**CYSTIC FIBROSIS ACTION CARD**

**ONCE DAILY INTRAVENOUS TOBRAMYCIN**

<table>
<thead>
<tr>
<th>FOR USE BY: Paediatric medical and nursing staff</th>
<th>LIAISES WITH: CF team, ward consultant, Microbiology</th>
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**Rationale:**

To ensure the safety and efficacy of treatment when prescribing, administering and monitoring once daily intravenous tobramycin to paediatric patients with cystic fibrosis.

Tobramycin is an antibacterial aminoglycoside. It displays activity against both Gram-negative organisms (including Pseudomonas aeruginosa) and some Gram-positive organisms (BNF for Children, 2015). It is not absorbed by the gut and must be given by intravenous injection. It is excreted principally via the kidney.

**Side effects and preventing toxicity:**

- Most important side effects are ototoxicity and nephrotoxicity. These are dose-related, so considerable care must be taken with dosing and monitoring plasma concentrations.
- Monitoring trough levels of tobramycin helps to prevent toxicity and ensure efficacy of treatment. Many children with cystic fibrosis receive intravenous tobramycin regularly, three or four times a year, at high doses and for longer than seven days. The risk of side effects is potentially greater in these patients.
- Check renal function on admission, and repeat with every trough level of Tobramycin. Renal function may need retesting more regularly if there are any concerns regarding abnormal renal function or high Tobramycin levels (please liaise with either the Ward Consultant or CF Team).
- Check hearing at annual review.

**Dosing and administration:**

**NOTES:**

- These doses are for CF patients ONLY; doses may need to be reduced in other situations
- Pre-dose (trough) concentration should be equal or less than 1 mg/mL (see monitoring drug levels below)
- Check before prescribing if there has been a high trough level during any previous course – ask the family specifically. If there has, discuss dosage with the CF team
- There is evidence that once daily dosing is less toxic and kills bacteria more effectively than tds dosing

- Administer Tobramycin as a once daily dose i.e. 24 hourly.
- Dose: 10mg/kg/day to a maximum dose of 660mgs.
- Start dosing/administration at 1400 to enable easier monitoring and processing of trough level. Some children receiving home intravenous therapy may have their daily dose in the evening to better fit their daily routine; however they should understand that in the event of a high result, a further level will have to be taken and the dose may need to be changed.
- Administer as an infusion via a syringe pump over 30 minutes. There are no specific volumes recommended for dilution; recommend diluting to 30mL with normal saline and administer over 30 minutes

**Monitoring drug levels:**

- Measure serum tobramycin levels 23 hours after administration of first dose (i.e. 1 hour before 2nd dose), and 23 hours after any adjustment. Check levels on a weekly basis thereafter unless there are concerns.
- Measure tobramycin plasma concentration and renal function in all paediatric patients via venous bloods (NOT from the line used to administer tobramycin). Use finger prick in exceptional circumstances
- Tobramycin trough level must be equal to or less than 1 mg/litre.
- If trough is more than 1 mg/L omit the next dose and check the trough level 23 hours after the omitted dose. Patient may ONLY be redosed when trough level is below 1 mg/L – reduce dose by 20% and then recheck trough level 23 hours after this reduced dose. Wait for this level to come back and only continue if level is less than 1mg/L.
- If renal function remains unchanged throughout the remaining course continue on the reduced dose and recheck the level weekly thereafter

Contd.
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- Do not give further doses until results are obtained and the level is confirmed as equal to or less than 1 mg/mL and the renal function is normal (Please discuss with Ward Consultant or CF team if there is any uncertainty) Refer to flow chart Appendix 1.

Each time levels are done, document in the notes:
  - Date/time blood taken
  - Dosage regimen
  - Results (also on the drug chart)
  - Any change to dosage
  - Any other action taken

- Consider measuring aminoglycoside trough levels and renal function at other time if –
  - Dehydration
  - Intercurrent diarrhoea and/or vomiting
  - DIOS
  - Other nephrotoxic drugs e.g., ibuprofen.

The Biochemistry Pathology Request Form:
- Levels are processed by Biochemistry at GRH
- Ensure adequate sample obtained – use one full Paediatric Lithium Heparin bottle (green top) or adult clotting accelerator and separation gel bottle (rust top) in older children. Please refer to Trust guidelines on “Pathology blood sample collection tubes for Infants and Children” for further details

Paediatric Tobramycin level documentation:
- Complete documentation in the patient notes and prescription chart when Tobramycin level and renal function are taken, as well as the results of these tests.

Results:

NOTES:
If results are unavailable due to sampling problems, e.g. insufficient blood or clotted specimen:

- Repeat the trough level and renal function 23 hours after the last dose
- Do not give the next dose until result obtained and tobramycin level is confirmed as less than or equal to 1 mg/mL and normal renal function

- Obtain the results via the Patient Administration System (PAS).
- The person taking the samples must document this in the medical notes.
- Medical staff must document the results of the Tobramycin trough level and renal function in the medical notes AND prescription chart
- Each time levels are done, document the following in the notes:
  - Date/time blood taken
  - Dosage regimen
  - Results (also on the drug chart)
  - Any change to dosage
  - Any other action taken
- If there are abnormal Tobramycin levels or renal function, liaise with the ward Consultant or the CF team

REFERENCES:
Clinical Guidelines: Care of Children with Cystic Fibrosis. Royal Brompton Hospital, 2014.

ALWAYS ENSURE ALL RELEVANT ACTIONS ARE DOCUMENTED!
Flow Chart for administering and monitoring once daily Tobramycin levels

1. DRUG DOSE AND START TIME
   - Once daily tobramycin
   - Check with parents and notes that no high trough levels with previous treatment courses. If there has please discuss dose with CF team.
   - Dose: 10mg/kg/day. Maximum dose: 660mg

2. ADMINISTRATION
   - Dilute dose to 30mls with 0.9% Sodium Chloride
   - Administer as an infusion with a syringe pump over 30 minutes

3. MONITORING DRUG LEVELS AND RENAL FUNCTION
   - NB Only trough levels are required
   - 1st level to be taken 23 hours after first dose, i.e. 1 hour before 2nd dose is due.
   - Take venous blood or blood from peripheral line NOT line used to administer drug (finger prick may be used in exceptional circumstances)
   - Note: ensure adequate sample obtained – one full Paediatric Lithium Heparin bottle (green top) or adult clotting accelerator and separation gel bottle (rust top) in older children.

4. IMPORTANT
   - NO FURTHER DOSES TO BE GIVEN UNTIL TROUGH LEVEL IS CONFIRMED AS EQUAL TO OR LESS THAN 1MG/LITRE AND RENAL FUNCTION IS NORMAL
   - Each time levels are done, document in the notes:
     - Date / Time blood taken
     - Dosage regimen
     - Results (also on drug chart)
     - Any changes to dosage
     - Any other action taken

5. RESULTS
   - If abnormal renal function at any point please discuss with Ward Consultant or CF team

   **Trough level less than 1 mg/litre AND normal renal function**
   - Document as above (See Box 4)
   - Continue with current dose
   - Repeat trough level AND renal function in 1 week (Day 9)
   - NOTE – If trough tobramycin level is less than 1 mg/litre, however renal function is abnormal please discuss with ward consultant or CF Team.

   **Trough level greater than 1mg/litre**
   - Omit the next dose and check trough level 23 hours after omitted dose
   - Document as above (See Box 4)
   - Wait for the levels to come back and only continue as below if level is below 1 mg/litre

   **Trough level less than 1 mg/litre AND normal renal function**
   - Only once the trough level has fallen to below 1mg/litre can the patient be re-dosed.
   - Reduce the dose by 20%, and recheck the trough level with renal function after 23 hours.
   - If the patient's renal function remains unchanged throughout the remaining course continue on the reduced dose and recheck the level weekly thereafter.

   **Trough level greater than 1mg/litre**
   - Omit next dose and discuss with Ward Consultant and / or CF Team

Please contact Paediatric Respiratory Consultant or Respiratory Nurse Specialists if any further information is required.
**DOCUMENT PROFILE**

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<tr>
<td><strong>SPONSOR</strong></td>
<td>Wasim Qayum, Consultant Paediatrician</td>
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| **RELATED TRUST DOCUMENTS** |  |
| **OTHER RELEVANT DOCUMENTS** |  |
| **EXTERNAL COMPLIANCE STANDARDS AND/OR LEGISLATION** | • |