



Retained placenta after vaginal birth

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INTRODUCTION

The third stage of labor is the interval from delivery of the infant to expulsion of the placenta. Delayed separation and expulsion of the placenta is a potentially life-threatening event because it interferes with normal postpartum contraction of the uterus, which can lead to hemorrhage.

This topic will discuss the diagnosis and management of a retained placenta after vaginal birth. Management of retained products of conception after a miscarriage or pregnancy termination is reviewed separately. (See "[Retained products of conception](#)".)

DEFINITION

Retained placenta can be defined as lack of expulsion of the placenta within 30 minutes of delivery of the infant [1,2]. This is a reasonable definition in the third trimester when the third stage of labor is actively managed (ie, administration of a uterotonic agent before delivery of the placenta, controlled cord traction) because 98 percent of placentas are expelled by 30 minutes ([figure 1](#)) in this setting [3].

Physiological management of the third stage (ie, delivery of the placenta without the use of uterotonic agents or cord traction) increases the frequency of retained placenta: only 80 percent of placentas are expelled by 30 minutes ([figure 1](#)) and it takes about 60 minutes before 98 percent of placentas are expelled. In the second trimester, the frequency of retained placenta at 30 minutes is also high ([figure 2](#)); most are expelled by 90 to 120 minutes

These findings suggest that the definition, or the timing of intervention, should take into account how the third stage of labor is managed and the gestational age at delivery. In part for these

reasons, the World Health Organization (WHO) concluded that the length of time before making a diagnosis of retained placenta should be “left to the judgement of the clinician” [4]. (See ["Management of the third stage of labor: Drug therapy to minimize hemorrhage"](#) and ['Indications for intervention'](#) below.)

TYPES OF RETAINED PLACENTA

The three types of retained placenta, in order of increasing morbidity, are:

- **Trapped or incarcerated placenta** – The incarcerated or trapped placenta is simply a separated placenta that has detached completely from the uterus, but has not delivered spontaneously or with light cord traction because the cervix has begun to close.
 - **Placenta adherens** – The placenta is adherent to the uterine wall, but easily separated manually.
 - **Placenta accreta spectrum** – The placenta is pathologically invading the myometrium due to a defect in the decidua. It cannot be cleanly separated, although the placenta may still be removed vaginally if the area of attachment is small.
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PATHOGENESIS

Ultrasound studies have identified four phases in the third stage of labor [5]:

- **Latent phase** – Immediately after birth, all of the myometrium contracts except for the portion beneath the placenta.
- **Contraction phase** – The retroplacental myometrium contracts.
- **Detachment phase** – Contraction of the retroplacental myometrium produces horizontal (shear) stress on the maternal surface of the placenta, causing it to detach.
- **Expulsion phase** – Myometrial contractions expel the detached placenta from the uterus.

An abnormality in one or more of these phases may be the mechanism for retained placenta.

A trapped placenta may be seen as a failure of the expulsion phase, where the lower uterine segment and cervix contract before the placenta separates, or if expulsive or gravitational forces are inadequate to deliver the placenta.

Placenta adherens may be seen as resulting from a prolonged latent phase and/or abnormal contraction phase [5]. It has been hypothesized that localized failure of myometrial contractility may be present throughout labor and result in both dysfunctional labor and placenta adherens [6-8]. If the localized contractile failure is severe, then protraction or arrest of labor will occur and

cesarean delivery may be needed. If localized contractile failure is not severe, then the woman may achieve vaginal delivery, but is at increased risk of a placenta adherens. Histological studies suggest that the underlying mechanism may be placental changes associated with oxidative stress or preeclampsia [9].

The pathogenesis of placenta accreta is completely different, as it is a structural rather than a functional abnormality. (See "[Clinical features and diagnosis of placenta accreta spectrum \(placenta accreta, increta, and percreta\)](#)", section on 'Pathogenesis'.)

PREVALENCE

The overall prevalence of retained placenta varies across settings and over time. In a systematic review of observational studies, the median prevalence of retained placenta at 30 minutes in high-resource settings was 2.7 percent of vaginal deliveries compared with 1.5 percent in low-resource settings [10]. The prevalence has also been increasing: a review of historical data from nine hospitals in the British Isles reported an increase from 0.5 percent in the 1930s to 2.3 percent in the 1980s [10]. In 2005-2006, the prevalence of retained placenta in the author's hospital was 3.3 percent [11]. The difference in prevalence between the low and high resource countries and the observed increase in prevalence over time are probably related to differences in epidemiology and risk factors.

In the author's large prospective audit of cases of retained placenta resolved without hysterectomy, trapped placenta, placenta adherens, and placenta accreta accounted for 13, 81, and 6 percent of cases, respectively [11]. In another series, trapped placenta accounted for 51 percent of placentas manually removed to prevent postpartum hemorrhage [12].

Although small areas of focal placenta accreta are not uncommon at vaginal delivery, a complete placenta accreta is rare, as most affected patients are delivered by repeat cesarean delivery. These patients typically have a history of previous cesarean delivery and placenta previa, which are indications for repeat cesarean delivery. We estimate only 1 in 440 women who have a retained placenta following vaginal delivery will have placenta accreta. (See "[Clinical features and diagnosis of placenta accreta spectrum \(placenta accreta, increta, and percreta\)](#)".)

RISK FACTORS

A variety of risk factors have been associated with retained placenta [6,13-22]:

- Previous retained placenta
- Preterm gestational age ([figure 2](#))
- Use of ergometrine
- Uterine abnormalities

- Preeclampsia, stillbirth, small-for-gestational-age infant
- Velamentous cord insertion
- Maternal age ≥ 30 years
- Delivery in a teaching hospital

The association of active management of the third stage of labor with ergometrine with a prolonged third stage is likely a peculiarity of ergometrine which, in contrast to [oxytocin](#), causes a powerful, continuous uterine contraction. With intravenous (IV) administration, the onset of uterine contraction is immediate and closes the cervix at the same time as placental detachment occurs, thus trapping the placenta behind a closed cervix. The only trial to study use of IV ergometrine for management of the third stage of labor found a massive increase in the need for manual removal of the placenta (RR 19.5, 95% CI 2.6-145.4) [\[16\]](#). This finding was supported by data from a population study in Sweden: The retained placenta rate in 10 centers that routinely used methylergometrine was significantly higher than those that used oxytocin alone (2.7 versus 1.8 percent) [\[17\]](#).

Uterine abnormalities appear to be a prominent risk factor. In a series of 63 pregnancies in women with bicornuate, septate, or arcuate uteri, retained placenta was the predominant complication and occurred in 17 percent [\[18\]](#). In a study that performed routine hysteroscopy six weeks after manual removal of a retained placenta in 48 women, 15 percent had an incomplete uterine septum [\[19\]](#).

Defective placental implantation may be the underlying reason that preeclampsia, stillbirth, intrauterine growth restriction and small for gestational age infants have been associated with retained placenta [\[20\]](#).

A velamentous cord insertion is a risk factor for manual removal of the placenta, which has been described in 5.5 percent of pregnancies with this cord abnormality [\[21\]](#). Presumably breakage of the fragile cord at delivery resulted in a retained placenta.

CLINICAL FINDINGS AND DIAGNOSIS

The diagnosis of retained placenta is made when the placenta has not been expelled within 30 minutes of delivery of the infant. (See ['Definition'](#) above.)

A diagnosis of trapped placenta is made when the classic clinical signs of placental separation are present (lengthening of the umbilical cord, gush of blood from the vagina, change in the shape of the uterine fundus from discoid to globular, elevation of the fundal height, and contraction of the fundus) and the edge of the placenta is palpable through a small but patent cervical os.

A diagnosis of placenta adherens or placenta accreta is made in the absence of signs and symptoms of placental separation. Placenta adherens is generally only clinically distinguishable from placenta accreta at the time of attempted manual removal. If a clean plane of separation can

be created between the entire placenta and decidua, the diagnosis is placenta adherens. If areas of myometrial invasion prevent clean separation of part of the placenta, the diagnosis is focal placenta accreta. However, a mild focal placenta accreta can be difficult to distinguish clinically from placenta adherens.

Imaging — Ultrasound can distinguish between a detached trapped placenta and an adherent placenta, but is rarely performed unless the diagnosis is uncertain after physical examination [5]. With a trapped placenta, the myometrium is thickened all around the uterus and the placenta is seen within but largely separate from the uterine body in the lower segment. By contrast, with an adherent placenta the myometrium will be thickened in all areas except where the placenta is attached, where it will be very thin or even invisible ([image 1](#)) and no area of the placenta will be separate from the uterine body.

Placental pathology — A case-control study performed macroscopic and histological analysis of adherens-type retained (n = 49) and non-retained (n = 47) term singleton placentas from otherwise healthy pregnancies [9]. Adherens-type retained placentas had a significantly smaller surface area, were more oblong in shape, and had more signs of maternal underperfusion. They also had more basal plate myometrial fibers, but no increase in focal accreta. This is consistent with the association of retained placenta with intrauterine growth restriction and stillbirth (see '[Risk factors](#)' above), but suggests the association is with adherens type rather than focal accreta [3].

COMPLICATIONS

The two most common complications of retained placenta are postpartum hemorrhage and postpartum endometritis. Uterine inversion is less common. The frequency of these complications depends on multiple factors, including the definition used, etiology, and management of the retained placenta.

In high-resource settings, deaths from retained placenta are very rare. In settings with fewer resources, however, the case fatality rate is commonly around 1 percent, depending on women's ability to access services for treatment and support [23].

INDICATIONS FOR INTERVENTION

Patients with severe bleeding — Severe bleeding is an obstetric emergency that requires prompt intervention. (See "[Postpartum hemorrhage: Medical and minimally invasive management](#)").).

The retained placenta should be manually removed as soon as possible. Expulsion of the placenta promotes global uterine contraction and will likely reduce bleeding. (See '[Perform manual extraction](#)' below.)

Patients without severe bleeding — When the placenta has been retained for 30 minutes in a stable patient delivered in the third trimester, we perform a physical examination (and sometimes ultrasound) to determine whether the placenta is merely trapped or still adherent (see '[Clinical findings and diagnosis](#)' above) and begin preparations for intervention. (See '[Management](#)' below.) The optimum timing of intervention balances the risk of leaving the placenta in situ (postpartum hemorrhage) and the risks of intervention (postpartum hemorrhage and/or infection, uterine trauma) versus the likelihood that the placenta will spontaneously deliver with expectant management.

There is no consensus worldwide as to when intervention is indicated. We suggest discontinuing expectant management at 60 minutes. Available data suggest that delaying intervention until at least 30 minutes have elapsed will lead to spontaneous delivery of many placentas, and the risk of hemorrhage does not begin to increase until 20 to 30 minutes after birth [[6,24,25](#)]. Waiting as long as 60 minutes is reasonable if an intervention can be promptly and successfully initiated if the patient begins to bleed. This time period could be extended beyond 60 minutes for deliveries in the second trimester where the risk of retained placenta is higher ([figure 2](#)) and the risk of hemorrhage is lower. In the second trimester, waiting two hours for placental expulsion is reasonable [[26](#)].

There are very limited data to guide the maximum duration of expectant management [[27,28](#)], but we suggest not delaying intervention by more than two hours from delivery of the infant due to the risk of infection and bleeding. In a trial including 51 women who delivered in the third trimester with retained placenta at 60 minutes and no pharmacologic intervention, 23 women (45 percent) eventually expelled the placenta spontaneously, but 24 of the 51 women (47 percent) bled over 1000 mLs and 9 (18 percent) were transfused [[28](#)].

MANAGEMENT

The following steps in the approach to managing a retained placenta is based on our understanding of the etiology, pathophysiology, and complications of this disorder. Studies of the management of retained placenta have not taken into account the type of retained placenta in their inclusion/exclusion criteria or in outcome data.

Apply controlled cord traction — Gentle controlled cord traction alone may result in successful delivery of a trapped or incarcerated placenta or promote separation of placenta adherens [[29](#)]. For the Brandt-Andrews maneuver, one hand is placed on the abdomen to secure the uterine fundus and prevent uterine inversion while the other hand exerts sustained downward traction parallel to the direction of the birth canal on the umbilical cord [[30](#)]. Care should be taken to avoid avulsion of the cord.

It has been suggested that additional benefit can be gained by applying cord traction perpendicular to the direction of the birth canal while rotating the clamped end of the cord slowly in 360-degree clockwise rotation around the vaginal opening until the placenta is delivered [31].

Manage bleeding — Onset of uterine bleeding with a retained placenta may indicate separation, so it is worthwhile attempting further cord traction if bleeding starts.

If the placenta remains in the uterus despite increased traction, [oxytocin](#) should be administered.

Prostaglandin F2-alpha ([carboprost tromethamine](#)) may be of benefit if bleeding is severe and not controlled with [oxytocin](#). [Tranexamic acid](#) (1G intravenous [IV] injection) is effective at reducing mortality if heavy bleeding persists. The WOMAN study found a 19 percent reduction in maternal death in 20,060 women with postpartum hemorrhage; 10 percent of the women had a retained placenta [32]. Ergometrine should be avoided, if possible, as it constricts the cervix, making manual removal very difficult. Intrauterine balloon tamponade has no role in this setting.

If these measures fail to reduce to bleeding, then aortic compression (checking that it has been effective by feeling for loss of femoral pulse) is a useful maneuver to stop pelvic blood flow while the patient's hemodynamic and hemostatic status is evaluated and supported and while arrangements for laparotomy are made. (See "[Postpartum hemorrhage: Medical and minimally invasive management](#)" and "[Postpartum hemorrhage: Management approaches requiring laparotomy](#)".)

Address contributing uterine factors

Excessive cervical/uterine contraction — If the lower uterus/cervix is contracted, thereby preventing expulsion of the placenta, administering [nitroglycerin](#) (glyceryl trinitrate) will relax smooth muscle in the myometrium and cervix and facilitate placental delivery [33-37]. However, high-quality randomized trials have shown that it does not reduce the need for manual extraction [38,39].

There are no high-quality data to support a specific recommendation for dose or route of administration. We use glyceryl trinitrate two sprays (400 micrograms/spray) onto or under the tongue. Other options include administration of sequential bolus IV injections: 50 micrograms, maximum cumulative dose 200 micrograms, until sufficient uterine relaxation is achieved to allow manual removal of the placenta, or sublingual tablets 0.6 to 1.0 milligrams. Uterine relaxation occurs within 60 seconds after the dose and lasts for one to two minutes.

Blood pressure should be monitored continuously, as a drop in blood pressure always occurs, although most patients do not become hypotensive. Using sequential boluses and monitoring maternal blood pressure help to minimize the occurrence of severe hypotension.

Atony — If the uterus is atonic, separation and/or expulsion of the placenta may fail to occur. In these cases, IV infusion of [oxytocin](#) may facilitate placental delivery. A reasonable dose is 10 to 30

units in 500 mL saline, with the rate of infusion adjusted, as needed, to prevent uterine atony. (See ["Management of the third stage of labor: Drug therapy to minimize hemorrhage", section on 'Oxytocin'.](#))

Perform manual extraction — Manual extraction of the placenta is performed if controlled cord traction and drug therapy (when indicated as described above) do not lead to delivery of the retained placenta. Manual extraction is painful; therefore, except in cases of severe bleeding or other emergency, adequate analgesia should be achieved with regional or general anesthesia, or conscious sedation. The procedure should be performed in a room where aseptic technique is easily achieved and appropriate personnel, medications, and equipment are available to deal with any complications (eg, hemorrhage, placenta accreta, uterine perforation) that arise.

Manual extraction of the placenta increases the risk of endometritis [40,41]. For this reason, we agree with the World Health Organization (WHO) recommendation to administer prophylactic antibiotics [42], although there are no data to support or refute this practice [43]. We administer a single dose of a broad spectrum antibiotic (eg, [ampicillin](#) or a first-generation cephalosporin; [clindamycin](#) if allergic to penicillin).

After routine surgical preparation and bladder catheterization, one hand follows the path of the umbilical cord through the vagina, cervix, and lower uterine segment to find the maternal-placental interface, while the other hand is placed on the mother's abdomen and used to maintain the uterine fundus in position. If the opening of the cervix is too small to admit the clinician's hand, uterine relaxation may be achieved with [nitroglycerin](#) (glyceryl trinitrate) (see ['Excessive cervical/uterine contraction'](#) above). The plane of interface, which feels velvety and irregular, is gently dissected using a side-to-side motion of the fingers until the placenta has been completely separated.

We believe there is no role for routine uterine curettage or aspiration after manual extraction. It has no documented benefit and carries the risk of uterine perforation and Asherman syndrome. Routine ultrasound evaluation of the uterus after manual extraction is also unnecessary [44].

Management of refractory or complicated cases

Instrument extraction — If digital extraction is not possible, large-headed forceps (eg, Bierer forceps, ring forceps) can be used to grip and extract the placenta in pieces or as intact specimen; ultrasound guidance can be helpful. One group described grasping the placental tissue with Bierer forceps under ultrasound guidance and applying slow, gentle traction in short strokes, regrasping increasingly more distal areas of placenta as needed to gently extract the placenta [45]. This procedure requires less analgesia than digital extraction.

Incomplete extraction — During manual placental extraction, the clinician may note a small area where the placenta is very adherent to the uterus. This can usually be managed by slow persistent finger dissection to create a plane of separation at the maternal-placental interface. The

plane of dissection is often partially through the placenta in these cases, which leaves some placenta adherent to the decidua and myometrium. This will not lead to postpartum hemorrhage as long as the uterus contracts well and there is no area of subinvolution at the site of the retained placental fragments. Curettage should be avoided, if possible, as the myometrium may be very thin at the point of adherence, thus increasing the risk of perforation. Curettage of the postpartum uterus also increases the risk of formation of intrauterine adhesions (Asherman syndrome).

However, if placental tissue is retained and the patient is bleeding excessively, then curettage using a large blunt placental curette or aspiration is reasonable to remove the remaining placental tissue.

Unexpected placenta accreta spectrum — Rarely, the placenta accreta spectrum is first recognized at the time of manual removal of the placenta. In these cases, there is no plane of dissection between the uterus and placenta and, almost invariably, attempts at manual removal lead to life-threatening hemorrhage. We suggest administration of uterotonic drugs and preparation for hysterectomy, which is the definitive therapy. (See "[Management of the placenta accreta spectrum \(placenta accreta, increta, and percreta\)](#)".)

Unproven and ineffective approaches — There is no high-quality evidence that any pharmacologic therapy is effective for expulsion of placenta adherens in patients who have been managed with parenteral [oxytocin](#) and cord traction as part of active management of the third stage of labor [46].

It has been hypothesized that administration of an additional uterotonic drug may be effective in this setting, in part because placenta adherens appears to result from contractile failure in the retroplacental area. Although ergot derivatives cause the uterus to contract, limited evidence suggests these drugs are no more effective than [oxytocin](#) alone [47]. Furthermore, a powerful, continuous uterine contraction makes subsequent manual extraction more difficult.

We also recommend avoiding intraumbilical [oxytocin](#) injection or administration of prostaglandins by any route for facilitation of expulsion of a retained placenta (as opposed to management of atony or hemorrhage). In meta-analyses of placebo-controlled randomized trials, none of these interventions resulted in a significant reduction in need for manual removal of retained placenta [46,48,49]. (See "[Management of the third stage of labor: Drug therapy to minimize hemorrhage](#)".)

PREVENTION

There are few trials of techniques for the prevention of retained placenta, and no intervention has been proven to be effective. In systematic reviews of randomized trials, the frequency of retained placenta was not reduced by use of [oxytocin](#) for active management of the third stage of labor, timing of oxytocin administration (before versus after placental expulsion), or early versus delayed cord clamping [48,50]. Cord drainage during the third stage reduced the frequency of retained

placenta at 30 minutes (RR 0.28, 95% CI 0.10-0.73; one trial, n = 477) [51], but this finding is not consistent with the finding from trials of late cord clamping [50], which would also have the effect of placental drainage.

RECURRENCE RISK

Following a retained placenta in any previous pregnancy, the odds of recurrence were 12.6 (95% CI 3.6-44.1 [52]) in one study and 6.25 percent in another [22].

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "[Society guideline links: Delivery](#)".)

SUMMARY AND RECOMMENDATIONS

- Retained placenta can be defined as lack of placental expulsion within 30 minutes of delivery of an infant. This time period can be extended to 90 to 120 minutes for births in the second trimester and third stages of labor managed without [oxytocin](#). (See '[Definition](#)' above.)
- The three etiologies of retained placenta are: the placenta may be trapped behind a partially closed cervix (trapped or incarcerated placenta); the placenta may be adherent to the uterine wall, but easily separated manually (placenta adherens); or the placenta may be pathologically invading the myometrium (placenta accreta). (See '[Types of retained placenta](#)' above.)
- The strongest risk factor for retained placenta is gestational age less than 26 weeks ([figure 2](#)). (See '[Risk factors](#)' above.)
- A diagnosis of trapped placenta is made when the classic clinical signs of placental separation are present (lengthening of the umbilical cord, gush of blood from the vagina, change in the shape of the uterine fundus from discoid to globular, elevation of the fundal height, and contraction of the fundus) and the edge of the placenta is palpable through a narrow cervical os.

A diagnosis of placenta adherens or placenta accreta is made in the absence of signs and symptoms of placental separation. Placenta adherens is indistinguishable from placenta accreta until the time of attempted manual removal. If a clean plane of separation can be created between the entire placenta and decidua, the diagnosis is placenta adherens. If areas

of myometrial invasion prevent clean separation of part of the placenta, the diagnosis is focal placenta accreta. (See ['Clinical findings and diagnosis'](#) above.)

- Postpartum hemorrhage is the major complication of retained placenta. (See ['Complications'](#) above.)
- Severe bleeding is an obstetric emergency that requires prompt intervention. The retained placenta should be manually removed as soon as possible. (See ['Patients with severe bleeding'](#) above.)
- In the absence of heavy bleeding, we suggest intervention when the third-trimester placenta has been retained for 30 to 60 minutes rather than expectant management or earlier intervention ([Grade 2C](#)). (See ['Patients without severe bleeding'](#) above.)
 - Gentle cord traction is the initial maneuver. If unsuccessful and the lower uterus/cervix is constricted, we administer [nitroglycerin](#) (glyceryl trinitrate) to release the constriction. If the uterus is atonic, we administer an [oxytocin](#) infusion to promote uterine contraction. If these measures fail to result in placental expulsion, we suggest manual rather than instrumental extraction of the placenta ([Grade 2C](#)). (See ['Management'](#) above.)
 - We suggest administering a single dose of a broad spectrum prophylactic antibiotic before manual extraction of the placenta ([Grade 2C](#)). (See ['Perform manual extraction'](#) above.)
- For women with a second-trimester birth and no significant bleeding, the time period before manual extraction can be extended as the frequency of retained placenta is higher and the risk of hemorrhage is lower. We suggest not waiting more than two hours due to the risk of infection ([Grade 2C](#)). (See ['Management'](#) above.)
- For women with a small area of placenta accreta, we slowly create a plane of separation at the maternal-placental interface using finger dissection. Curettage is a second-line option if finger dissection is unsuccessful. (See ['Unexpected placenta accreta spectrum'](#) above.)

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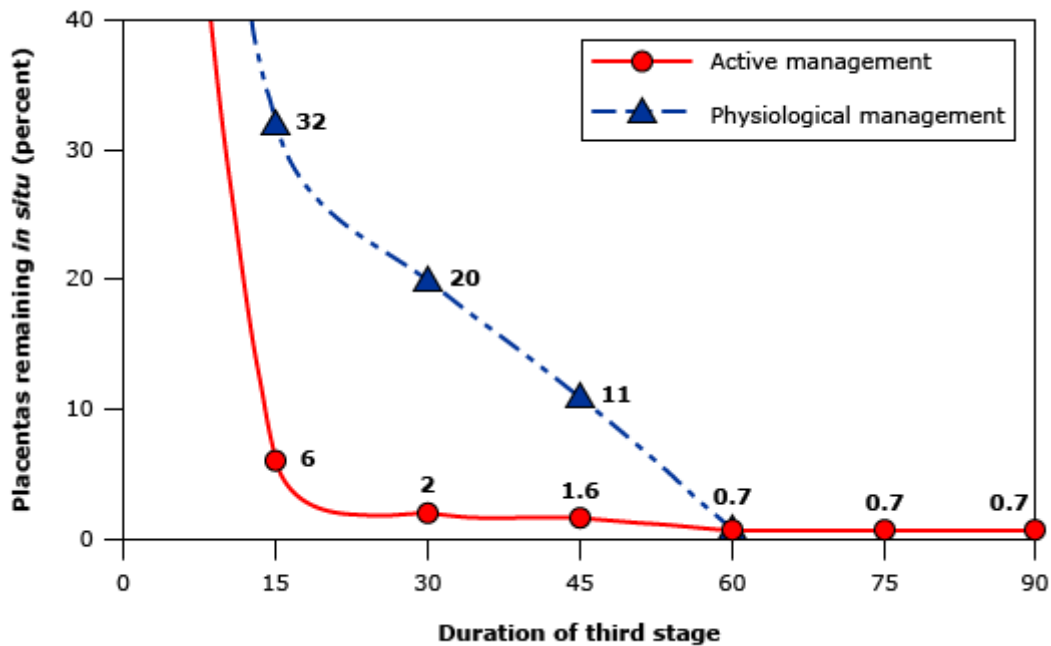
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GRAPHICS

Frequency of retained placenta by length and management of third stage

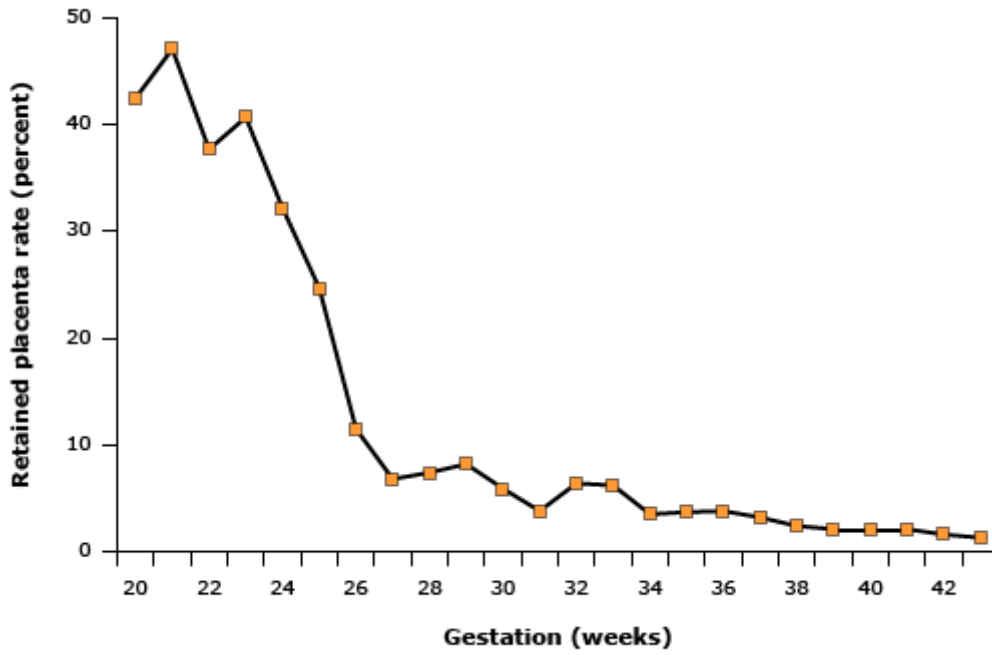


Natural history of retained placentas with active and physiological management. Data on the natural history of the third stage are derived from the length of the third stage from the active versus control arms of trials of active management of labor, and the expectant management arms from trials of umbilical oxytocin as a treatment for retained placenta.

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Graphic 78067 Version 2.0

Rate of retained placenta by gestational age



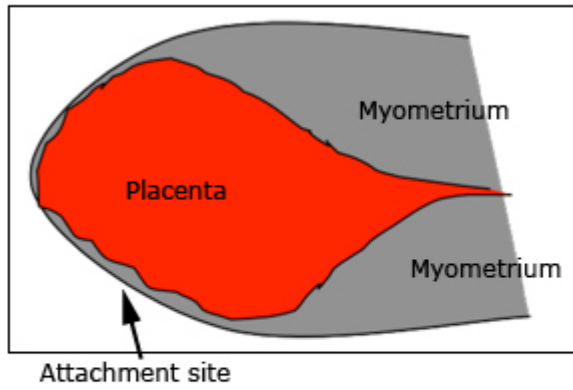
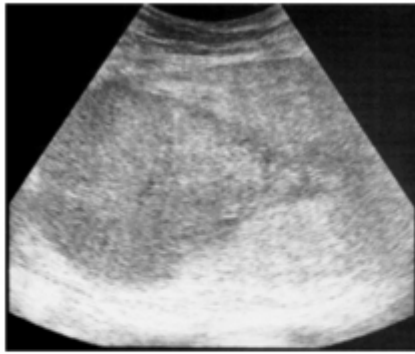
Retained placenta rate at different gestational ages.

Data from: Dombrowski, MP, Bottoms, SF, Saleh, AA, et al. Third stage of labor: analysis of duration and clinical practice. *Am J Obstet Gynecol* 1995; 172:1279.

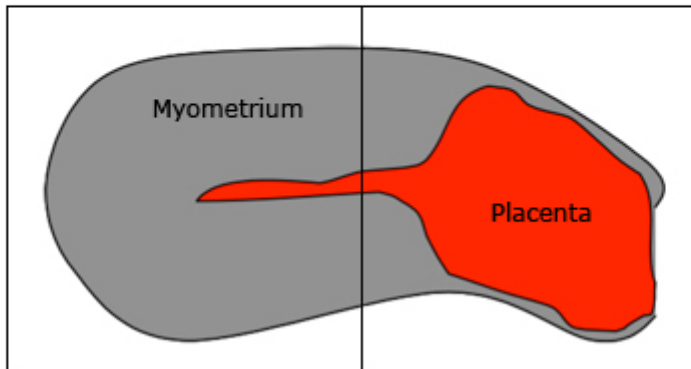
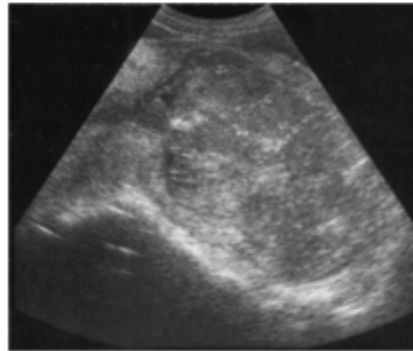
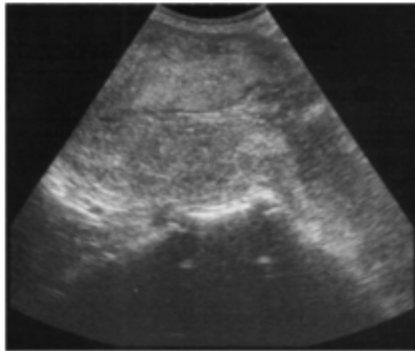
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Placenta adherens and trapped placenta

Placenta adherens



Trapped placenta



Ultrasound pictures (sagittal midline view) of placenta adherens and a trapped placenta.

Graphic 65797 Version 2.0

Contributor Disclosures

Andrew Weeks, MD, MRCOG Nothing to disclose **Vincenzo Berghella, MD** Nothing to disclose **Vanessa A Barss, MD, FACOG** Nothing to disclose

Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate standards of evidence.

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