GUIDELINES FOR SONOGRAPHERS PERFORMING ULTRASOUND EXAMINATION OF PAEDIATRIC PATIENTS FOR DEVELOPMENTAL DYSPLASIA OF THE HIP

Developed in response to: Best practice
CQC Fundamental Standard: 12

Consulted With

<table>
<thead>
<tr>
<th>Name</th>
<th>Post/Committee/Group</th>
<th>Date</th>
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<tbody>
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Author/Contact for Information Emma Buchanan-Parker, Emily Sawtell – Advanced Practitioner Sonographers
Policy to be followed by (target staff) All Sonographers
Distribution Method Intranet, website, and hard copies to be kept in the ultrasound department.
Related Trust Policies (to be read in conjunction with)

<table>
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<tr>
<th>Policy Description</th>
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<tbody>
<tr>
<td>04071 Infection Control Policy</td>
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<tr>
<td>05118 Chaperone Policy</td>
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<tr>
<td>04064 Safeguarding Children Policy</td>
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<tr>
<td>10085 Developmental dysplasia of the Hips</td>
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<table>
<thead>
<tr>
<th>Version Number</th>
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<tbody>
<tr>
<td>1.0</td>
<td>Emma Buchanan-Parker, Emily Sawtell</td>
<td>27th October 2014</td>
</tr>
<tr>
<td>2.0</td>
<td>Emily Sawtell, Emma Buchanan-Parker</td>
<td>23 March 2018</td>
</tr>
</tbody>
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Appendix A: Infection control procedure for the decontamination of ultrasound transducers used for intracavity and non-intracavity procedures.

Appendix B: Competencies for performing Ultrasound of Paediatric Hips for investigation of DDH
1.0 Purpose

1.1 The purpose of this guideline is to concentrate on the methods of diagnosing dysplasia of the hip with ultrasound in the neonatal period and the subsequent reporting and pathway of referral for the patient.

1.2 Consistent management of scanning by Sonographers facilitates an accurate and thorough approach to the examination with accurate reporting to the referring Clinician.

2.0 Introduction

2.1 The term dysplasia of the hip refers to an abnormal relationship between the femoral head and the acetabulum.

2.2 Dysplasia of the hip is the most common pathology found in the neonatal musculoskeletal system.

2.3 Early detection of DDH can enable less invasive and potentially more effective corrective procedures.

2.3 The Graf technique is a recognised method to obtain reproducible, standardised images of the paediatric hip. This is based on a coronal image and the use of measurements to quantify the coverage of the femoral head.

3.0 Scope

3.1 The optimal time for scanning infant hips is between 4 and 6 weeks of age. Infants up to the age of 12 months can be scanned. In infants of over 12 months age an x-ray is indicated instead of ultrasound.

3.2 Indications for screening for DDH:

One or more of the following indications must be applicable for referral for screening:
- Breech presentation
- Clinically indicated at post natal checks (those patients with a positive postnatal check eg positive NIPE examination require a fast track scan before 2 weeks old).
- Oligohydramnius in utero
- Family history of DDH (Parent or sibling)
- Neuromuscular abnormality (e.g. Spina bifida or arthrogryposis)
- Paediatric or Orthopaedic consultant referral
- Multiple births.

3.3 Patients over the age of one year who are referred for screening cannot be examined by ultrasound and an X-ray should be requested.

4.0 Examination Preparation

4.1 No specific preparation is required for this scan.
5.0 Consent

5.1 The consent process is a continuum beginning with the referring health care professional who requests the ultrasound examination and ending with the Sonographer who carries it out.

5.2 It is the responsibility of the referring professional to provide sufficient information to the patient or their parent/guardian to enable the latter to consent to the ultrasound examination being requested.

5.3 It is the responsibility of the Sonographer to ensure that the patient or their parent/guardian understands the scope of the ultrasound examination prior to giving consent.

5.4 Verbal consent must be obtained for all examinations. Additional verbal consent should be obtained where a student Sonographer undertakes part or all of the ultrasound examination under supervision.

6.0 Ultrasound Protocol Performing Paediatric Hip Ultrasound for DDH

6.1 Technique:

6.1.1 The ‘Graf Cradle’ and probe holder should be used for all examinations. This ensures the baby lies in the correct position and reduces tilting of the probe.

6.1.2 A linear transducer 9-3MHz should be used. The image should be able to be rotated through 90° by use of a slave monitor if required.

6.1.3 An incontinence sheet should be used to line the cradle.

6.1.4 Babies in a therapeutic harness must be scanned in the harness unless otherwise directed by the Consultant in the Paediatric Orthopaedic clinic.

6.1.5 If scanned in harness the report must state whether or not the hip is centred.

6.2 Measuring

6.2.1 Three lines should be drawn on the images using the measurement package on the ultrasound machine or on the PACS system and then saved.

- The bony roof line from the lower limb tangential to the bony rim.
- The base line runs tangential to the os ilium at the top of the cartilaginous roof (along the line of the plane).
- The cartilage roof line runs from the centre of the labrum to the bony rim.

6.2.2 The alpha angle is the value of the angle between the bony roof line and the base line. The beta angle is the value of the angle between the cartilage roof line and the base line.

6.2.3 There is no need to measure the angles if the hip is decentred.
7.0 Images to be Stored

7.1 At least two coronal images of each hip, including the lower limb, plane and labrum, should be stored and saved to PACS with the measurements performed on the image, or the measurements performed on the PACS system and then saved.

8.0 Reporting

8.1 Each report should include a description of each hip joint, a grading, the alpha and beta angle where measured and a conclusion at the end of the report.

8.2 Graf Grading System

- Graf type I: A normal hip. Alpha angle is greater than 60°. Send a copy of the report back to the referring clinician.

- Graf type IIa (+): An immature hip. Alpha angle is between 50-59° at less than 12 weeks of age and the alpha angle demonstrates the minimal degree of maturity expected. Rebook the patient for a rescan when the baby is 12 weeks. Send a copy of the report back to the referring clinician.

- Graf type IIa (-): An immature hip. Alpha angle is between 50-59° at between 6-12 weeks of age and the alpha angle does not demonstrate the minimal degree of maturity expected. Rebook the patient for a rescan in 3 weeks time. Send a copy of the report back to the referring clinician. If remains a Graf type IIa (-) at the repeat scan consider the hip dysplastic and refer to the Paediatric Orthopaedic Consultant.

- Graf type IIb: Dysplastic hip. Alpha value is between 50-59° but infant is older than 12 weeks. Refer to the Paediatric Orthopaedic Consultant.

- Graf type IIc: Dysplastic hip. Alpha value is between 43-49°. The hip is severely dysplastic and close to decentring. (Note if the beta angle is greater than 77° the hip is close to decentring and is a type D). Refer to the Paediatric Orthopaedic Consultant.

- Graf type III: Dysplastic hip. The hip is decentred and the cartilage is displaced upwards. No need to measure the angles. Refer to the Paediatric Orthopaedic Consultant.

- Graf type IV: Dysplastic hip. The hip is decentred and the cartilage is displaced downwards. No need to measure angles. Refer to the Paediatric Orthopaedic Consultant.

9.0 Referring Patients with an Abnormal Result

9.1 These patients should be referred to the Paediatric Orthopaedic consultant. The Orthopaedic nurse Lead should be contacted on #6555 2129 in order to arrange an urgent follow up or email the Consultant in Paediatric Orthopaedics' Secretary. Take a contact telephone number for the patient’s parents/guardian.
10.0 Staff and Training

10.1 The procedures should be carried out by suitably qualified Sonographers possessing the Diploma in Medical Ultrasound (DMU), a Postgraduate Diploma in Medical Ultrasound (PG Dip) or equivalent. Staff performing paediatric hip sonography should have attended the ‘Graf Infant Hip Ultrasound’ course or supervised by someone who has.

10.2 These scans should always be performed by two members of staff, one of whom must have been trained and deemed competent for a year or more. These Sonographers must have completed the departmental competencies. (Refer to Appendix 1)

10.3 All trainees must have a signed off competency sheet before be able to operate as a trained member of staff. (Refer to Appendix B)

10.4 Members of staff responsible for training must have been deemed competent for a year (and have been regularly undertaking Paediatric hip examinations during this time).

10.5 If there is evidence of poor compliance with this guideline, further training will be provided for staff

11.0 Infection Prevention

11.1 All staff should follow the Trust’s guideline on infection control whilst performing the scan, paying particular attention to the specific ultrasound protocols relating to the cleaning of ultrasound equipment which can be found in Appendix A.

12.0 Risk Events / Error Reporting

12.1 A risk event form (datix) must be completed when a baby has been harmed in any way during or as a result of this procedure.

12.2 All errors are reported to the Ultrasound Manager/Imaging Services Manager for discussion with the Sonographer involved.

13.0 Audit and Monitoring

13.1 Compliance with the guideline is monitored as part of an ongoing audit of imaging, completed by the ultrasound department.

13.2 Feedback to all staff is given on a regular basis and presented at staff meetings.

14.0 Communication

14.1 Following ratification, these guidelines will be uploaded to the intranet and website and notified to staff in Focus.

14.2 The author is responsible for ensuring all sonographers have a personal emailed copy
14.3 Hard copies of approved guidelines are kept in each ultrasound room where sonographers scan.

16.0 References


Infection control procedure for the decontamination of Ultrasound Transducers.

Equipment

- The operators’ hands must be washed and/or decontaminated with alcohol gel hand rub both before and after the scan.

Procedure – Non intra-cavity ultrasound

- Apply a small amount of gel to the surface of the transducer.
- Undertake procedure.

Decontamination of equipment after each procedure

<table>
<thead>
<tr>
<th>Non-intracavity transducers</th>
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<tbody>
<tr>
<td>1. Remove excess gel with a paper tissue</td>
</tr>
<tr>
<td>2. Clean all surfaces of the transducer and cable with a detergent wipe*.</td>
</tr>
<tr>
<td>3. Dry the transducer with a paper tissue</td>
</tr>
<tr>
<td>4. The non-intracavity transducer is now ready for the next patient</td>
</tr>
</tbody>
</table>

*Detergent wipes = Sani-Cloth Multi Surface Detergent Wipes
## PAEDIATRIC HIP ULTRASOUND COMPETENCY SELF ASSESSMENT STATEMENT

**Examination:** Ultrasound Paediatric Hip to assess for Developmental Dysplasia

**Competency Statement Number:**

**Area:** Ultrasound

**Staff groups performing the examination:** Sonographers

**Training level:** Beyond PgDip Medical Ultrasound

The statements below are designed to assess your competence to perform this examination. You should self-assess your competency after you have received the relevant theoretical training and practical training. Responsibility for performing this examination remains with you, so if you are in any doubt about your competence to perform this examination, you must seek additional training in liaison with your line manager / supervisor and then re-assess your competence against the statement.

<table>
<thead>
<tr>
<th>Part 1 Performing the Scan</th>
<th>Assessment</th>
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<tbody>
<tr>
<td>1</td>
<td>Can you correctly set up the Graf Paediatric Cradle and linear probe?</td>
</tr>
<tr>
<td>2</td>
<td>Can you correctly position the patient for both left and right sides?</td>
</tr>
<tr>
<td>3</td>
<td>Are you able to obtain and identify the correct coronal section?</td>
</tr>
</tbody>
</table>
| 4  | Can you identify the following anatomy:  
• Chondro-osseous border  
• Femoral head  
• Synovial fold  
• Joint capsule  
• Labrum  
• Cartilage  
• Bony roof  
• Bony rim  
• Lower limb? | Yes / No |
| 5  | Can you apply the measurement lines below to the image:  
• Bony roof line  
• Base line  
• Cartilaginous roof line? | Yes / No |
| 6  | Can you identify and obtain values for the alpha and beta angles? | Yes / No |
| 7  | Can you classify the hip as per the Graf classification scale? | Yes / No |
| 8  | Are you able to recognise a decentred hip (Graf type III or IV)? | Yes / No |
| 9  | Do you know how to refer an abnormal hip onto the correct pathway for treatment? | Yes / No |
| 10 | Have you performed 50 or more of these scans? | Yes / No |
| 11 | Have you read the departmental guidelines for performing Ultrasound of the Paediatric for the investigation of DDH? | Yes / No |
| 12 | Do you feel competent to perform this examination? | Yes / No |
| 13 |  | Yes / No |
| 14 |  | Yes / No |
| 15 |  | Yes / No |
| 16 |  | Yes / No |
| 17 |  | Yes / No |
| 18 |  | Yes / No |
| 19 |  | Yes / No |
| 20 |  | Yes / No |
| 21 |  | Yes / No |

**Operator - sign and print**

**Practical Trainer – sign and print**

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