Previa especially with previous CS Section (CS) is a life-threatening complication of pregnancy, with 10 folds rising rate in the past 50 years because of the increasing (CS) rate worldwide. It's incidence is 1:2500 per delivery. It may be asymptomatic or presented with antepartum (APH) or postpartum hemorrhage(PPH), abdominal pain, acute abdomen, retained placenta, uterine rupture, DIC or occasionally maternal death **(2),(3)**.
5. Early antenatal diagnostic criteria of MAP using Doppler U/S & MRI, which can reduce it's morbidity & mortality includes:**(4)**
6. Thinning of anterior Lower uterine segment(LUS)of less than 1mm.
7. Lacunae vascular spaces (Swiss cheese appearance) & inter parenchymal placental lacunar flow.
8. Extension of placental tissue beyond uterine serosa & bladder uterine serosa hypervascularity.
9. Prominence of subplacental venous complexes.
10. MAP management with a multidisciplinary approach includes hemorrhage anticipation & management , availability of packed cells, platelets, fresh frozen plasma, cryoprecipitate, & activated factor VII. Interventional radiology & cell saver technology are useful**(5)**.

11. Classical, high transverse, fundal & fundal transverse uterine incisions with pre-operative &/or intra-operative U/S MAP areas mapping, have been used to avoid the placental hemorrhage & to deliver the fetus (6) .
12. Traditional management of MAP is CS hysterectomy, but it is associated with postoperative complications & fertility loss. However, if hysterectomy is done without removal of the placenta, this would prevent unnecessary hemorrhage & reduce maternal mortality. In cases where MAP is associated with placenta previa, total hysterectomy is preferred to a subtotal hysterectomy(7) .
13. Balloon catheter occlusion of the pelvic vessels or Selective Arterial Embolization decreases blood flow to the uterus & makes it possible to perform surgery under controlled circumstances. Bilateral internal iliac artery ligation is performed prior to peripartum hysterectomy to reduce blood loss especially when interventional radiology is not available (8) .
14. Other uterus sparing strategies are described to achieve hemostasis by resecting the area of placental attachment, if it is focal & the majority of the placenta has been removed (9) .
15. In conservative approach, once the baby is delivered the placenta is left undisturbed. The cord is cut short & the uterine incision is closed with monitoring for bleeding & sepsis (10) .
16. Morbidity was defined as the occurrence of 1 or more of the following(11):
17. Maternal admission to the intensive care unit (ICU) for > 24 hours.
18. Transfusion of [?] 4 units of packed red blood cells.
19. Coagulopathy (platelets [?]100000/ microliter, international normalized ratio [?]1.2, &/or fibrinogen[?]200mg/dl).
20. Ureteral injury.
21. Bladder injury.
22. Reoperation.
23. **Aim of the Work**
24. The aim of this work is evaluation of different management options for MAP patients & their effects on pregnancy outcomes to find the best option & to decrease MAP associated morbidity & mortality .
25. **Patients & Methods**
26. This is a prospective study that includes 42 hospitalized pregnant women diagnosed with MAP between December 2019 & May 2020 at Ain Shams & Zagazig Universities Hospitals.

Inclusion criteria:

1. All cases of placenta previa in the third trimester admitted to Hospitals & diagnosed antenatally as MAP
2. **Exclusion criteria :**
3. Any medical disorder with pregnancy as anemia, hypertension, diabetes, cardiac lesion, liver diseases or kidney diseases.
4. **Steps of performance & techniques that were used:**
5. Each woman was subjected to the following:
6. **Full history taking:**
7. **Examination:**
8. **Laboratory investigations:**
9. A blood sample was withdrawn to check for complete blood count, coagulation profile, liver function tests, renal function tests & random blood sugar.
10. A urine sample was taken to check for proteinuria, hematuria & presence of urinary tract infection.
11. Blood group , cross matching for blood & plasma before operation
12. **U/S:**
13. U/S was performed for each patient to confirm viability, gestational age, fetal biometry, fetal presentation, amount of liquor & detailed assessment of placental site, degree of adherence by 2D U/S & Doppler
14. **U/S machine :** (GE voluson healthcare Austria with 3.5 MHz sector transducer for TAS& 7.5 MHz sector transducer for TVS)

15. *Sonographic features of MAP by 2D U/S:*
16. Deficiency of retroplacental sonolucent zone.
17. Vascular lacunae.
18. Myometrial thinning.
19. Interruption of bladder line.
20. Presence of exophytic masses.
21. *Characteristic findings on color Doppler U/S include:*
22. A diffuse lacunar flow pattern with high-velocity pulsatile venous type flow (peak systolic velocity more than 15cm/s) spread throughout the placenta, myometrium & cervix.
23. A central lacunar flow pattern with turbulent flow distributed regionally or focally in the parenchyma.
24. Bladder–uterine serosal interphase hyper vascularity.
25. Markedly dilated vessels over the peripheral sub placental zone.
26. An absence of sub placental vascular signals in the areas lacking the peripheral sub placental hypo echoic zone.
27. Abnormal vascular channels linking the placenta to the bladder.
28. **Consenting :**
29. An informed written consents about different management options including hysterectomy , blood products needs during the operation & risk of mortality were taken from all patients & their husbands .
30. **Preoperative preparation:**
31. Fasting at least 6 hours preoperative.
32. Preservation of adequate amount of blood & plasma from the same ABO group, platelets & recombinant activated factor vii.
33. Notification to neonatal, gynecological oncologists, urology, interventional radiologists & vascular surgeons' teams to be available if needed.
34. **Surgical techniques:**
35. Different management were performed in MAP patients with placenta previa according to the degree of adhesion, amount of bleeding & the future fertility desire.
36. All cases with MAP were operated by a senior obstetrician with attendance of a senior anesthesiologist.
37. General anesthesia & Prophylactic antibiotic were given before skin incision.
38. Skin incision: midline or pfannenstiell incision.
39. Uterine incision: high transverse or vertical upper segment incision.
40. Delivery of the baby.
41. Hysterectomy without or with placental removal followed by conservatives' procedures were left to the experience of the senior obstetrician.
42. Bilateral internal iliac balloon was inserted before operation & inflated after delivery of the baby to decrease blood loss during surgery.
43. If bladder or ureteric injury was suspected urological consultation was done.
44. **Postoperative care:**
45. Close monitoring to vital signs (blood pressure, pulse, temperature & respiratory rate), urine output (color & amount) & drains was done in ICU or in the ward according to patient condition.
46. Complete blood count & packed RBCs transfusion if the patient was anemic.
47. Early mobilization, good hydration & prophylactic anticoagulant if needed to prevent DVT.
48. After discharge the patients returned to outpatient clinic to remove stitches & their wounds were examined for infection.
49. Postoperative histopathological assessment of the placental remains.
50. **Estimation of blood loss:**
51. Actual blood loss (ABL) was calculated from a modification of the gross formula **(13)**
52. Actual blood loss = $BV \{Hct(i) - Hct(f)\} / Hct(m)$
53. BV: Blood volume. Blood volume is calculated from the body weight by multiplying the Body weight (in Kg) by $\times 70$

54. Hct (i): Initial hematocrit
55. Hct (f): Final hematocrit
56. Hct (m): Mean hematocrit
57. **Neonatal care:**
58. All neonates were examined by pediatrician with detection of APGAR score, gender & birth weight.
59. *Statistical analysis:*
60. Data collected throughout history, basic clinical examination, laboratory investigations & outcome measures coded, entered & analyzed using Microsoft Excel software. Statistical Package for the Social Sciences (SPSS version 20.0) (**Statistical Package for the Social Sciences**) software for analysis was used afterwards for further analysis of the data in this study.
61. **Results**
62. All cases had placenta previa & 41 cases had at least one previous CS, 18 of the 42 patients (42.9%) had a history of at least one previous uterine curettage, the mean age of the included women was 32.21 ± 5.28 years (range: 21-43 years), the median parity was 3 (range: 1-5), 20 (47.61%) presented with APH, 14 (33.3%) cases had urgent surgery due to APH or uterine contraction.
63. Midline incision was done in 13 (31%) cases & pfannenstiell incision was done in 29 (69%) women, there are 20 cases had hysterectomy from the start without trial of placental removal while attempt placental removal was tried in 22 cases that succeeded in 13 cases had CS only & failed in 9 cases had hysterectomy.
64. Different uterus sparing methods were tried including bilateral uterine artery ligation in 13 (59%) cases, bilateral ovarian artery ligation in 3 (13.6%) cases, bilateral internal iliac artery ligation in 3 (13.6%) cases, intrauterine tamponade in 4 (18.1%) cases & hemostatic sutures in placental bed in 11 (50%) cases, while B-lynch suture was not done, while procedures which were performed to control pelvic hemorrhage after hysterectomy included internal iliac artery ligation in 8 (27.5%) cases, pelvic packing in 5 (17.2%) cases & internal iliac balloon inflation to control hemorrhage in 1 (3.4%) case.
65. Bladder injury occurred in 7 (16.7%) cases & ureteric injury occurred in only 1 (2.4%) case, the median estimated intraoperative blood loss was 2 L (range: 1-8 L), all cases need blood transfusion. The median was 4 units (range: 1-17 units), the overall rate of FFP transfusion was 39/42 (92.85%). The median was 2 units (range: 1-8 units), only 2 (4.76%) woman received platelet transfusion & only 3 (7.14%) woman received cryoprecipitate transfusion, only 1 (2.4%) woman needed Recombinant activated factor vii.
66. The postoperative complications are DIC, postpartum collapse, reoperations in (2 cases ;4.8%), ICU admission in (5 cases ,11.9%), Wound infection, decidual cast, retained products of conception, chorioamnionitis & pulmonary embolism in (1 case ;2.4%). Median duration of hospital stay was 4 days (range: 2-25).
67. *Table (1): Patient clinical characteristics:*

| | |
|------------------------------------|-------------------|
| Age (Years) | 21 – 43 |
| Range | 32 .21 \pm 5.28 |
| Mean \pm SD | |
| Gestational Age at delivery(Weeks) | 33-39 |
| Range | 36.61 \pm 1.60 |
| Mean \pm SD | |
| Parity | 1 – 5 |
| Range | |
| Median | |

SD standard deviation

Table (2): Risk factors in Women with Morbidly-Adherent Placenta Previa:

| | |
|--------------------------------|-------------|
| No. of Previous CS | 1 (2.38%) |
| 0 | 6 (14.28%) |
| 1 | 13 (30.95%) |
| 2 | 14 (33.33%) |
| 3 | 7 (16.66%) |
| 4 | 1 (2.38%) |
| 5 | |
| No. of previous D&C | 18 (42.9%) |
| Asherman | 1 (2.38%) |

1. CS Cesarean section
2. Data presented as number (percentage)
3. APH Antepartum Hemorrhage
4. Data presented as number (percentage)
5. *Table (3):Degree of Morbid Placental Adherence by preoperative U/S evaluation:*

| | |
|-----------------------------------|------------|
| Degree of Morbid Adherence | 13(31%) |
| Focal accreta | 14 (33.4%) |
| Accreta | 10 (23.8%) |
| Increta | 5 (11.9%) |
| Percreta | |

Data presented as number (percentage)

Table (4): Type of surgery:

| | |
|-------------------------|-----------|
| CS only | 13(31%) |
| CS Hysterectomy | 29 (69%) |
| Elective surgery | 28(66.7%) |
| Urgent surgery | 14(33.3%) |
| Midline | 13(31%) |
| Pfannenstiel | 29(69%) |

Data presented as number (percentage)

Table (5): Intraoperative procedures performed to conserve the uterus after trial of placental removal:

| | |
|--|---------------------------------|
| | Total number of cases=22 |
| Bilateral uterine artery ligation | 13 (59%) |
| Bilateral ovarian artery ligation | 3 (13.6%) |
| Uterine tamponade | 4 (18.1%) |
| Internal iliac artery ligation | 3 (13.6%) |
| Hemostatic sutures in placental bed | 11 (50%) |
| B-lynch | 0 |

Data presented as number (percentage)

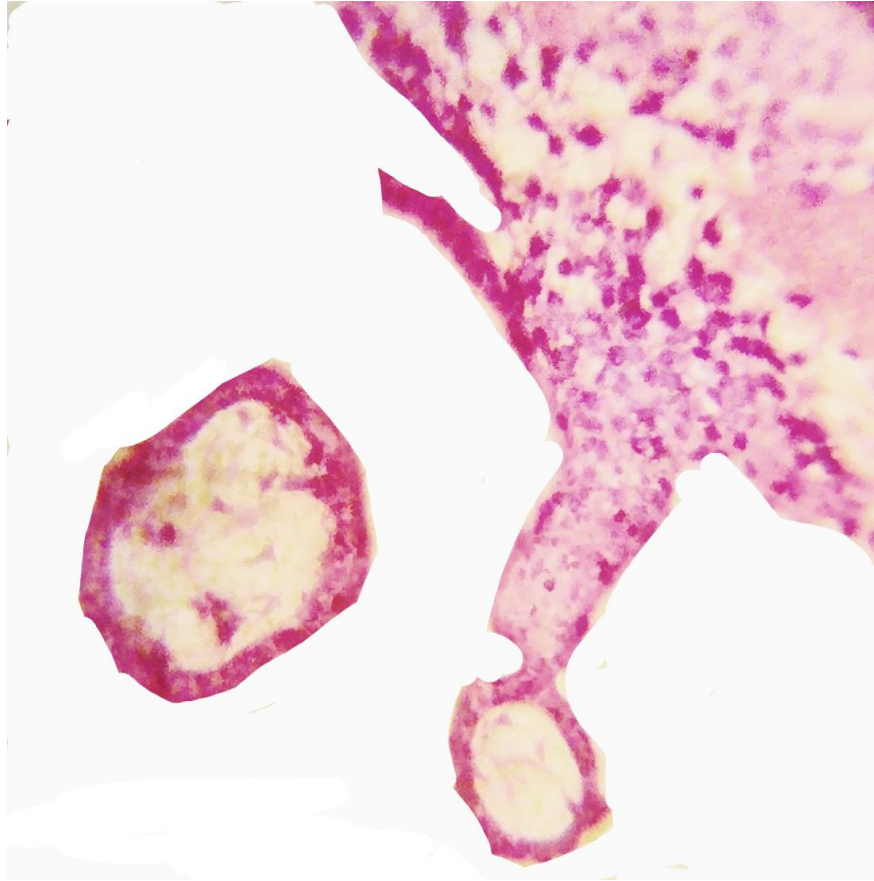
Table (6):Intraoperative complications & Estimated intraoperative blood loss & blood transfusion:

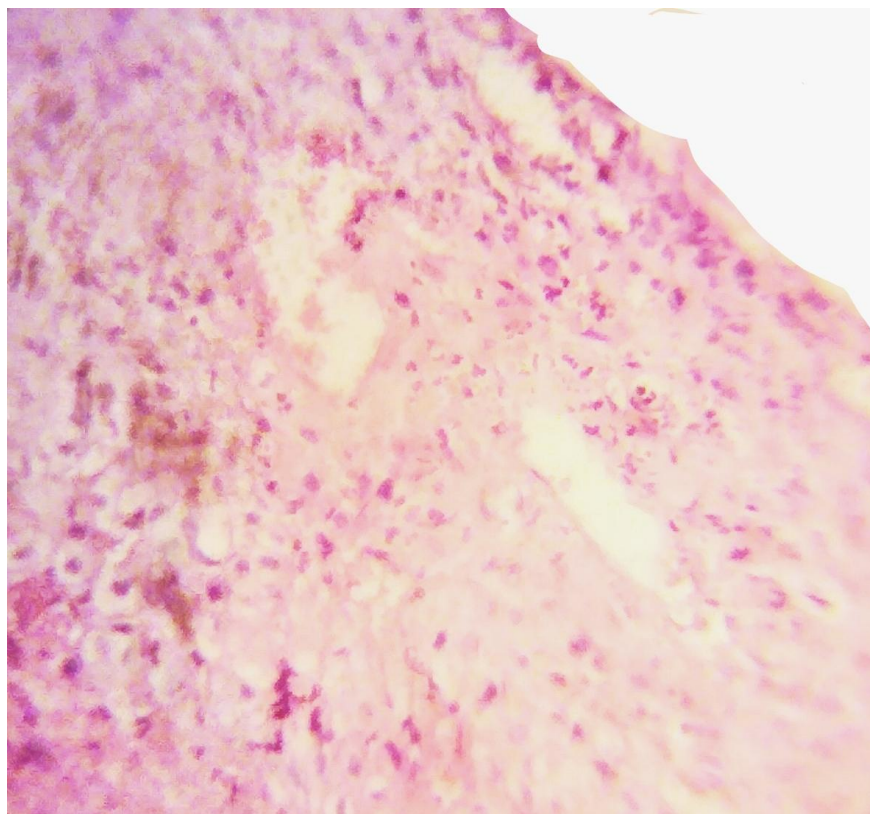
| | |
|---------------------------------|---------------------------------|
| Total number of cases=42 | Total number of cases=42 |
|---------------------------------|---------------------------------|

| | | |
|----------------------------------|----------------------------------|-------------|
| Bladder injury | 7 (16.7%) | 7 (16.7%) |
| Ureteric injury | 1 (2.4%) | 1 (2.4%) |
| Intestinal injury | 0 | 0 |
| Vascular injury | 0 | 0 |
| Total number of cases= 42 | | |
| Estimated Blood Loss (L) | Estimated Blood Loss (L) | 1 – 8 |
| Range | Range | 2 |
| Median | Median | |
| Blood Transfusion(RBCs units) | Blood Transfusion(RBCs units) | 1 – 17 |
| Range | Range | 4 |
| Median | Median | |
| FFP Transfusion | FFP Transfusion | 39 (92.85%) |
| FFP Transfusion(units) | FFP Transfusion(units) | 1 – 8 |
| Range | Range | 2 |
| Median | Median | |
| Platelet Transfusion | Platelet Transfusion | 2 (4.76%) |
| Cryoprecipitate Transfusion | Cryoprecipitate Transfusion | 3 (7.14%) |
| Recombinant activated factor vii | Recombinant activated factor vii | 1 (2.4%) |

Table (7):Postoperative complications in included women with morbidly-adherent placenta

| | |
|----------------------------------|---------------------------------|
| | Total number of cases=42 |
| DIC | 2 (4.8%) |
| ICU admission | 5 (11.9%) |
| Reoperation | 2 (4.8%) |
| Wound infection | 1 (2.4%) |
| Postpartum collapse | 2 (4.8%) |
| Pulmonary embolism | 1 (2.4%) |
| Mortality | 1 (2.4%) |
| Retained products of conception | 1 (2.4%) |
| Decidual cast | 1 (2.4%) |
| Chorioamnionitis | 1 (2.4%) |
| Duration of hospital stay (days) | 2 - 25 |
| Range | 4 |
| Median | |





1. Data presented as number (percentage)
- 2.
3. **Figure(1):** microscopic picture of retained product of conception & atrophic villi lined by syncytiotrophoblast with infiltration of decidua by inflammatory cells($\times 400$,H&E).
- 4.
5. **Figure(2):** microscopic picture of chorioamnionitis showing inflamed chorionic membranes & infiltration by inflammatory cells($\times 400$,H&E
6. **Discussion**
7. In our study, all cases had at least 1 previous CS, except for only 1 case that had no previous CS. While **Melissa et al., (2013)** reported that only 2 (6.1%) cases had no previous CS, while 11 (33.3%) women had 1 previous CS (**12**).
8. In this study, hysterectomy was done without placenta removal in 20 cases (47.6%) & with its removal in 22 cases (52.4%). The decision of placental removal was left to the experience of the senior due to absence of management protocol for MAP in our hospital.
9. Our results revealed that 20 cases (47.61%) presented with APH, 14 of them (33.3%) had urgent surgery, while **Eller et al., 2009** reported APH in 29(62%) cases & urgent surgery in 13(45%) cases (**19**).
10. **Biler A, et al., 2016** agreed with our study that, there is no significant difference (P: 0.64) between elective & urgent surgery as regard blood loss, while **Eller et al., 2009** reported that scheduled surgery

associated with reduced maternal morbidity in MAP patients. The reason of contradiction may be due to availability of senior obstetrician, anesthesiologists & blood bank in our hospital (19,20).

11. In this study midline incision was done in 31% cases & pfannenstiell incision was done in 69% of cases, while **Melissa et al., 2013** reported that midline incision was done in 30(90.9%) cases & pfannenstiell incision was done in 3 (9.1%) women. (12)
12. Intraoperatively trial placental removal plus conservative procedures were performed in 22(52.4%) cases that succeeded in 13 (59%) women who had CS only, failed in 9 (40.9%) women who had hysterectomy, while hysterectomy with placenta left in situ was done in 20(47.6%) women.
13. While **Biler A, et al. 2016** reported that 11(22%) women had hysterectomy without removal of the placenta, while 38 (78%) women were managed conservatively. The placenta was removed after delivery in all these patients. (20)
14. While **Deeba F.N et al., (2016)** reported that majority of patients 17(74%) undergone CS hysterectomy without removal of the placenta, Placental removal was performed in 6 (26%) patients all having focal adherence of placenta. (16)
15. Intraoperatively, many procedures were performed to control pelvic hemorrhage after hysterectomy, internal iliac artery ligation in 8 (27.5%) cases, pelvic packin2009 reported cases & internal iliac balloon was inflated to control hemorrhage in 1 (3.4%) case, **Eller et al., 2009** reported that 20 (36%) cases need bilateral internal iliac artery ligation, while **Fitzpatrick KE et al., 2014** reported that 11 (8%) women had internal iliac balloon was inflated to control hemorrhage, & 16 (12%) women had intra-abdominal packing. (19,21)
16. In this study, the rate of FFP transfusion was 92.85%. Moreover platelets & Recombinant activated factor VII transfusion rate was (7.14%) (2.4%), respectively. While **Melissa et al., 2013** reported transfusion of FFP in 11 cases (33.3%), platelets in 4 cases (36.4%) & cryoprecipitate in 2 cases (18.2%). **Fitzpatrick KE et al., 2014** revealed that 5 (4%) cases needed Recombinant activated factor VII. (12,21)
17. **Fitzpatrick KE et al., 2014** also reported in agreement with this study that, there is highly significant increase in blood loss in patients undergoing CS hysterectomy with placental removal when compared to those with same procedure but without placental removal. But they disagreed with us, as regard the difference between them in the hospital stay (21).
18. **Biler A et al. 2016** reported in accordance with our study, that intraoperative complications, bladder & ureteric injury occurred, while bowel & vascular injuries have not occurred. However, **Eller et al., 2009** revealed that bowel, ureteric & vascular injury occurred.
19. The median hospital stay in this study was 4 days in comparison to 5 days in a study by **Melissa et al., 2013** (12).
20. In our study, maternal mortality was reported in only 1 case (2.4%). Morbidity like DIC, postpartum collapse, pulmonary embolism occurred only in cases with hysterectomy & placental removal, due to internal hemorrhage. **Deeba F.N et al 2016** reported mortality rate in 2 cases 8.69% (18,22).
21. This study, revealed a mean gestational age of 36.61 weeks, the median birth weight of 3400 g& Apgar score of 7 with uniformly good neonatal outcome. **Eller et al., 2009** reported that mean of gestational age at time of delivery was 35.4 weeks (19).
22. A major strength of our study is its prospective population-based design, not relying on routinely coded data to ascertain cases. But the limitations include the sample size. As it was insufficient to identify differences in complications with the use of different management strategies, control of bleeding differed in every patient.

23. Additionally, management decisions were made at the discretion of the responsible clinician, & protocols were not employed.
24. **Conclusion**
25. Up till now there is no completely sensitive & specific test for MAP diagnosis. Early antenatal diagnosis of MAP& timely delivery decision in tertiary care center with appropriate expertise & facilities are the key to success in the management.
26. Multidisciplinary approach individualized according to hemodynamic stability; future fertility desire may reduce maternal morbidity & mortality in MAP patients. As CS hysterectomy, should be avoided in women with future fertility desire.
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