ECG monitoring with clozapine
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An audit of current ECG monitoring of patients on clozapine in the wellbeing clinic against the Maudsley and Australian guidelines. Clarification of the action required for safe ECG monitoring in the community setting.
Frequency of ECG monitoring

PRE-TREATMENT
➢ Baseline: document HR, rhythm, QTc, any abnormalities

POST TREATMENT INITIATION
➢ Week 1
➢ Week 2
➢ Week 3
➢ Week 4
➢ 6 monthly
➢ ANUALLY

Monitoring Heart Rate
Clozapine related tachycardia (HR > 100)
➢ Common! (Incidence up to 25%)
➢ Usually occurs in first 4 weeks then tolerance occurs
➢ Make sure no secondary reason e.g. low BP / Hb

TREATMENT
1. Optimize
Reduce caffeine, pre-cigarette reading, HR in home setting. MEDS REC: Look for other anti-cholinergic medicines (additive effect)

2. Repeat
Take multiple readings if tachycardic

3. Treat
If persistent (e.g. over several weeks) consider starting propanolol (Persistent tachycardia is associated with increased risk of cardiomyopathy)

STOP CLOZAPINE IF
➢ Tachycardia + CP
➢ Tachycardia + signs of heart failure

Monitoring QTc

<table>
<thead>
<tr>
<th>Men &lt;440ms</th>
<th>Women &lt;470ms</th>
<th>NORMAL</th>
<th>No action required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 500ms</td>
<td>Repeat ECG Calculate QTc manually</td>
<td>Consider discussion with on call cardiologist</td>
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<tr>
<td></td>
<td>Reduce dose &amp; repeat ECG</td>
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<tr>
<td>&gt;500ms</td>
<td>Stop clozapine and repeat ECG</td>
<td>Immediate discussion with on call cardiologist</td>
<td></td>
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<tr>
<td>New abnormal T wave morphology</td>
<td>Reduce dose</td>
<td>Immediate discussion with on call cardiologist</td>
<td></td>
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</tbody>
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AUDIT

Inclusion criteria:
• Pt on clozapine under the WBC
• Under one consultant

Exclusion criteria:
• No ECG in the last 5 years

• Date of clozapine initiation
• Yearly ECGs
• Interpretation of latest ECG and action taken against the current guidelines

RESULTS: ECG Management

- 42 patients total. 3 excluded (no ECG in 5yrs)
- Clozapine initiation 2007-2018
- 0/39 had documented yearly ECGs

- Abnormal ECGs N=19
  - Sinus tachycardia N=12
  - HR 100-109 N=9
  - HR 110-120 N=1
  - HR >120 N=2
  - QTc <500 N=8
  - QTc >500** N=1
  - Other* N=4

  - Short PR (117), LVH (Sokolov Lyon Criteria), T wave abnormalities, “Atrial flutter”
  - QTc >500 documented by machine as 702 but by hand was <500

Conservative measures: 3/12
Repeated: 3/12
Discussed with cardio: 4/12
> ECHO, 24 hour tape
Bisoprolol Started: 4/12
HR 123, 134, 103, 105
Clozapine reduced 3/12

Offered dose reduction: 4/8
Discussed with cardio: 1/8
CONCLUSIONS

1. Current ECG monitoring far from the gold standard – particularly annual monitoring
2. ECG interpretation usually done well.
3. Over reliance on the machine interpretation
4. ECGs rarely repeated when abnormality found
5. Variable management strategies when abnormalities found

IMPLEMENTATION: ECG Management flow chart to support WBC doctor. Re-audit.
ECG MONITORING IN CLOZAPINE GUIDELINE
THE WELLBEING CLINIC

When to perform ECG?
- Week 1
- Week 2
- Week 3
- Week 4
- Every 6 months

Assess the patient?
- Any of:
  - Chest pain?
  - T > 38.0
  - HR > 110
  - Short of breath

Who to assess?
- YES: immediate assessment by duty doctor
- NO: Routine assessment of ECG by wellbeing clinic doctor
ECG MONITORING
MANAGING CLOZAPINE INDUCED TACHYCARDIA

BACKGROUND
Clozapine related tachycardia (HR > 100)
Common! (Incidence up to 25%)
Usually occurs in first 4 weeks then tolerance occurs
Make sure no secondary reason e.g. low BP / Hb

ASSESSMENT
1. Optimize
   Reduce caffeine, pre-cigarette reading,
   HR in home setting.
   MEDS REC: Look for other
   anti-cholinergic medicines (additive effect)
2. Repeat ECG

TREATMENT
If persisting > 4 weeks after initiation consider starting propranolol
Persistent tachycardia is associated with increased risk of cardiomyopathy

STOP CLOZAPINE IF
- Tachycardia + CP
- Tachycardia + signs of heart failure

A&E
# ECG Monitoring

## Managing QTc Abnormalities in Clozapine

### Men <440ms
- **Women <470ms**
- **Normal**
  - No action required

### Up to 500ms
- Repeat ECG
- Calculate QTc manually
- Reduce dose & repeat ECG
- Consider discussion with on call cardiologist

### >500ms
- **Stop clozapine** and repeat ECG
- Immediate discussion with on call cardiologist

### New abnormal T wave morphology
- Reduce dose
- Immediate discussion with on call cardiologist