Green-top Guideline No. 27b  
Peer Review Draft – Autumn 2017

Vasa Praevia: Diagnosis and Management

This is the fourth edition of this guideline. The first, published in 2001, was entitled Placenta Praevia: Diagnosis and Management; the second, published in 2005, was entitled Placenta Praevia and Placenta Praevia Accreta: Diagnosis and Management; and the third, published in 2011, was entitled Placenta Praevia, Placenta Praevia Accreta and Vasa Praevia: Diagnosis and Management.

1. Purpose and scope

The purpose of this guideline is to describe the diagnostic modalities and review the evidence-based approach to the clinical management of pregnancies complicated by vasa praevia.

2. Introduction and background epidemiology

Vasa praevia occurs when the fetal vessels run through the membranes, over the cervix and under the fetal presenting part. Unprotected by placental tissue or Wharton’s jelly of the umbilical cord, the vessels are liable to rupture in active labour, or at amniotomy to induce or augment labour. Vasa praevia is classified as type I when the vessel is connected to a velamentous umbilical cord and type II when it connects the placenta with a succenturiate or accessory lobe.

Vasa praevia is uncommon in the general population with a prevalence ranging between 1 in 1200 and 1 in 5000 pregnancies, although the condition may have been under-reported.

Vasa praevia may be diagnosed during early labour by vaginal examination, detecting the pulsating fetal vessels inside the internal os, or by the presence of dark-red vaginal bleeding and acute fetal distress after spontaneous or artificial rupture of the placental membranes. The mortality rate in this situation is at least 60% despite urgent caesarean delivery. However, improved survival rates of over 95% have been reported where the diagnosis has been made antenatally followed by planned caesarean section.

3. Identification and assessment of evidence

This guideline was developed in accordance with standard methodology for producing Royal College of Obstetricians and Gynaecologists (RCOG) Green-top Guidelines. The Cochrane Library (including the Cochrane Database of Systematic Reviews and the Database of Abstracts of Reviews of Effects [DARE]), EMBASE, Trip, MEDLINE and PubMed (electronic databases) were searched for relevant randomised controlled trials (RCT), systematic reviews and meta-analyses. The search was restricted to articles published between May 2009 and September 2016 (the search for the previous Guideline was up to May 2009). The databases were searched using the relevant Medical Subject Headings (MeSH) terms, including all subheadings, and this was combined with a keyword search. Search words included, ‘vasa praevia’, ‘velamentous cord insertion’ and ‘umbilical cord anomalies’. The search was restricted to humans and the English language. The National Library for Health and the National Guideline Clearinghouse were also searched for relevant guidelines and reviews.

Where possible, recommendations are based on available evidence. In the absence of published evidence, these have been annotated as ‘good practice points’. Further information about the assessment of evidence and the grading of recommendations may be found in Appendix I.
4. Undiagnosed vasa praevia at delivery

Emergency caesarean delivery and neonatal resuscitation, including the use of blood transfusion if required, are essential in the management of ruptured vasa praevia diagnosed during labour. [B]

The classic presentation in labour of unexpected vasa praevia is the presence of painless vaginal bleeding (also known as Benckiser’s haemorrhage). This occurs mainly when the cervix is effaced and dilated, and the membranes rupture spontaneously or are ruptured artificially.\(^3,^3\) As the total fetal blood volume at term is approximately 80–100 ml/kg, the loss of what may appear as a relatively small amount of blood can have major implications for the fetus and is rapidly fatal.\(^3,^6,^9\) [Evidence level 4]

A systematic review and meta-analysis of the association among placental implantation abnormalities (including placenta praevia, placenta accreta, vasa praevia, velamentous cord insertion) and preterm delivery in singleton gestations has found a perinatal death rate random effect pooled risk ratio of 4.52 (95% CI 2.77–7.39) for vasa praevia.\(^5\) [Evidence level 2++]

5. Can vasa praevia be diagnosed antenatally?

The performance of ultrasound in diagnosing vasa praevia at the time of the routine fetal anomaly scan has a high diagnostic accuracy with a low false-positive rate. [B]

A combination of both transabdominal and transvaginal colour Doppler imaging (CDI) ultrasonography provides the best diagnostic accuracy for vasa praevia. [D]

The previous version of this guideline concluded that in the absence of vaginal bleeding during the antenatal period, there is no method to diagnose vasa praevia clinically. Vaginal bleeding in pregnancy could be considered as a possible alert symptom for vasa praevia,\(^10\) but this is likely to have a very low positive predictive value given the high prevalence of bleeding during pregnancy and low prevalence of vasa praevia.\(^11\) Various tests can differentiate between maternal and fetal blood but are often not timely in a potentially life-threatening clinical situation. [Evidence level 4]

Transvaginal CDI has improved the accuracy of greyscale imaging\(^12,^13\) in diagnosing vasa praevia by demonstrating flow and fetal vascular waveforms on pulsed Doppler through at least one aberrant vessel within 2 cm from the internal cervical os.\(^3,^6,^7\) The definition of “within 2 cm from the internal cervical os” was modelled after the existing definitions for low-lying placentas.\(^14\) Overall, prenatal diagnosis is more effective around midpregnancy (18–26 weeks of gestation) than during the third trimester.\(^13,^14\) [Evidence level 4]

The largest study to date on perinatal outcome is based on a cohort of 155 women with vasa praevia which reported a 97% survival rate in cases of prenatal diagnosis compared with only 44% when the diagnosis was made during delivery.\(^15\) [Evidence level 2+]

A prospective population-based cohort study using the Australasian Maternity Outcomes Surveillance System found that there were no perinatal deaths in the 58 cases diagnosed prenatally out of the 63 cases with confirmed vasa praevia at birth.\(^16\) [Evidence level 2+]

There is limited information regarding the actual safe distance that a vasa praevia needs to be from the internal os to be confident that there is no risk for vessel rupture during labour and delivery. A systematic review, including two prospective and six retrospective cohort studies of which six had poor methodology, found prenatal detection rates ranging between 53% (10/19) and 100% for a
total of 442,633 women, including 138 cases of vasa praevia. Four out of the eight studies used transvaginal scanning (TVS) for primary assessment, while the remaining four studies used transabdominal ultrasound and only used TVS when a vasa praevia was suspected on the transabdominal scan. The results of two prospective studies including a total of 33,795 women reported that TVS CDI performed during the second trimester detects all cases (n = 11) of vasa praevia (sensitivity, 100%) with a specificity of 99.0–99.8%. [Evidence level 2++]

The Society of Obstetricians and Gynecologists of Canada guideline based on the published literature up to 2009 also indicates that using combined abdominal and transvaginal CDI results in a high diagnostic accuracy with an extremely low false-positive rate. Their guideline update also highlighted that many cases are not diagnosed and not making such a diagnosis is still acceptable. [Evidence level 4]

6. Should we screen for vasa praevia?

There is still insufficient evidence to support universal screening for vasa praevia at the time of the routine fetal anomaly scan in the general population. [D]

Targeted screening for vasa praevia in cases of velamentous cord insertion, low-lying placenta, multiple pregnancy, bilobate placenta and succenturiate placental lobes can reduce perinatal loss. [GPP]

The accuracy of ultrasound in screening for vasa praevia at 9–13 weeks of gestation was evaluated prospectively in a case–control study that included 139 cases of cord insertions in the lower third of the uterine cavity and 1,172 controls. Three cases of vasa praevia were found in the ‘cases’ and 0 cases of vasa praevia in the ‘controls’. [Evidence level 2-]

The 2017 UK National Screening Committee (NSC) external review of the 2013 screening policy concluded that there appears to be little benefit in attempting to identify cases of vasa praevia in the second trimester and that this strategy could be associated with a high false-positive rate. RCTs to investigate whether ultrasound screening for vasa praevia decrease perinatal mortality would be ethically unacceptable in view of the poor neonatal prognosis. The analysis of the literature included in the 2017 UK NSC external review of the 2013 screening policy indicates that up to 80% of vasa praevia cases have one or more identifiable prenatal risks. [Evidence level 4]

A 2016 systematic review of the incidence and risk factors of vasa praevia including 13 studies (two prospective cohort studies, 10 retrospective cohort studies and one case–control study) and reporting on 569,410 women found that 83% of the 325 cases reviewed had one or more risk factors, including placenta praevia, bilobed placenta, succenturiate placental lobes, conception by assisted reproductive technology and velamentous cord insertion. [Evidence level 2++]

The 2017 prospective population-based cohort study using the Australasian Maternity Outcomes Surveillance System found that 55 of the 58 women diagnosed prenatally had at least one risk factor for vasa praevia, with velamentous cord insertion (62%) and low-lying placenta (60%) the most prevalent. [Evidence level 2+]

Vasa praevia diagnosed in the second trimester resolve in around 20% of cases before delivery. A follow-up ultrasound examination at 32 weeks of gestation is suggested, in particular in women with a low-lying placenta as even if it has resolved it is still associated with a high risk of vasa praevia. The American Institute of Ultrasound in Medicine has recommended that the placental cord insertion site be documented when technically possible. Identification of the placental cord
insertion at the routine fetal anomaly scan is easy and accurate, does not add significantly to scan time and requires little additional scanning skills for a trained operator. [Evidence level 4]

A questionnaire survey of obstetricians and gynaecologists in England and Wales with a 55% response rate found that most (80%) respondents felt that a selective screening policy for vasa praevia was not feasible, one-third could not name one risk factor associated with vasa praevia and over one-half had no experience in diagnosing nor managing the condition. This survey highlights the need to increase awareness of vasa praevia in healthcare professionals, and also the need to ensure skill validation and quality control across the board. [Evidence level 4]

A decision-analytic model to estimate the lifetime incremental costs and benefits of screening for vasa praevia in all twin pregnancies was found to be cost effective in a study of approximately 132,000 pregnancies. Using these data and based on an 80% detection rate, the 2014 UK NSC external review found that the targeted screening of all twins and singleton pregnancies with at least one high-risk factor could reduce perinatal loss rate by as many as 150 cases per year. [Evidence level 4]

7. How should vasa praevia be managed?

Because of the speed at which fetal exsanguination can occur and the high perinatal mortality rate associated with ruptured vasa praevia, delivery should not be delayed while trying to confirm the diagnosis, particularly if there is evidence that fetal wellbeing is compromised. [GPP]

In the presence of confirmed vasa praevia in the third trimester, elective caesarean section should be carried out prior to the onset of labour. [GPP]

A decision for prophylactic hospitalisation from 30–32 weeks of gestation in women with confirmed vasa praevia should be individualised and based on a combination of factors, including preterm contractions and short cervical length, and the presence of a low-lying placenta or placenta praevia. [GPP]

In cases of vasa praevia that develop premature rupture of membranes and/or labour at viable gestational ages, a caesarean section should be performed without delay. [D]

To avoid unnecessary anxiety, admissions, prematurity and caesarean section, it is essential to confirm persistence of vasa praevia by ultrasound in the third trimester. [GPP]

Delivery by caesarean section of women with confirmed vasa praevia is intuitive and logical, and not based on RCTs. The objective of the management of vasa praevia diagnosed during the second trimester of pregnancy is to prolong pregnancy safely while avoiding potential complications related to rupture of membranes before or during labour. Two other national societies have existing clinical guidelines on the management of vasa praevia diagnosed during pregnancy, but the corresponding recommendations are also based on observational data, decision analyses and expert opinion. [Evidence level 4]

Antenatal hospitalisation in a unit with appropriate neonatal facilities has been proposed from 30–32 weeks of gestation, but the evidence is weak and of low quality. The purpose of hospitalisation is to allow for closer surveillance for signs of labour and a more timely performance of caesarean delivery before labour and/or before membrane rupture. Outpatient care has been associated with excellent outcomes, and thus, the benefit of hospitalisation remains unproven. [Evidence level 4]
Data on the use of TVS cervical length measurements in the management of vasa praevia are limited and the role of cervical cerclage is unknown. Some authors have suggested that outpatient management is possible if there is no evidence of cervical shortening on TVS and there are no symptoms of bleeding or preterm uterine activity. Data from the follow-up of women with placenta praevia indicate that the probability of bleeding is higher if the cervix is shorter in length than expected for gestational age. Similarly, serial TVS cervical length measurements from 26–28 weeks of gestation may be useful to evaluate the individual risk of preterm birth, in particular in twin pregnancies which are at higher risk of preterm labour and delivery. Based on these observations, as well as a lower probability of labour, asymptomatic women with stable cervical length measurements should be the best candidates for outpatient management. [Evidence level 4]

8. At what gestation should elective delivery occur?

The ultimate management goal of confirmed vasa praevia should be to deliver before rupture of membranes while minimising the impact of iatrogenic prematurity. Based on available data, planned caesarean delivery for a prenatal diagnosis of vasa praevia at 35–36 weeks of gestation is reasonable in asymptomatic women. [D]

Administration of corticosteroids for fetal lung maturity should be recommended due to the increased risk of preterm delivery. [GPP]

Optimal timing of caesarean delivery remains unknown. There is no consensus about the timing of delivery in cases of confirmed vasa praevia and the currently low prevalence of prenatal diagnosis of this condition precludes any prospective trials to evaluate the ideal timing. [Evidence level 4]

Overall, vasa praevia is associated with an increased risk of preterm birth. The associated complications of prematurity are in many cases the result of iatrogenic preterm birth in an effort to prevent stillbirth. Gestational age at delivery is the only other variable associated with perinatal outcomes in the management of vasa praevia. As for other obstetric situations associated with a higher risk for late preterm delivery, the administration of corticosteroids is recommended. [Evidence level 4]

In the largest cohort study published so far, fetuses that were diagnosed prenatally had a 97% survival rate for a mean gestational age at delivery of 34.9 (±2.5) weeks of gestation. [Evidence level 2+]

Data from a decision analysis study comparing 11 strategies for delivery timing in a patient with vasa praevia found that delivery between 34 and 36 weeks of gestation balances the risk of premature rupture of membranes and subsequent fetal haemorrhage and death versus the risks of prematurity. The authors found no benefit to expectant management beyond 37 weeks of gestation and that at any given gestational age, incorporating amniocentesis for verification of fetal lung maturity does not improve outcomes. [Evidence level 4]

9. Clinical governance

9.1 Debriefing

Postnatal follow-up should include debriefing with an explanation of what happened, why it happened and any implications for future pregnancy.
Raising awareness about the clinical risk factors of vasa praevia should be pursued locally, including organising policies or guidelines for flagging up women at risk and arranging for them to see a specialist consultant when suspected.

There should be appropriate training for ultrasound staff in the antenatal diagnosis of vasa praevia.

9.3 Clinical incident reporting

Any lack of compliance with the care bundle by the clinical team for a woman with vasa praevia should be investigated.

There should be written protocols for identification of and planning further care of women diagnosed with vasa praevia.

10. Recommendations for future research

- Quality data are needed to compare hospitalisation at 30–32 weeks of gestation with outpatient follow-up in the management of vasa praevia.
- RCTs of optimal timing of delivery for all three conditions (placenta praevia, placenta accreta and vasa praevia) are needed.

11. Auditable topics

- Appropriate delivery plan in place if antenatal diagnosis of vasa praevia made (100%).

12. Useful links and support groups

- Vasa praevia raising awareness [www.vasapraevia.co.uk/the-experts/].
- The Vasa Previa Foundation [www.vasaprevia.org].
- Royal College of Obstetricians and Gynaecologists. Low-lying placenta after 20 weeks [placenta praevia]. Information for you. London: RCOG; 20XX [insert web address].

References


Appendix I: Explanation of guidelines and evidence levels

Clinical guidelines are: ‘systematically developed statements which assist clinicians and patients in making decisions about appropriate treatment for specific conditions’. Each guideline is systematically developed using a standardised methodology. Exact details of this process can be found in Clinical Governance Advice No.1 Development of RCOG Green-top Guidelines (available on the RCOG website at http://www.rcog.org.uk/green-top-development). These recommendations are not intended to dictate an exclusive course of management or treatment. They must be evaluated with reference to individual patient needs, resources and limitations unique to the institution and variations in local populations. It is hoped that this process of local ownership will help to incorporate these guidelines into routine practice. Attention is drawn to areas of clinical uncertainty where further research may be indicated.

The evidence used in this guideline was graded using the scheme below and the recommendations formulated in a similar fashion with a standardised grading scheme.

### Classification of evidence levels

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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<tbody>
<tr>
<td>1++</td>
<td>High-quality meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a very low risk of bias</td>
</tr>
<tr>
<td>1+</td>
<td>Well-conducted meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a low risk of bias</td>
</tr>
<tr>
<td>1−</td>
<td>Meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a high risk of bias</td>
</tr>
<tr>
<td>2++</td>
<td>High-quality systematic reviews of case–control or cohort studies or high-quality case–control or cohort studies with a very low risk of confounding, bias or chance and a high probability that the relationship is causal</td>
</tr>
<tr>
<td>2+</td>
<td>Well-conducted case–control or cohort studies with a low risk of confounding, bias or chance and a moderate probability that the relationship is causal</td>
</tr>
<tr>
<td>2−</td>
<td>Case–control or cohort studies with a high risk of confounding, bias or chance and a significant risk that the relationship is not causal</td>
</tr>
<tr>
<td>3</td>
<td>Non-analytical studies, e.g. case reports, case series</td>
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<tr>
<td>4</td>
<td>Expert opinion</td>
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### Grades of Recommendation

- **A** At least one meta-analysis, systematic reviews or RCT rated as 1++, and directly applicable to the target population; or a systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population and demonstrating overall consistency of results

- **B** A body of evidence including studies rated as 2++ directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1++ or 1+

- **C** A body of evidence including studies rated as 2+ directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2++

- **D** Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+

### Good Practice Points

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Page 9 of 11
Recommended best practice based on the clinical experience of the guideline development group
This guideline was produced on behalf of the Royal College of Obstetricians and Gynaecologists by: Professor ERM Jauniaux FRCOG, London; Professor Z Alfirevic FRCOG, Liverpool, UK; Mr AG Bhide FRCOG, London, UK; Professor GJ Burton, University of Cambridge, UK; Professor SL Collins MRCOG, Oxford, UK; Professor R Silver, University of Utah, Salt Lake City, Utah, USA

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All RCOG guidance developers are asked to declare any conflicts of interest. A statement summarising any conflicts of interest for this guideline is available from: XXX.

The final version is the responsibility of the Guidelines Committee of the RCOG.

The guideline will be considered for update 3 years after publication, with an intermediate assessment of the need to update 2 years after publication.

DISCLAIMER

The Royal College of Obstetricians and Gynaecologists produces guidelines as an educational aid to good clinical practice. They present recognised methods and techniques of clinical practice, based on published evidence, for consideration by obstetricians and gynaecologists and other relevant health professionals. The ultimate judgement regarding a particular clinical procedure or treatment plan must be made by the doctor or other attendant in the light of clinical data presented by the patient and the diagnostic and treatment options available.

This means that RCOG Guidelines are unlike protocols or guidelines issued by employers, as they are not intended to be prescriptive directions defining a single course of management. Departure from the local prescriptive protocols or guidelines should be fully documented in the patient’s case notes at the time the relevant decision is taken.