Perinatal Ectopic Beats Clinical Guideline

V1.0

March 2019
Summary

Antenatal diagnosis of premature ectopic beats
(if ectopics beats have ceased prior to delivery no further action required)

Clinical examination including heart rate, rhythm (for 1 min), pre and post ductal sats and blood pressure
(If CVS examination normal - safety net advice to parents and patient can be discharged home)

An ECG should be performed in infants if:
- Heart rate < 80
- Heart rate >180
- Irregular rhythm on auscultation

If concerns regarding pre and post ductal sats see this guideline and inform senior

ECG: Diagnosis of atrial ectopics beats (see Appendix 2) or ventricular ectopic beats (see Appendix 3)
1. **Aim/Purpose of this Guideline**

1.1. To provide a standard framework for investigating neonates with antenatal/postnatal premature atrial and ventricular contractions

1.2. To provide information to parents to help reduce anxiety

1.3. **Data Protection Act 2018 (General Data Protection Regulation – GDPR) Legislation**

The Trust has a duty under the DPA18 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed and documented. We can't rely on Opt out, it must be Opt in.

The DPA18 covers how the Trust obtains, hold, record, use and store all personal and special category (e.g. Health) information in a secure and confidential manner. This Act covers all data and information whether held electronically or on paper and extends to databases, videos and other automated media about living individuals including but not limited to Human Resources and payroll records, medical records, other manual files, microfilm/fiche, pathology results, images and other sensitive data.

DPA18 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the DPA18 please see the ‘information use framework policy’, or contact the Information Governance Team rch-tr.infogov@nhs.net

2. **The Guidance**

2.1. **Introduction**

2.1.1. Fetal arrhythmias are noted in only 1% of all pregnancies and can be categorized by rate and regularity. Approximately 50% of fetuses referred for evaluation of fetal arrhythmias are in normal sinus rhythm, with the vast majority having isolated supraventricular extrasystoles. Less than 10% of fetuses are found to have sustained arrhythmias.

2.1.2. Premature atrial and premature ventricular contractions (ectopic beats) are common and may be found in up to 2% of fetuses between 36 and 41 weeks. In most cases these ectopic beats stop without any treatment towards the end of pregnancy. In some neonates these continue after birth, not causing any significant problem.
2.1.3. Infrequent (<15 ectopics/minute) premature atrial or ventricular complexes are common in the neonatal period, present in up to 30% of healthy neonates. Most cases (50-70%) represent premature supraventricular/atrial beats that usually disappear in the first months of life.

2.1.4. Frequent (≥ 15 ectopics/minute) premature beats occur in 1% of babies and may require further investigation.

2.1.5. Premature contractions can present as either a slow, fast or irregular heart beat during the antenatal or postnatal period. They are commonly intermittent.

2.2. Postnatal Management of Antenatally Detected Ectopic Beats

2.2.1. If ectopic beats have ceased prior to delivery:
No need for further investigation (No ECG required) following birth unless clinically indicated.

2.2.2. If ectopic beats are present during delivery:
Clinical examination including heart rate auscultated for 1 minute, rhythm, pre and post-ductal saturations and blood pressure.

\[\text{2.2.2.1. If cardiovascular examination is normal with regular heart rate and rhythm then no further investigation is required (No ECG). Patient can be discharged.}\]

\[\text{2.2.2.2. 12-lead ECG should be performed in infants if:}\]
\[\begin{itemize}
    \item Heart rate < 80
    \item Heart rate >180
    \item Irregular rhythm on auscultation
\end{itemize}\]

\[\text{2.2.2.3. If purely irregular pulse with normal rate and well baby– can go home and return for ECG, as neonatal outpatient on the next working day}\]

2.2.4. Evaluation of ectopic beats is made on ECG. The differentiation between atrial and ventricular ectopics is not always straightforward. It is helpful to obtain a rhythm strip as the frequency of ectopic beats varies.

2.3. Premature Atrial Ectopics (PAC)

2.3.1. The characteristic of a premature atrial beat is an early, abnormal P wave. In regular sinus rhythm at a normal rate, a P wave that occurs before the next expected P wave is a premature atrial beat. These usually have a different morphology (flattened, notched, pointed, biphasic or lost in T-wave) and different axis from sinus P waves. All leads need to be carefully examined for P waves as they may overlap with the previous T wave, and can be masked.
2.3.2. A premature atrial beat may be conducted to the ventricles:

- Normally - followed by normal narrow QRS complex

- Aberrantly - when part of the ventricular conduction system is still in its refractory period the resulting QRS will be abnormal in morphology and wide. BEWARE Differentiate from premature ventricular contraction: an aberrant conduction PAC producing a wide QRS complex will have a preceding P-wave which will be different in shape to sinus P wave and may be buried in preceding T-wave.

- Blocked - when the conduction system is still in it's refractory period, there will be no following QRS complex and a pause before the next P wave. If blocked atrial ectopics alternate with normal sinus beats this will simulate a sinus bradycardia.

2.4. Premature Ventricular Ectopics (PVC)

2.4.1. A premature ventricular beat is recognised as a premature abnormal QRS (not similar to the sinus QRS complex) that is not preceded by a premature P wave. In infants these QRS complexes may be of normal or only slightly prolonged duration. Even if a QRS is of normal duration it can be recognised as an ectopic ventricular beat if it has a different morphology to the normal QRS complex and is not preceded by a premature P wave. It is uncommon to have premature atrial and ventricular ectopics in the same baby.

2.4.2. Ventricular ectopics may be a sign of underlying structural cardiac disease, intracardiac tumour or cardiomyopathy.

2.5. Management of Atrial Ectopics

A clinical assessment of the baby should be made including history and examination to elicit symptoms and signs of cardiac disease. Discuss case with neonatal consultant on service/middle grade.

2.6. Infrequent Atrial Premature Beats (<ectopics/ minute)

If the baby is well with a normal examination then the parents can be reassured that this is a normal finding present in up to 51% of babies and does not need any further investigation or follow up4.

2.7. Frequent Atrial Ectopics (>15 ectopics/ minute)

2.7.1. Clinically Well Baby
2.7.1.1. Repeat ECG at 1-2 weeks. If this continues to show frequent atrial ectopic beats then a 24 hour outpatient ECG will be performed to exclude runs of SVT and referral to cardiac clinic (Dr Sam Padmanabhan/Dr Ola Elmasry via maxims).

2.7.1.2. If it is otherwise normal the patient can be safely discharged and safety net advice given to parents regarding signs and symptoms of SVT and heart failure.

2.7.2. Inpatient/ Clinically Unwell

2.7.2.1. Discuss with paediatric cardiologist on-call and consider central line placement.

2.7.2.2. In a case series 80% of atrial premature beats had resolved by 8 weeks, and 90% by 20 weeks. In a baby with a central line, atrial ectopics may be a sign of atrial wall irritation. They may also be a marker for the development of SVTs.

2.8. Management of Ventricular Ectopics

Infrequent < 15 ectopics/minute
Frequent ≥ 15 ectopics/minute
Pathway for both groups

The infant should be evaluated for signs or symptoms of cardiac disease.

Ventricular ectopics may be a sign of underlying acidosis, hypoxaemia or myocarditis.

- The electrolytes should be checked including calcium and magnesium.

- The corrected QT interval should be calculated: \[ \text{QT interval} / \sqrt{(R - R)} \] (QT interval is from beginning of Q wave to end of T wave; R-R is the interval between two R waves). Normal value is <450 ms. In newborns. Parents should also be questioned about any family history of unexplained sudden death.

- The case should be discussed with the middle grade or consultant on service and if clinically unwell consideration of central line placement.

- Clinically well baby can be discharged with safety net advice, outpatient 24 hour ECG and referral to cardiac clinic.

Having considered the above, most ventricular ectopics are benign. The natural history shows that around 50% have resolved by 8 weeks and 90% by 12 weeks.
3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Key Changes to practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Dr. Paul Munyard</td>
</tr>
<tr>
<td>Tool</td>
<td>Audit</td>
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<tr>
<td>Frequency</td>
<td>As dictated by audit findings</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Child Health Directorate Audit and Neonatal Clinical Guidelines Group</td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>Dr. Paul Munyard. Consultant Paediatrician and Neonatologist.</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Required changes to practice will be identified and actioned within 3 months. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders</td>
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</tbody>
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4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Inclusion & Human Rights Policy' or the Equality and Diversity website.

4.2. Equality Impact Assessment
The Initial Equality Impact Assessment Screening Form is at Appendix 2.
### Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Perinatal Ectopic Beats Clinical Guideline V1.0</th>
</tr>
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<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>6th February 2019</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>March 2019</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>March 2022</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Paul Munyard Consultant Paediatrician</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 253293</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>To provide a standard framework for investigating neonates with antenatal/postnatal premature atrial and ventricular contractions. To provide information to parents to help reduce anxiety</td>
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<tr>
<td>Suggested Keywords:</td>
<td>Ectopic beat, atrial ectopics, Arrhythmia</td>
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<td>Target Audience</td>
<td>RCHT</td>
</tr>
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<td></td>
<td>✓</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>Initial Issue</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>New Document</td>
</tr>
<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>Consultant approval. Child Health Directorate Audit. Neonatal Clinical Guidelines Group</td>
</tr>
<tr>
<td>Divisional Manager confirming approval processes</td>
<td>Debra Shields, Care Group General Manager</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not required</td>
</tr>
<tr>
<td>Name and Signature of Divisional/Directorate Governance Lead confirming approval by specialty and divisional management meetings</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Document Library Folder/Sub Folder</td>
<td>Neonatology</td>
</tr>
<tr>
<td>Links to key external standards</td>
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**Related Documents:**

Training Need Identified? No

Version Control Table

<table>
<thead>
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<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<td>22/2/2019</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>Paul Munyard Consultant Paediatrician</td>
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This document is to be retained for 10 years from the date of expiry. This document is only valid on the day of printing

Controlled Document
This document has been created following the Royal Cornwall Hospitals NHS Trust Policy for the Development and Management of Knowledge, Procedural and Web Documents (The Policy on Policies). It should not be altered in any way without the express permission of the author or their Line Manager.
Appendix 2. Initial Equality Impact Assessment Form

_This assessment will need to be completed in stages to allow for adequate consultation with the relevant groups._

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed</th>
<th>Perinatal Ectopic Beats Clinical Guideline V1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Directorate and service area:</strong></td>
<td>Women’s Children’s and Sexual Health, Neonatal</td>
</tr>
<tr>
<td><strong>Is this a new or existing Policy:</strong></td>
<td>New</td>
</tr>
<tr>
<td><strong>Name of individual completing assessment:</strong></td>
<td>Dr. P. Munyard</td>
</tr>
<tr>
<td><strong>Telephone:</strong></td>
<td>01872 253293</td>
</tr>
</tbody>
</table>

1. **Policy Aim**
   - **Who is the strategy / policy / proposal / service function aimed at?**
   - To provide a standard framework for investigating neonates with antenatal/postnatal premature atrial and ventricular contractions. To provide information to parents to help reduce anxiety

2. **Policy Objectives**
   - As above

3. **Policy – intended Outcomes**
   - To guide midwives and neonatal staff on management of babies with irregular heart beats

4. **How will you measure the outcome?**
   - Audit

5. **Who is intended to benefit from the policy?**
   - Patients

6a **Who did you consult with**
   - Workforce
   - Patients
   - Local groups
   - External organisations
   - Other

   - ✔

b) **Please identify the groups who have been consulted about this procedure.**
   - **Please record specific names of groups**
     - Consultant led Neonatal Guidelines Group
7. The Impact
Please complete the following table. **If you are unsure/don’t know if there is a negative impact you need to repeat the consultation step.**

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
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<tbody>
<tr>
<td>Age</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex (male, female, trans-gender / gender reassignment)</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race / Ethnic communities /groups</td>
<td></td>
<td>x</td>
<td></td>
<td>Information provided should be in an accessible format for the parent's/ carer’s needs – i.e available in different languages if required/access to an interpreter if required</td>
</tr>
<tr>
<td>Disability - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.</td>
<td></td>
<td>x</td>
<td></td>
<td>Those parent’s/ carer’s with any identified additional needs will be referred for additional support as appropriate - i.e to the Liaison team or for specialised equipment. Written information will be provided in a format to meet the family’s needs e.g. easy read, audio etc</td>
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<tr>
<td>Religion / other beliefs</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
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<tr>
<td>Marriage and Civil partnership</td>
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<td>Pregnancy and maternity</td>
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<td></td>
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<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
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<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:

- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation- this excludes any policies which have been identified as not requiring consultation. or
- Major this relates to service redesign or development
8. Please indicate if a full equality analysis is recommended.  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>

9. If you are **not** recommending a Full Impact assessment please explain why.

No areas indicated

Signature of policy developer / lead manager / director  
Dr. Paul Munyard  22/02/2019

Names and signatures of members carrying out the Screening Assessment  
1. Dr. Paul Munyard  
2. Human Rights, Equality & Inclusion Lead

Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead  
c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

This EIA will not be uploaded to the Trust website without the signature of the Human Rights, Equality & Inclusion Lead.

A summary of the results will be published on the Trust’s web site.

Signed _P. Munyard________________

Date __22/02/2019________________
Appendix 3. Atrial Ectopic Beats Confirmed on 12-Lead ECG

All abnormal cases to be discussed with middle grade/consultant

Occasional atrial ectopics on 12-lead ECG (<15 ectopics/minute)

No further investigation
if CVS exam (as per appendix 1) normal
Safety net advice to parents and discharge home

Frequent atrial ectopics on 12-lead ECG (≥15 ectopics/minute)

If clinically unwell - discuss with senior and consideration of central line placement
If clinically well - Repeat 12-lead ECG in 1-2 weeks
If normal: < 15 ectopics/minute or no ectopics and CVS exam (as per appendix 1) normal - no further assessment Safety net advice to parents and discharge home
If abnormal: see below

24 hour outpatient ECG
If normal: no runs of SVT and CVS exam (as per appendix 1) normal
Safety net advice to parents and discharge home
(Consider discussing with paediatric cardiologist/paediatrician with cardiology expertise if concerns)
If abnormal: (SVT/frequent atrial/ventricular beats)
Referral to Paediatric Consultant with specialist interest in cardiology/Paediatric cardiologist
Appendix 4. Ventricular Ectopic Beats Confirmed on 12-Lead ECG

May be a sign of underlying structural cardiac disease or cardiomyopathy. However most are benign. Natural history is that 50% have resolved by 8 weeks and 90% by 12 weeks.

All cases to be discussed with middle grade/consultant

- CVS examination inc BP, calculate QTc and enquire about family history of cardiac disease i.e. long QT syndrome, history of sudden death

- Perform blood gas and check electrolytes (venous sample) including U&E's, Bone profile and Magnesium
  
  (Correct abnormalities if present)

- Discuss findings with middle grade +/- consultant on service and consideration of central line placement if clinically unwell

- If clinically well - can be discharged with safety net advice, outpatient 24 hour ECG and referral to local cardiac clinic
Appendix 5. Atrial Ectopic Beats Patient Information Leaflet

Atrial ectopic beats

What are atrial ectopic beats?
Occasionally when a baby’s heart is listened to, or seen on scan, an irregular rhythm is noticed. This is most often caused by little extra beats, which are of no significance to the baby.

Why do they occur?
A small area in the heart regulates the normal heartbeat by sending out electrical pulses. These pulses spread throughout the heart muscle and cause it to contract in a regular rhythm. Sometimes however, another area in the heart sends out an extra electrical pulse, which in turn causes an extra early heartbeat. There is then a resting gap while the heart muscle gets back into the regular rhythm.

Is my baby’s heart normal?
We have scanned your baby’s heart today and found that there are no obvious abnormalities with the structure or function of the heart.

Will these cause problems in the pregnancy?
We would expect the irregular heartbeat to settle down as the pregnancy progresses. Your community midwife will check the baby’s heartbeat once a week because, very rarely, the baby’s heartbeat may develop into a rapid rhythm (tachycardia). If this is left untreated this could make the baby unwell. The process of becoming unwell takes much longer than one week, so weekly checks are adequate and safe.

What happens if the baby’s heartbeat becomes very fast?
Although this is rare (1 or 2 cases in 100), if this did occur, medication is offered to the mother to correct this.

Will the baby need any special care after birth?
If the ectopic beats are no longer present before the birth, there is no need for any further tests and your care in labour will be the same as anyone else. If the ectopic beats are still present, we recommend that the baby is checked by a paediatrician (baby doctor). They may arrange a simple electrical recording of the heart (electrocardiogram or ECG). This is a painless test and only takes a few seconds. For this reason, it is advisable to deliver the baby in hospital to ensure these checks are carried out promptly. The paediatrician would advise further if any extra tests are required.

Any questions?
If you have any further questions or concerns, please speak to a member of the fetal medicine staff on 01872 252682, or your own community midwife/GR.

If you would like this leaflet in large print, braille, audio version or in another language, please contact the General Office on 01872 252690