# UPDATES ON THE MANAGEMENT OF PLACENTAL ABRUPTION AND ASSOCIATED ANXIETY: A SYSTEMATIC REVIEW

**Ahmed Baker A Alshaikh[1], Fawaz E Edris[2], Farah Turki Mazen Alfuhigi[3], Wala Khaled Aif Alruwaili[4], Rawan Ghazi Alsharari[4], Razan Ghazi Alsharari[3], Norah Ahmad Monawer Alsayer[3], Hana Nasser Alkhalifah[3]**

**[1]Associated Professor and Consultant obstetrics and gynecology. College of medicine. Jouf University KSA; [2]Professor and Consultant of Obstetrics and Gynecology, College of Medicine, Umm AlQura University, Makkah, Saudi Arabia; [3]Medical Student, College of medicine. Jouf University, KSA; [4]Medical Intern, College of medicine. Jouf University, KSA**

**Abstract**

**Objectives:** To review the published literature on the management (diagnosis and treatment) of placental abruption (PA).

**Methods:** We conducted a thorough search of PubMed, SCOPUS, Web of Science, and Google Scholar to find pertinent literature. Rayyan QRCI was utilized during the entire process.

**Results:** We included eight studies with a total of 1920 participants. One study stated that ultrasound was reported as the only method of diagnosis and confirmatory for PA while another reported that sonography is not sensitive enough to confirm PA. Two other studies demonstrated that MRI and CT are the confirmatory methods for PA diagnosis. Prompt delivery in PA cases may have saved the life of just one fetus. CS delivery was documented in five studies and ranged from 84.6% to 43.3%. Bleeding during delivery was considerably higher with cesarean delivery than during vaginal delivery. On the other hand, cases with vaginal deliveries had serious complications, including uterine rupture and maternal mortality. Both an intensive care unit and a blood transfusion were necessary for PA management.

**Conclusion:** One significant contributing factor to perinatal death and morbidity is still PA. Unfortunately, there is currently no way to accurately forecast or prevent abruption. Even with the advancements in medical technology, abruption diagnosis is still made clinically. Ongoing assessments of the mother's and fetus's health, careful consideration of the advantages and disadvantages of conservative care, and, where necessary, prompt delivery can all help to maximize the results for both the mother and the newborn.

**Keywords:** Placental abruption; Placental separation; Management; Systematic review.

Manuscrito recibido: 01/10/2024
Manuscrito aceptado: 17/10/2024

*Corresponding Author: Ahmed Baker A Alshaikh, Associated Professor and Consultant obstetrics and gynecology. College of medicine. Jouf University KSA

Correo-e: ptrservices2022@gmail.com

## Introduction

Premature placental separation from a typically implanted placenta is known as PA. While a placenta previa frequently results in some degree of placental separation, these situations are not typically regarded as abruptions in the strict sense of the word. If an abruption is "revealed," blood will flow between the decidua and the membranes before exiting the body through the cervix and into the vagina. The less common "concealed" abruption happens when there is no visible external bleeding and blood builds up below the placenta [1].

From episodes of modest bleeding and little to no effects to catastrophic abruption resulting in fetal death and significant maternal morbidity, PA has a wide range of clinical relevance. Ten percent or more of premature deliveries may be related to disruption [1].

PA complicates about 1% of births, according to several epidemiologic cohort studies [2, 3]. In many situations, the exact pathophysiology leading to placental abruption remains unknown. Hemorrhage at the decidual–placental junction causes disruption. Presumptive placental separation appears to be preceded by an abrupt vasospasm of tiny arteries. Venous hemorrhage and decidual necrosis may be present together with decidual thrombosis of the decidual vessels [4].

The diagnosis of abruption is clinical, and women who have a history of trauma, vaginal bleeding, abdominal pain, or both, as well as those who appear with otherwise unexplained premature labor, should be suspected of having the disorder. All potential causes of stomach pain and bleeding are included in the differential diagnosis [5].

The degree of maternal and fetal impairment, the presentation, and the gestational age all influence how PA is managed. The presentation can vary greatly, thus it's critical to customize management for each situation. In milder occurrences of abruption, more active care may not be necessary, although it is desired in cases of severe abruption [6]. This systematic review investigates the published literature on the management (diagnosis and treatment) of PA.

## Methodology

### Study Design and Duration

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) standards were followed in the conduct of this systematic review [7]. In April 2024, the systematic review got started.

### Search strategy

To find relevant material, a comprehensive search was conducted using four key databases: PubMed, SCOPUS, Web of Science, and Google Scholar. We searched through databases that contained only English content, paying attention to the unique requirements of each. To find the relevant papers, we converted the following keywords to PubMed Mesh terms; "Placental abruption," "Placental detachment," "Placental separation," and "Management." "OR," "AND," and "NOT," three boolean operators, matched the necessary keywords. Full-text English publications, freely accessible articles, and human trials were among the search results.

### Selection criteria

We considered the following criteria for inclusion in this review:

- Any study design that discussed the recent literature on the management (diagnosis and treatment) of PA.
- We did not include any case reports and studies that discussed the treatment of PA with complications.
- Only human subjects.
- English language.
- Free accessible articles.

### Data extraction

Two output verifications of the search method were conducted using Rayyan (QCRI) [8]. By using inclusion/exclusion criteria, the researchers evaluated how relevant the abstracts and titles were to the combined search results. The reviewers carefully considered every manuscript that met the inclusion requirements. The authors talked about ways to resolve conflicts. A pre-made data extraction form was used to upload the approved study. The authors extracted data on the study title, authors, study year, country, participants, age, gestational age (GA), mode of delivery, type of PA, diagnosis, and management.

### Strategy for data synthesis

Summary tables using information from relevant studies were compiled to provide a qualitative assessment of the research's findings and components. The best technique for making use of the data from the included study articles was chosen after the data for the systematic review was gathered.

## Results

### Search results

The systematic search produced 979 study articles in total, of which 516 duplicates were eliminated. After 463 studies had their titles and abstracts screened, 396 were not included. After 67 reports were requested to be retrieved, 3 articles were not found. After screening 64 studies for full-text assessment, 37 were rejected due to incorrect study results, 9 were rejected due to incorrect population type, 4 articles were editor's letters, and 6 were abstracts. This systematic review included eight eligible study articles. A synopsis of the procedure for choosing studies is provided in (Figure 1).

### Characteristics of the included studies

Table (1) shows the sociodemographic details of the research articles that are included. Our results included eight studies with a total of 1920 participants. Six studies were retrospective cohorts [9, 10, 11, 13, 15, 16], one was an observational study [12], and one was a randomized control trial (RCT) [14]. Five studies were conducted in the USA [9, 10, 11, 14, 15], one in Japan [12], one in Italy [13], and one in Senegal [12].

### Diagnosis

Table (2) presents the clinical characteristics. One study stated that ultrasound was reported as the only method of diagnosis and confirmatory for PA [11] while another reported that sonography is not sensitive enough to confirm PA [9]. Two other studies demonstrated that MRI and CT are the confirmatory methods for PA diagnosis [13, 15].

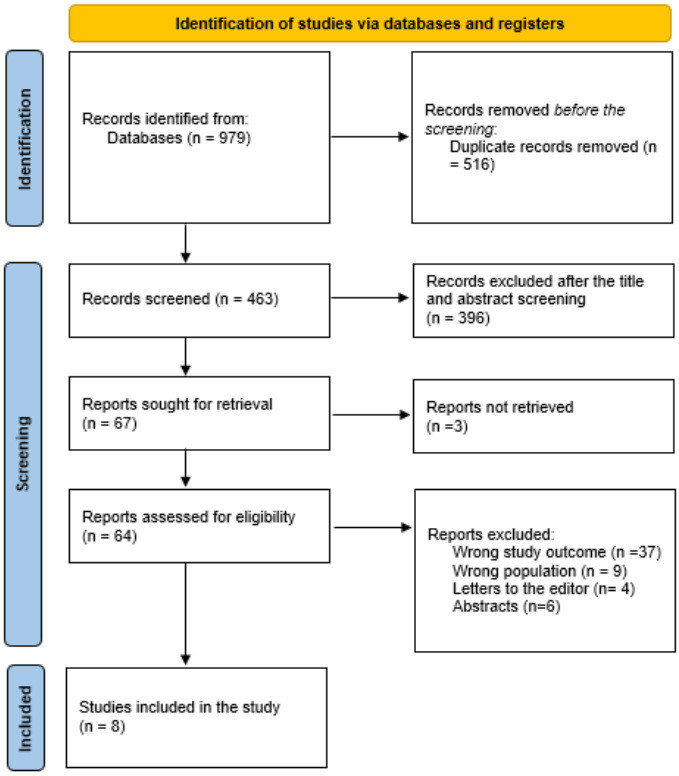


**Figure 1.** Study selection is summed up in a PRISMA flowchart.

### Management

Prompt delivery in PA cases may have saved the life of just one fetus. CS delivery was documented in five studies and ranged from 84.6% [10] to 43.3% [14]. Bleeding during delivery was considerably higher with cesarean delivery than during vaginal delivery. On the other hand, cases with vaginal deliveries had serious complications, including uterine rupture and maternal mortality [12]. Both an intensive care unit and a blood transfusion were necessary for PA management [16].

## Discussion

Usually, when the vascular structure supporting the placenta is compromised, PA ensues. More specifically, it happens when there is a tear in the vascular matrix connecting the maternal side. The fetus receives oxygen and nutrients from these structures, which accounts for their significance [17].

In this study, Combs et al. stated that ultrasound was reported as the only method of diagnosis and confirmatory for PA [11], while Glantz & Purnell, reported that sonography is not sensitive enough to confirm PA [9]. However, because sonographic evidence of PA is either infrequently seen or difficult to diagnose, ultrasonography has historically been less helpful in the diagnosis of this condition. Because of this, when ultrasound has not revealed a placenta previa and all other potential sources of vaginal bleeding have been ruled out, the sonographic diagnosis of abruptio placentae has traditionally been referred to as an exclusion diagnostic. The characteristic sonographic anomalies of a retroplacental hypoechoic region or dissection of blood between the fetal membranes were previously seen in only a small number of patients with clinical indications of placental separation [18].

Placental separations have occurred in the first and second trimesters of pregnancy as a result of the routine use of ultrasonography to evaluate bleeding early in the pregnancy. But many of these pregnancies have gone on to progress regularly after that. It is significant to highlight that the ability of ultrasonography to identify PA depends in part on the stage of the process, even though most doctors still primarily rely on it to rule out placenta previa. Ultrasonographic results may be negative if the abruption is moderate or if bleeding happens without a significant blood clot—that is if the blood escapes outside [19].

According to published reports, the ultrasonography detection rate of PA might vary from 2% to 50% [20-22]. Nevertheless, the majority of research was done in the past, before the development of highly sophisticated ultrasound equipment, and thus did not fully account for the variety of abruption sonographic findings. Studies frequently failed to demonstrate a consistent time span between the ultrasound examination, delivery, and the start of clinical signs.

Additionally, two other studies demonstrated that MRI and CT are the confirmatory methods for PA diagnosis in the current review [13, 15]. The requirement for advanced training to interpret images skillfully may be a potential limitation of MR imaging in the diagnosis of abruption. For this reason, the excellent interobserver agreement between two readers with varying levels of proficiency in fetoplacental MR imaging is an important side finding [13].

There are no laboratory tests or diagnostic techniques that support the diagnosis of PA; however, an ultrasound examination may be helpful in leading to the proper diagnosis and ruling out other possibilities, such as placenta previa, through differential diagnosis. Hemorrhage in the acute phase of PA was shown to be isoechoic, or comparable to the sounding tissue. In any case, it is challenging to visualize both the bleeding from the surrounding tissue and the bleeding from PA [23].

When treating patients with PA, the health of the mother and fetus must be considered. We found that prompt delivery in PA cases may have saved the life of just one fetus. CS delivery was documented in five studies and ranged

**Table 1**. Sociodemographic characteristics of the included participants.

| Study | Study design | Country | Participants | Mean age |
|---|---|---|---|---|
| Glantz & Purnell, 2002 [9] | Retrospective cohort | USA | 149 | NM |
| Alouini et al., 2022 [10] | Retrospective cohort | USA | 201 | 17-46 (range) |
| Combs et al., 1992 [11] | Retrospective cohort | USA | 40 | 27.9 ± 6.3 |
| Wada et al., 2023 [12] | Observational study | Japan | 1134 | 29-37 |
| Masselli et al., 2011 [13] | Retrospective cohort | Italy | 60 | 20-38 |
| Colón et al., 2016 [14] | RCT | USA | 30 | 29.2 ± 7.17 |
| Kopelman et al., 2013 [15] | Retrospective cohort | USA | 176 | NM |
| Ngom et al., 2022 [16] | Retrospective cohort | Senegal | 130 | 25-35 (range) |

*NM=Not-mentioned

**Table 2.** Clinical characteristics and outcomes of the included studies.

| Study | GA | Mode of delivery (cesarean) | Type of PA | Diagnosis | Management |
|---|---|---|---|---|---|
| Glantz & Purnell, 2002 [9] | 24 | 81 (54.4%) | Mixed and concealed | Sonography is not sensitive enough to confirm PA. When there is a positive sonographic result, obstetric care is administered more aggressively, and the perinatal outcome is not as good as it is when the sonogram is normal. | NM |
| Alouini et al., 2022 [10] | 18-42 | 201 (84.6%) | Mixed and concealed | NM | It is imperative that the chosen form of birth is a CS and that the delivery not be postponed. Women who have metabolic and vascular disorders should be closely monitored during pregnancy and educated about the risk of PA. |
| Combs et al., 1992 [11] | 20-36.3 | NM | Mixed and concealed | The only basis for the PA diagnosis was sonographic data; yet, abruption was not suspected clinically. | When treating individuals with minor PA, expectant care makes sense. There was no maternal morbidity linked to the delivery delay. Prematurity was nearly the sole cause of both fetal morbidity and mortality. Prompt delivery may have saved the life of just one fetus. |
| Wada et al., 2023 [12] | 30-36 | 608 (536%) | Mixed and concealed | NM | In women with PA and intrauterine fetal demise, bleeding during delivery was considerably higher with cesarean delivery than during vaginal delivery. On the other hand, cases with vaginal deliveries had serious complications, including uterine rupture and maternal mortality. |
| Masselli et al., 2011 [13] | 27-38 | NM | Mixed and concealed | If the diagnosis of PA would affect care, MR imaging should be examined after negative US results in the context of late pregnancy hemorrhage, as it can reliably display PA with excellent interobserver agreement. | NM |
| Colón et al., 2016 [14] | 28-32 | 13 (43.3%) | Mixed and concealed | NM | In the treatment of preterm nonsevere PA, magnesium sulfate tocolysis did not significantly alter pregnancy prolongation. |
| Kopelman et al., 2013 [15] | 20 | NM | Traumatic PA | By precisely identifying PA, a placenta evaluation using CT imaging can assist stratify patients who are at risk of prenatal problems. | NM |
| Ngom et al., 2022 [16] | 32.5 | 103 (79.2%) | Mixed and concealed | NM | Both an intensive care unit and a blood transfusion were necessary for the problems' management. In 6.2% of instances, a hemostasis hysterectomy was carried out. |

*NM=Not-mentioned

from 84.6% [10] to 43.3% [14]. Compared to vaginal delivery, cesarean delivery resulted in significantly more bleeding during delivery. However, cases involving vaginal deliveries experienced severe side effects, such as maternal death and uterine rupture [12]. For PA management, an intensive care unit and a blood transfusion were required [16].

Individuals who exhibit signs of preterm bleeding ought to be admitted right away to the labor and delivery unit [24]. Blood loss may be significantly underestimated because covert hemorrhage frequently occurs alongside PA. Vasoconstriction brought on by acute volume loss may initially result in normal or raised blood pressure. Additionally, hemoglobin concentrations might not adequately represent sudden blood loss. Hemodynamic monitoring by central venous pressure or central arterial pressure may be useful when there appears to be a large blood loss or when concealed abruption is suspected. The insertion of a Foley catheter allows for a precise assessment of urine production and offers more details regarding the patient's volume status. It's also important to identify related obstetric and medical conditions including diabetes mellitus and preeclampsia. Assessment of gestational age and fetal condition needs to happen quickly and precisely. The patient's condition should be communicated to the appropriate personnel in the pediatric and anesthetic departments [24].

The state of the mother and fetus, gestational age, and cervical status all influence the time and mode of birth. Because this is frequently a self-limiting event, the premature fetus with a modest abruption and minimal bleeding may be handled optimistically with close observation [25].

## Conclusion

One significant contributing factor to perinatal death and morbidity is still PA. Unfortunately, there is currently no way to accurately forecast or prevent abruption. Even with the advancements in medical technology, abruption diagnosis is still made clinically. Ongoing assessments of the mother's and fetus's health, careful consideration of the advantages and disadvantages of conservative care, and, where necessary, prompt delivery can all help to maximize the results for both the mother and the newborn.

## References


1. Ananth CV, Berkowitz GS, Savitz DA, Lapinski RH. Placental abruption and adverse perinatal outcomes. JAMA 1999;282: 1646–51.
2. Sheiner E, Shoham-Vardi I, Hallak M, Hadar A, GortzakUzan L, Katz M, et al. Placental abruption in term pregnancies: clinical significance and obstetric risk factors. J Matern Fetal Neonatal Med 2003; 13:45–9.
3. Salihu HM, Bekan B, Aliyu MH, Rouse DJ, Kirby RS, Alexander GR. Perinatal mortality associated with abruptio placenta in singletons and multiples. Am J Obstet Gynecol 2005; 193:198–203.
4. Bernischke K, Kaufmann P. Pathology of the human placenta. 4th ed. New York (NY): Springer; 2000.
5. Tikkanen M. Placental abruption: epidemiology, risk factors and consequences. Acta obstetricia et gynecologica Scandinavica. 2011 Feb;90(2):140-9.
6. Brennan K. Placental pathology: A review of placenta previa, placental abruption and placenta accreta. Update in anaesthesia. 2019 Sep 1;34.
7. Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. International journal of surgery, 88, 105906.
8. Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan—a web and mobile app for systematic reviews. Systematic reviews, 5, 1-10.

9. Glantz C, Purnell L. Clinical utility of sonography in the diagnosis and treatment of placental abruption. Journal of ultrasound in medicine. 2002 Aug;21(8):837-40.

10. Alouini S, Valery A, Lemaire B, Evrard ML, Belin O. Diagnosis and Management of Pregnant Women With Placental Abruption and Neonatal Outcomes. Cureus. 2022 Jan 11;14(1).

11. Combs CA, Nyberg DA, Mack LA, Smith JR, Benedetti TJ. Expectant management after sonographic diagnosis of placental abruption. American journal of perinatology. 1992 May;9(03):170-4.

12. Wada Y, Takahashi H, Sasabuchi Y, Usui R, Ogoyama M, Suzuki H, Ohkuchi A, Fujiwara H. Maternal outcomes of placental abruption with intrauterine fetal death and delivery routes: A nationwide observational study. Acta Obstetricia et Gynecologica Scandinavica. 2023 Jun;102(6):708-15.

13. Masselli G, Brunelli R, Di Tola M, Anceschi M, Gualdi G. MR imaging in the evaluation of placental abruption: correlation with sonographic findings. Radiology. 2011 Apr;259(1):222-30.

14. Colón I, Berletti M, Garabedian MJ, Wilcox N, Williams K, El-Sayed YY, Chueh J. Randomized, double-blinded trial of magnesium sulfate tocolysis versus intravenous normal saline for preterm nonsevere placental abruption. American journal of perinatology. 2016 Jun;33(07):696-702.

15. Kopelman TR, Berardoni NE, Manriquez M, Gridley D, Vail SJ, Pieri PG, O'Neill PJ, Pressman MA. The ability of computed tomography to diagnose placental abruption in the trauma patient. Journal of Trauma and Acute Care Surgery. 2013 Jan 1;74(1):236-41.

16. Ngom PM, Edouard FM, Fatou GY, Aya SM, Ndew TM, Amine IM, Hajar B, Khadidja F, Madjiguène K, Mansour FM. Management and Maternal-Fetal Prognosis of Placental Abruption: A Retrospective Study of 130 Cases. Open Journal of Obstetrics and Gynecology. 2022 Jul 12;12(7):590-8.

17. Lucian SE, Ovidiu CD. A Brief Review of the Aetiological Factors Involved in Placental Abruption.

18. Yiu-Chiu V, Chiu L. Sonographic features of placental complications in pregnancy. American Journal of Roentgenology. 1982 May 1;138(5):879-85.

19. Spirt BA, Kagan EH, Rozanski RM. Abruptio placenta: sonographic and pathologic correlation. American Journal of Roentgenology. 1979 Nov 1;133(5):877-81.

20. HURD WW, Miodovnik ME, Hertzberg VI, LAVIN JP. Selective management of abruptio placentae: a prospective study. Obstetrics & Gynecology. 1983 Apr 1;61(4):467-73.

21. Jaffe MH, Schoen WC, Silver TM, Bowerman RA, Stuck KJ. Sonography of abruptio placentae. American Journal of Roentgenology. 1981 Nov 1;137(5):1049-54.

22. Sholl JS. Abruptio placentae: clinical management in nonacute cases. American journal of obstetrics and gynecology. 1987 Jan 1;156(1):40-51.

23. Kwiatkowski S, Kwiatkowska E, Rzepka R, Torbe A, Dolegowska B. Ischemic placental syndrome–prediction and new disease monitoring. The Journal of Maternal-Fetal & Neonatal Medicine. 2016 Jun 17;29(12):2033-9.

24. Yeo L, Ananth C, Vintzileos A. Placental abruption. Gynecology and Obstetrics. Lippincott, Williams & Wilkins. 2003.

25. Combs CA, Nyberg DA, Mack LA, Smith JR, Benedetti TJ. Expectant management after sonographic diagnosis of placental abruption. American journal of perinatology. 1992 May;9(03):170-4.