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Co-authors: Dr Farah Siddiqui, University Hospitals, Leicester; Dr Janet Ashworth, Royal Derby Hospital.

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1. **Introduction and who the guideline applies to:**

The incidence of placenta praevia and AIP along with its complications is increasing due to the increasing incidence of Caesarean section and increasing maternal age. Women are at increased risk of antepartum haemorrhage, preterm delivery, blood transfusion and hysterectomy. The commonest aetiological factor for AIP is previous endometrial injury particularly previous Caesarean section in combination with a placenta praevia. The risk of AIP in women with a placenta praevia and a history of one previous Caesarean section is approximately 10% in comparison to greater than 60% in women with three or more previous Caesarean sections.

The most important aspects of management of AIP are:

1. Early identification of pregnant women at risk of AIP
2. Multidisciplinary planning
3. Care and delivery in an appropriately experienced and equipped unit

Studies have shown that maternal morbidity and mortality are reduced (less bleeding and less likely to require further surgery) when women with AIP deliver in a centre with a multidisciplinary care team who have experience in managing the risks and challenges in these cases and hence the reason for the development of a regional AIP service. There are three key areas that will be covered within the guideline: these include antenatal diagnosis; multi-disciplinary planning; and, management of delivery.

This guideline applies to all Obstetricians, Midwives and Sonographers within UHL providing care for women in the Antenatal Period.

**Definitions**

**Abnormally invasive placentation** (AIP) or placenta accreta spectrum, is a generalised term when a placenta implants with some degree of invasion into the uterine wall. It occurs as a consequence of deficiency in the decidual basalis layer of the uterus. It is graded by the depth of invasion and includes:

- placenta accreta, where the chorionic villi attach to the myometrium rather than being confined by the decidual basalis
- placenta increta, where the chorionic villi invade into the myometrium
- placenta percreta, where chorionic villi fully penetrate the myometrium and extend into the uterine serosa (parametrium). In some cases they can invade into surrounding structures.

**Placenta praevia** exists when the placenta is embedded wholly or partly into the lower segment of the uterus. It is classified as major if the placenta overlies the cervical os and minor or partial when the leading edge of the placenta is in the lower segment of the uterus but not covering the cervical os. It occurs in 0.3 – 0.5 % (up to 1 in 200) pregnancies.

### 2. Recommendations

#### Antenatal diagnosis

The anomaly scan (usually undertaken between 18 and 20+6 weeks) should include documentation of placental location. Any woman booking later than this gestation should additionally have the placental localisation documented at the time of their first scan.

The placenta should be reported as low lying if the leading edge is less than 20 mm from the internal cervical os or praevia if covering the os (RCOG). If the placenta is considered to be low lying or a praevia a transvaginal scan should be performed to confirm the diagnosis. This is safe to perform and more accurate than a transabdominal scan to confirm the diagnosis.

It is not recommended that an MRI be requested without discussion with the AIP centre or to bypass the AIP service. Locally specialist USS is better for prediction of AIP than MRI due to operator experience - diagnosis with both modalities remains subjective and accuracy varies with experience of the operator. Systematic review confirms that for women with a previous Caesarean section and placenta praevia USS is highly predictive of AIP with a sensitivity of 97% (95% confidence interval 93-99%) and specificity of 97% (95% CI 97- 98%).

AIP should be suspected when there is a placenta praevia and particularly in women with additional risk factors. Risk factors are classified as major, intermediate or minor.

**Women with a placenta praevia (covering os) and one major risk factor should be referred after their detailed scan.**

**Women with low lying placenta (<20mm at 20 weeks) with a risk factor or placenta praevia with 1 or more intermediate or 2 or more minor risk factors should have a rescan at their local hospital between 26-28 weeks gestation.**

If the placenta is still covering or <20mm from os on TV scanning at 26-28 weeks referral to the AIP centre for further imaging is recommended.

**90% of those with a low lying placenta at 20 weeks will migrate upwards with advancing gestation.**
<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>History of:</th>
</tr>
</thead>
</table>
| **Major Risk Factors** | - Previous AIP  
- Caesarean section  
- Previous tracheectomy (removal of cervix)  
- Suspected scar ectopic in this pregnancy |
| **Intermediate Risk Factors** | - ≥ 2 episodes of endometrial curettage (including ERPC and STOP)  
- Uterine surgery involving the endometrium (e.g. myomectomy which breached the cavity or resection of uterine septum)  
- Endometrial ablation  
- MROP with significant PPH requiring blood transfusion  
- Asherman’s syndrome |
| **Minor Risk Factors** | - 1 episode of endometrial curettage (including ERPC and STOP)  
- IVF  
- MROP not requiring blood transfusion  
- Previous postnatal endometritis or septic miscarriage |

<table>
<thead>
<tr>
<th>PLACENTA COVERING OS PLUS ONE MAJOR RISK FACTOR</th>
<th>PLACENTA COVERING OS PLUS ONE INTERMEDIATE OR TWO OR MORE MINOR RISK FACTORS PLACENTA &lt; 20mm FROM OS WITH A RISK FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOLLOWING COMPLETED DETAILED SCAN REFER TO REGIONAL AIP CENTRE FOR IMAGING</td>
<td>RESCAN 26-28 WEEKS LOCALLY. IF PLACENTA &lt; 20MM FROM OS REFER TO REGIONAL AIP CENTRE</td>
</tr>
</tbody>
</table>

A checklist is included to facilitate the screening (Appendix 1: page 14).
Referral protocol for women at increased risk of AIP

Referrals should be made on the Fetal Medicine referral form (Appendix 2: page 15) and the relevant unit telephoned for an appointment prior to faxing the referral over.

Women will be seen within 14 working days of referral, depending on gestation and urgency.

Referrals should be made to one of the following:
- Leicester: Dr Farah Siddiqui, Leicester Royal Infirmary. Telephone 01162587770
- Derby: Dr Janet Ashworth, Fetal Medicine, Royal Derby Hospital. Telephone: 01332785409.
- Nottingham: Dr Nia Jones, Fetal Care Unit, City Hospital. Telephone number 01159249924, extension 56480

Specialist AIP centre diagnostic service

Women attending for specialist scanning will have their scans performed by fetal medicine specialists who have experience in assessing for AIP.

At review the women will have an USS performed which will include greyscale and colour Doppler imaging.

A standardised reporting form will be used based on international consensus and necessitates confirming or refuting the ultrasound features for AIP (Appendix 3: page 16).

Women will be classified as having high, intermediate or low risk of AIP following the USS. Classification of each case will be reviewed by the fetal medicine AIP specialists. This will be facilitated by using WebEx. (this is a virtual MDT meeting when Images from other units can be discussed and shared)

Women with low risk of AIP will be referred back for standard care.

MRI may be requested on a subset of patients. This decision will be made by either the fetal medicine AIP specialist or following an MDT meeting. The MRI will aim to look at the depth of invasion of the placenta and involvement of surrounding, particularly lateral, structures.

Women with intermediate or high risk of AIP will have further discussions and planning of care by a MDT.

A Patient Information Leaflet will be given to women following the clinic review (Appendix 4: page 17).

Multidisciplinary planning for delivery

The multidisciplinary team will consist of:
Fetal medicine specialists in AIP scanning
- Obstetrician
- Gynaecologists with experience in complex pelvic surgery
- Urologist
- Obstetric anaesthetist
- Interventional radiologist
- Vascular surgeon (Leicester)
- MRI radiologist

The team will meet (usually virtually by WebEx) to discuss the cases of intermediate and high risk of having AIP to plan delivery (both in elective and emergency scenarios). We will endeavour to have one member of each specialty group be in attendance. As a minimum a fetal medicine specialist, obstetrician and Gynaecologist should be in attendance.

There are four potential surgical approaches that have been described:

1. Primary hysterectomy following delivery of the fetus, without attempting placental separation
2. Delivery of the fetus avoiding the placenta, with repair of the incision leaving the placenta in situ
3. Delivery of the fetus without disturbing the placenta, followed by partial excision of the uterine wall (placental implantation site) and repair of the uterus
4. Delivery of the fetus without disturbing the placenta, and leaving it in situ, followed by elective secondary hysterectomy 3–7 days following the primary procedure.

Uterine preservation is appropriate in some women who wish to preserve fertility in the absence of excessive bleeding and when the extent of the AIP is limited in depth and surface area, and the entire placental implantation area is accessible and visualised (i.e. completely anterior, fundal or posterior without deep pelvic invasion).

Elements of the planning will be discussed and documented (Appendix 5: page 21) and will include:

- Confirmation of diagnosis
- Assessment for evidence of extra-uterine invasion
- Timing of elective surgery including date and team
- Timing of admission
- Pre-operative investigations and management
  - FBC and ferritin
  - Blood group and presence of antibodies
  - Ensure patient would accept blood products if required
  - Further imaging- USS or MRI

- Surgical planning:
  - Planned anaesthesia
  - Cystoscopy and/or ureteric stenting
- **Review date to discuss plan with patient**
-  **Surgery**
-  **Anaesthesia**
-  **Interventional radiology**

A formal written plan will then be formulated and discussed with the patient by either the lead obstetrician or fetal medicine specialist. Antenatal review with an anaesthetist will also be planned.

**Pre-operative patient counselling**

This will be carried out by the consultant obstetrician or fetal medicine specialist on the AIP team. Include partner/ family in meeting if possible to facilitate understanding.

Details of diagnosis and suspected extent of morbid adherence/abnormal invasion will be discussed.

Advise to avoid sexual intercourse, also advise to come to hospital if any vaginal bleeding.

Discuss planned antenatal admission.

Risks to be discussed include:

-  **Preterm delivery**
-  **Antepartum haemorrhage**
-  **Risk of severe haemorrhage**
-  **Need for blood transfusion and cell salvage**
-  **Potential for hysterectomy. May be the preferred option.**
-  **Damage to surrounding structures, particularly bladder and ureters**
-  **Potential risk of death (up to 7% for placenta percreta)**

Discussion should also include a conversation around if family complete and option of sterilisation if uterus conserved and risk of AIP in subsequent pregnancy.
**Elective delivery**

**Pre-operative management**

Patients with suspected AIP should be delivered by Caesarean section. This should be done by an experienced multidisciplinary team as this is associated with improved outcomes.

All women with suspected AIP (intermediate or high risk on antenatal USS assessment) should be encouraged to remain close to the planned hospital for delivery in the third trimester and admission to hospital considered beyond 34 weeks in the absence of a history of antepartum haemorrhage. Women with a history of antepartum haemorrhage should be advised to stay in hospital after 32 weeks gestation as there is an increase in the risk of needing emergency delivery in the presence of previous APH.

In the presence of any APH the patient should be reviewed by a doctor at registrar level or above and the senior registrar on call and consultant on call should be informed of the event. Similarly the consultant on call should be informed if a patient with suspected AIP is admitted with tightening or ruptured membranes.

Timing of delivery will depend upon the availability of an appropriate surgical team. At all the elective cases will be performed in the main theatres at LRI. Caesarean sections will usually be performed at 36 weeks gestation in women with AIP to reduce the risk of needing to perform an emergency delivery and earlier in women at high risk of early delivery. The timing of the delivery should be individualised and take into account the clinical history (e.g. bleeding) of the patient and availability of staff and resources and is a balance between the risk of emergency delivery and neonatal morbidity. Antenatal corticosteroids for fetal lung maturity should be administered prior to a planned Caesarean section and considered prior to an emergency delivery. A critical care bed should be booked at time of decision for elective surgery.

Haemoglobin should be optimised. Start iron if ferritin <30 μg/L or anaemic. Women should have a group and save sample sent on admission and in the presence of bleeding cross matching of blood 6 units). Routine cross matching during hospital admission is not necessary but those women who additionally have red cell antibodies should be discussed with Blood Bank and an individualised plan made. Six units of blood should be cross-matched on the day prior to the planned surgery.

A pre-operative checklist should be completed by 32 weeks gestation (Appendix 6: page 22). Consent for interventional radiology procedure will be completed by an interventional radiologist (independent of the consent for the Caesarean section. Ideally this will be done prior to the day of the surgery but this will be decided on a case by case basis.
Operative day

Pre-operative
There will be multiple teams and staff in theatre. Each team should nominate a team leader and the Consultant Obstetrician will take the overall lead for the case. Clear communication is essential and avoid overcrowding theatre - attendance more suitable for senior trainees compared to junior trainees and students.

Cases should ideally be planned for the morning and be the only planned case for this day.

All pre-operative preparation should be performed in accordance with the local elective Caesarean section pathway.

Ensure 6 units of blood is cross-matched and Blood Bank aware of case.

On the morning of the surgery the team should meet for a briefing and run through the plans for the day prior to commencing the operation. The briefing will be led by the obstetric lead surgeon.

The WHO and AIP pre-operative checklists will be completed. Appendix 7 (page 24) includes a list of equipment required for cases.

Team present will include:

- Obstetrician (team leader)
- Gynaecologist
- Anaesthetist (2 consultant anaesthetists at LRI)
- Interventional radiologist (+/- IR radiographer) (+ IR nurse)
- Theatre practitioner
- Midwife
- +/− Neonatal team

If an epidural is planned for anaesthesia this will be sited first followed by a urinary catheter (placement of iliac artery compliant balloons through a groin approach means that the patient cannot be positioned for these two procedures after interventional radiology).

Interventional radiology (if required): At LRI, interventional radiology is undertaken in theatre (C arm in theatre). Fetal monitoring should be considered during this procedure. Vasospasm (which should be evident to the interventional radiologists) can potentially be treated with Glyceryl Trinitrate (GTN).

Transfer back to theatres if applicable. Once intra-arterial compliant balloons are in place then care is required with patient transfer to minimise flexion of legs at the hips.

Top up epidural will commence and invasive monitoring lines may also be sited. Alternatively general anaesthesia will be commenced at this point.

Pre-operative cystoscopy and ureteric stent insertion (if required).

Ultrasound on table to confirm lie and position and plan abdominal and uterine incision site prior to Caesarean section (if required).
Intra-operative

Maintain normothermia during surgery.
Inspect uterine surface prior to incision for any evidence of AIP and for areas of abnormal vascularity.
Aim for a classical or high transverse incision to avoid the placenta. Incision through the placenta is associated with increased maternal and fetal bleeding.
Inflate intra-arterial compliant balloons (interventional radiologist) immediately after birth of baby. Embolisation may be required later if issues with haemostasis. Consider embolisation when total blood loss reaches 2.0 litres.
Allow time for the placenta to deliver spontaneously or, if retained and not bleeding, consider leaving placenta in situ.
Confirm operative plan i.e. hysterectomy, resection, attempted placental removal or leave placenta in situ based on pre-operative planning and operative findings.
If planning resection then there needs to be a 2cm area of normal uterine tissue between the area of AIP and the cervix to allow for reconstruction following resection. If this is not present a hysterectomy would be a more suitable procedure. Resection is also less likely to be successful in lateral AIP.
If planning hysterectomy, do not attempt to remove placenta. Do not electively administer uterotonics as can cause partial placental separation and increase risk of bleeding. Consider closure of uterine incision to reduce operative bleeding. Proceed with hysterectomy and set lowest landmark for total or subtotal hysterectomy.
Keep check on blood loss intra-operatively (the anaesthetist will take the lead on this) and ensure appropriate blood product transfusion (including cell salvaged blood). Activate major obstetric haemorrhage protocol if indicated and consider early use of tranexamic acid to attempt to reduce blood loss. Correct any clotting abnormalities. Uterotonics may be used to try and reduce blood loss from an atonic lower uterine segment.
Check the ureters: direct visualisation of the ureters during surgery may reduce the chance of injury.
Separate and mobilise bladder.
Once hysterectomy performed consider inflating bladder with normal saline +/- methylene blue to assess for any bladder injury.
Deflate intra-arterial compliant balloons and confirm haemostasis.
Insert drain intraperitoneally.
Removal of intra-arterial balloon +/- sheath will be completed by the interventional radiologists and the end of the operation. Leaving the sheaths in post-operatively is associated with risk of thrombosis and limb ischaemia and is not recommended.
Complete WHO checklist (sign out).

Post-operative

The majority of women will be managed on the Delivery Suite. Surgical HDU or critical care may be required depending upon blood loss, haemodynamic stability, acidosis, temperature etc. For the majority the stay in critical care is likely to be around 24 hours. Anaesthetist to inform critical care once clear that patient does not require a critical care bed.

Follow post Caesarean section protocol for observations unless an amended plan requested by anaesthetic and surgical team.

Avoid excessive patient movement post-operatively as the risk of significant haemorrhage from the groin sites is high if this does occur.

Leave invasive monitoring in situ until haemodynamic stability is confirmed and discuss with duty anaesthetist prior to removal.

Correct any acidosis, hypothermia, hypocalcaemia or coagulopathy. Check FBC, coagulation fibrinogen, U&E, Calcium post-operatively and the following day as a minimum.

Rhesus negative women who have received cell salvaged blood transfusion need a maternal Kleihauer and cord blood for fetal blood group. It should be clearly documented on the request form that cell salvage blood has been transfused. Repeat Kleihauer 30-45 minutes after the cell salvaged blood transfusion in case more anti-D will be required. If the baby is Rhesus positive (or blood group unknown) the minimum dose of Anti-D given should be 1500 IU.

Women are at increased risk of PN thromboembolism in view of prolonged operative time, heavy blood loss, extensive pelvic dissection, reduced mobility and possible blood product use. Postnatal thromboprophylaxis with low molecular weight heparin (e.g. clexane) is therefore recommended for a minimum of 10 days, longer if the patient remains in hospital or has further complications. The surgical and anaesthetic team should confirm with the midwife the timing of the first dose.

Senior registrar or consultant should review the patient prior to transfer to the ward.

Offer PN follow up for debrief.

Emergency delivery

Some cases may require emergency delivery or may not be diagnosed prior to commencing surgery.

In women with suspected AIP surgical preparation may be in place- FOLLOW PATIENTS' PRE-OPERATIVE PLAN/ CHECKLIST.

At the AIP centre inform the appropriate personnel:

1. On call consultant Obstetrician
For women with suspected AIP emergency Caesarean section is mostly performed in the presence of vaginal bleeding, PROM and/or uterine contractions.

**Clinical operative features of AIP:**

There may be features to suggest AIP at the time of Caesarean section. These include:

- Abnormal vascularity on the serosal surface of the uterus overlying the placenta
- Bluish tinge to the uterine wall
- Bulging of the uterine wall

If these features are recognised then it is important to ensure that the right team are involved with the delivery from here. Consideration should be given to delaying the surgery and transfer the patient to the LRI if the patient is at the LGH. If a trainee has commenced the operation they should not continue until there is a consultant present. Decision by the consultant should be whether to transfer the patient to the LRI or continue with the surgery at LGH. Delivery at the LRI is likely to lead to reduced blood loss and morbidity but may increase the risk of fetal compromise. Out of hours the consultant on call can be contacted through switchboard. Consideration is needed on whether the patient is stable for transfer. If the surgery is to be completed locally consider if a second consultant is needed for the surgery and ensure senior anaesthetist and adequate anaesthetic support is in theatre.

If the baby is to be delivered at LGH then the uterine incision should be done distal to the placental site (often either classical or high transverse incision). Once the baby is delivered then a decision needs to be made as to whether to close the uterus and transfer the patient to the LRI or whether to continue with surgery at the LGH. The decision should be made in conjunction with a discussion with the LRI and will depend on the stability of the patient and extent of bleeding. If the incision has been made through the placenta then it is unlikely that bleeding will be controlled to allow for transfer. If the decision is to complete the surgery at the LGH the placenta should be left in situ and an emergency hysterectomy performed as attempting to separate the placenta is likely to increase blood loss.

Do not transfer the patient without contacting the LRI first.

Aortic compression can be performed in desperate cases to try and control the bleeding (to achieve this extend vertical incision above the umbilicus) this can be maintained for several hours if necessary (up to 4 hours) whilst further assistance is sought.
Care pathway for patients with placenta left in situ

For a proportion of patients the decision will be made to leave the placenta in situ at the time of the Caesarean section. The patient can then either be managed conservatively or further interval surgical intervention planned when there is potentially less morbidity from placental invasion of surrounding structures e.g. bladder.

In this group of women the risk of subsequent hysterectomy is high (28-30%) - half occurring within the first 24 hours after the primary surgery and half delayed (Mei 2015; Sentilhes 2010).

There is a significant risk of AIP in subsequent pregnancies (10-30%) (Timmermans 2007, Ramoni 2013).

It may take many months (6-12 months) for the placenta to be entirely reabsorbed with conservative management. Patient selection is therefore important and only suitable for those willing to attend for regular review.

In these cases it is important to counsel the patient about the risk of bleeding, which can be severe, and infection. The complications can occur immediately or be delayed for a significant length of time (months). A patient information leaflet can be given to the patient (Appendix 8: page 26).

Other recognised complications include:
- Infectious morbidity (sepsis, septic shock, peritonitis, renal impairment, pulmonary oedema)
- Fever secondary to tissue necrosis
- Prolonged retention of products of conception
- Prolonged bleeding
- Placental polyp
- Expulsion of placental tissue vaginally
- Vesicouterine fistula in cases of placenta percreta (rare)
- Venous thromboembolism

Symptoms and signs of infection should be discussed with the patient and inflammatory markers should be checked if there is clinical suspicion of infection.

Administer antibiotics (oral cephalixin or alternative if penicillin allergy) for 7 days post-delivery in all cases.

Uterine artery embolization and methotrexate have not been proven to reduce the risk of infection and bleeding and therefore should not be routinely recommended.

Monitor for resorption with serum human chorionic gonadotrophin (β-HCG) and ultrasound. HCG should be performed weekly and USS monthly until the placenta is completely reabsorbed (β-HCG <5, normal USS).

If a patient presents with continued or heavy bleeding options for further management include:
- Radiological embolization
- Surgery: selective arterial ligation, uterine balloon tamponade, uterine compression sutures and hysterectomy.
3. **Education and Training**

None

4. **Audit**

Data on outcomes of cases reviewed by the service will be continually and prospectively collected. This will include information on:

- Accuracy of antenatal diagnosis
- Gestation at delivery
- Blood loss
- Blood product administration
- ICU stay and duration
- Operative details including incision, surgical procedure undertaken
- Maternal complications
- Fetal complications
- Balloon inflation duration
- Embolisation undertaken and details

5. **Supporting References**

None

5. **Key Words**

Placenta praevia accreta abnormally invasive placenta

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**CONTACT AND REVIEW DETAILS**

<table>
<thead>
<tr>
<th>Guideline Lead</th>
<th>F Siddiqui as part of the East Midlands Regional network, Consultant Obstetrician in Fetal Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Lead:</td>
<td>A Furlong</td>
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Details of Changes made during review: N/A as new document
Appendices

Appendix 1: Checklist for risk factors for abnormally invasive placentation

Appendix 2: Fetal Medicine referral form

Appendix 3: AIP service ultrasound reporting form

Appendix 4: Patient information leaflet for placenta praevia and abnormally invasive placentation (RCOG)

Appendix 5: AIP service MDT proforma

Appendix 6: AIP service pre-operative checklist

Appendix 7: AIP service list of possible equipment

Appendix 8: Patient information leaflet for placenta left in situ
### CHECKLIST: Risk factors for abnormally invasive placenta (AIP)

To be completed on all women with low lying placenta at 20 weeks

<table>
<thead>
<tr>
<th>Risk factor present</th>
<th>YES</th>
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<tbody>
<tr>
<td><strong>Major Risk Factors</strong></td>
<td></td>
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<tr>
<td>Previous Abnormal Invasive Placentation</td>
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<td></td>
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<tr>
<td>Previous Caesarean section</td>
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<tr>
<td>Previous trachelectomy (removal of cervix)</td>
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<td></td>
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<tr>
<td>Suspected scar ectopic in this pregnancy</td>
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<tr>
<td><strong>Intermediate Risk Factors</strong></td>
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<td>Two or more episodes of endometrial curettage - including Evacuation of retained products of conception (ERPC) and Surgical termination of pregnancy (STOP)</td>
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<td>Uterine surgery involving the endometrium (e.g. myomectomy which breached the cavity or resection of uterine septum)</td>
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<tr>
<td>Endometrial ablation</td>
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<td></td>
</tr>
<tr>
<td>Manual removal of placenta with significant postpartum haemorrhage requiring blood transfusion</td>
<td></td>
<td></td>
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<tr>
<td>Asherman’s syndrome</td>
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<td><strong>Minor Risk Factors</strong></td>
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</tr>
</tbody>
</table>

- Women with a placenta praevia (covering os) and one major risk factor (previous AIP, Caesarean section or trachelectomy, suspected scar ectopic) should be referred after their detailed scan.

- Women with a placenta praevia with 1 or more intermediate or 2 or more minor risk or low lying placenta (<20mm at 20 weeks) with a risk factor: arrange repeat USS (TVS) for placental location and consultant ANC appointment at 26-28 weeks.

- If the placenta is still covering or <20mm from os on TV scanning at 26-28 weeks referral to the AIP centre for further imaging is recommended.

- For referrals use fetal medicine referral form (available online or Appendix 2) FAO Dr Jones (Nottingham), Dr Siddiqui (Leicester), Dr Ashworth (Derby). Fax referral form and copy of this checklist. See AIP pathway for further information.

- 90% of those with a low lying placenta at 20 weeks will migrate upwards with advancing gestation.

Signature: ______________________________
**FETAL MEDICINE CLINIC REFERRAL FORM** | Date of referral:
---|---

Fix addressograph sticker here

Name of person completing referral form:

Name of Base Hospital and Responsible Consultant:

Liaison Neonatologist:

<table>
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<th>Parity:</th>
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<th>BMI:</th>
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</table>

In order to provide appropriate information for the fetal scan please tick the box identifying the indication for the scan below and then add appropriate detail in the space at the bottom of the page. **This information is critical to the planning and performance of the scan.**

- Request for ultrasound assessment and ongoing management plan:
  - 1. Fetal malformation or anomaly identified or suspected: state:
  - 2. Known increased risk of genetic or chromosomal anomaly: state
  - 3. Previous fetal anomaly with increased recurrence risk:
  - 4. History of periconceptual exposure to teratogenic drugs (e.g. Lithium/mycophenolate):
  - 5. Request for invasive testing:
    - Carrier of gene or chromosomal disorder: state:
    - Increased Nuchal Translucency in the first trimester (>3.5mm)
    - High risk on screening
    - High risk on NIPT
    - Increased Nuchal Fold measurement in the second trimester (>6mm)
    - Rhesus D group
  - 6. Placenta praevia plus one major or two or more minor risk factors for abnormally invasive placentation (please also include copy of checklist with referral):
  - 7. Other indication. **Use box below to specify reason for referral:**

**Further Information:**

**Allergies:**

Appt date/time: | Parents Informed: Yes / No | Fax sent date/time:
## SUSPECTED ABNORMALLY INVASIVE PLACENTA (AIP)

### Ultrasound report

#### Demographics and Risk Factors
- **Date:**
- **EDD:**
- **Gestational age:** _weeks_ _days_
- **Parity**
- **BMI:**
- **Number of previous CS**
- **Number of classical CS**
- **Number of previous surgical evaucations (including TOP)**
- **Was Cesarean scar pregnancy suspected/diagnosed in first trimester?**
- **Previous uterine surgery (e.g. myomectomy, endometrial ablation)**
- **History of AIP**
- **Placenta previa on ultrasound**
  - **If yes:**
    - **Anterior placenta previa**
    - **Posterior placenta previa**
  - **< 2 cm from internal os**
  - **> 2 cm from internal os**
  - **Covering internal os**
  - **Episode of APH**
  - **Gestation:** _weeks_
- **Desire for future fertility:**

#### Ultrasound Signs

<table>
<thead>
<tr>
<th>Cervical length (without funnel or placental tissue)</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Loss of 'clear zone'</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Loss or irregularity of hypoechoic plane in myometrium underneath placental bed ('clear zone')</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Myometrial thinning</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Thinning of myometrium overlying placenta to &lt;1mm or undetectable</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Abnormal placental lacunae</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Presence of numerous lacunae including some that are large and irregular, often containing turbulent flow visible on grayscale imaging</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Bladder wall interruption</th>
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<tbody>
<tr>
<td>- Loss or interruption of bright bladder wall (hyperechoic band or 'line' between uterine serosa and bladder lumen)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Placental bulge</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Deviation of uterine serosa away from expected plane, causing abnormal bulge of placental tissue into neighboring organ, typically bladder; uterine serosa appears intact but outline shape is distorted</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Focal exophytic mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Placental tissue seen breaking through uterine serosa and extending beyond it; most often seen inside filled urinary bladder</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Color Doppler ultrasound parameters and definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Uterovesical hypervascularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Striking amount of color Doppler signal seen between myometrium and posterior wall of bladder; this sign probably indicates numerous, closely packed, tortuous vessels in that region (demonstrating multidirectional flow and aliasing artifacts)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subplacental hypervascularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Striking amount of color Doppler signal seen in placental bed; this sign probably indicates numerous, closely packed, tortuous vessels in that region (demonstrating multidirectional flow and aliasing artifacts)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bridging vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Vessels appearing to extend from placenta, across myometrium and beyond serosa into bladder or other organs; often running perpendicular to myometrium</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Placental lacunae feeder vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Vessels with high-velocity blood flow leading from myometrium into placental lacunae, causing turbulence upon entry</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parametrial involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Significance of Ultrasound Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability of clinically significant AIP</td>
</tr>
<tr>
<td>High</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extent of AIP</th>
</tr>
</thead>
</table>

**Signature:**

**PRINT:**

**POSITION:**

---

Placenta Praevia and Placenta Accreta UHL Obstetric Guideline Page 19 of 27

V1 Approved by Policy and Guideline Committee on Trust Ref: C6/2014

Next Review: Jan 2023

NB: Paper copies of this document may not be most recent version. The definitive version is in the Policy and Guidelines Library
AIP service multidisciplinary meeting proforma

Date of meeting: __ / __ / __
Completed by: ________________________

Team members present and specialty: Planned site: Derby [ ] Nott. [ ] Leic. [ ]

Local/base hospital: ________________
Allergies: ________________
BMI: ______

Confirmation of diagnosis
USS diagnosis: ________________________
Images reviewed by fetal medicine consultant with interest in AIP: YES [ ] NO [ ]
Index of suspicion: High [ ] Intermediate [ ] Low [ ]
Extra-uterine involvement suspected: YES [ ] NO [ ]

Surgical planning recommendations
Comorbidities (e.g. blood borne infection, major cardiac disease):
Obstetric complications (e.g. APH, pre-eclampsia):

Recommendation for timing: Elective surgery: _____ weeks Admission: _____ weeks
Anaesthesia: ________________________

Pre-Caesarean Cystoscopy: YES [ ] NO [ ]
Ureteric stenting: YES [ ] NO [ ]
Interventional radiology involvement planned: YES [ ] NO [ ]
Cell salvage: YES [ ] NO [ ]
Patient positioning for Caesarean section: Supine [ ] Lithotomy (transient) [ ]
Elective use of uterotonic: YES [ ] NO [ ]
Abdominal incision: Vertical [ ] Pfannenstiel [ ]

Surgical plan for placenta: removal of placenta, surgical resection, hysterectomy, conservative (placenta in situ)

Anticipated parametrial or paravesical dissection: ________________________
Anticipated transfusion requirements:
Team members to be present for delivery (elective and emergency):

____________________________________________________________________________________________

____________________________________________________________________________________________

____________________________________________________________________________________________

Comments:

____________________________________________________________________________________________
**AIP: The pre-operative checklist**

**Part 1 (completed ideally by 32 weeks)**

**Patient information:**

<table>
<thead>
<tr>
<th>Date of elective procedure: ____ / ____ / ____</th>
<th>Co-ordinating obstetric consultant: ____________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theatre booked:</td>
<td></td>
</tr>
<tr>
<td>Planned consultants:</td>
<td></td>
</tr>
<tr>
<td>o Obstetrician:</td>
<td></td>
</tr>
<tr>
<td>o Gynaecologist:</td>
<td></td>
</tr>
<tr>
<td>o Urologist:</td>
<td></td>
</tr>
<tr>
<td>o Anaesthetist:</td>
<td></td>
</tr>
<tr>
<td>o Interventional radiologist:</td>
<td></td>
</tr>
<tr>
<td>o Other:</td>
<td></td>
</tr>
<tr>
<td>Consent form completed</td>
<td></td>
</tr>
<tr>
<td>- Surgery</td>
<td></td>
</tr>
<tr>
<td>- Interventional radiology</td>
<td></td>
</tr>
<tr>
<td>Delivery Suite manager informed:</td>
<td></td>
</tr>
<tr>
<td>Obstetric theatre manager informed:</td>
<td></td>
</tr>
<tr>
<td>Haematologist informed of case:</td>
<td></td>
</tr>
<tr>
<td>Critical care bed booked:</td>
<td></td>
</tr>
<tr>
<td>NNU informed:</td>
<td></td>
</tr>
<tr>
<td>Interventional radiology procedure booked</td>
<td></td>
</tr>
<tr>
<td>C arm booked</td>
<td></td>
</tr>
<tr>
<td>Accepts blood transfusion: YES/ NO (if no refer to unit guideline on women who decline blood products)</td>
<td></td>
</tr>
<tr>
<td>Blood results: Hb</td>
<td>WCC</td>
</tr>
<tr>
<td>Iron supplementation (if applicable):</td>
<td></td>
</tr>
<tr>
<td>Antenatal corticosteroids- date planned: ____ / ____ / ____</td>
<td></td>
</tr>
<tr>
<td>Antenatal planned admission date: ____ / ____ / ____</td>
<td></td>
</tr>
</tbody>
</table>
The pre-operative checklist: Part 2 (completed day of surgery)

Blood results:  Hb  WCC  Plt  Coag
                Na  K  Urea  Creatinine

Blood crossmatched: 6 units:  
Blood Bank informed of case:  
Antenatal corticosteroids  
Patient fasting  
Ranitidine  
TED stockings  
Cell salvage:  equipment  team  

WHO checklist
Complete part 1 in theatre when patient arrives  
Separate WHO checklist will be completed in interventional radiology
WHO checklist will be reconfirmed on arrival back in theatres

Planned anaesthesia:  GA  Epidural  Spinal

Anaesthetic machine checked  

Routine uterotonics planned  YES  NO

Completed by:
Signature: ___________________________  Print name: ___________________________
AIP: Equipment list

Arterial line pack
CVC pack (don’t open)
Swan introducer (don’t open)
Ultrasound machine for siting CVC
Double transducer
Patient forced air warmer (Bair hugger)
Rapid infusion device (if available)
Urinary catheter (with integrated temperature probe if available)
Patient wedge for interventional radiology suite (table does not tilt)
Pneumatic compression stockings (Flowtron)
Cell salvage
Epidural pack
Appropriate airway and intubation equipment for GA
Infusion pumps
Portable monitor for observations
CTG
Ultrasound machine
Resuscitaire
Caesarean prep pack
Image intensifier (C-arm) and lead aprons
Uterotonic drugs: Syntocinon, ergometrine, carboprost, misoprostol, plus tranexamic acid
Floseal
Brace suture
Bakri balloon
Negative pressure wound dressing if BMI greater than 35.
Blood in theatre for commencement of Caesarean section
(TEG if available)

Urology cases:
Image stack
25ch cystoscope sheath set
30’ 4mm telescope
Saline irrigation (compatible with irrigation set)
Irrigation set (Fresenius of Baxter)
Cystoscopy procedure pack (alternative D&C pack plus irrigation set)
Guidewire (Boston Scientific – sensor) x 2
4.8fr x 24cm stent x 2 (Boston Scientific perruflex)
4.8fr x 26cm stent x 2 (Boston Scientific perruflex)
Ureteric access catheter (prn)
Omnipaque just in case of difficulty and contrast is required to visualise the urinary syst