PAMIDRONATE PAEDIATRIC PROTOCOL

Introduction
Bisphosphonates have a phosphorus or carbon/phosphorus structure that is adsorbed onto hydroxyapatite to inhibit bone resorption. They increase bone mineral accretion and reduce bone turnover and are valuable in metabolic and inflammatory bone diseases of childhood. The drug of choice at present is Pamidronate, given intravenously (IV) in 3-4 monthly courses. Risedronate and other oral preparations are widely used in adults but have yet to be fully evaluated in paediatrics.

Indications
- Bone matrix abnormalities - eg: osteogenesis imperfecta, Gaucher’s Disease, hypophosphatasia and fibrous dysplasia.
- Bone disease from systemic illness and prolonged steroid use
- Ongoing, recurrent fractures
- Bone pain with significantly reduced bone mineralisation (ie DEXA and after correcting for age, height, weight, pubertal stage)
- Significant soft tissue calcification without bony abnormality - eg: dermatomyositis.
- Acute management of hypercalcaemia - eg: in malignancy.
- Chronic recurrent multifocal osteomyelitis (CRMO) – often only one course required
- Idiopathic juvenile osteoporosis

Investigations Before Starting Treatment
If diagnosis of osteopenia not fully evaluated see management guideline for a child with osteopenia

Otherwise check
- bone profile (calcium, phosphate and alkaline phosphatase)
- vitamin D status – if <50 pre-treat with colecalciferol.

Treatment Protocol
This protocol is for guidance and may need modification depending on the response to treatment or side effects. There is now good evidence that cyclic administration of Pamidronate will improve bone mineralisation in children.

Dosage:
Each cycle consists of an IV infusion of Pamidronate daily for two consecutive days:

Age (years) Dosage Frequency

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Dosage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 2</td>
<td>0.75mg/kg/day for 2 days</td>
<td>2 monthly</td>
</tr>
<tr>
<td>2-3</td>
<td>1.125mg/kg/day for 2 days</td>
<td>3 monthly</td>
</tr>
<tr>
<td>&gt; 3</td>
<td>1.5mg/kg/day for 2 days (max dose 90mg)</td>
<td>3 monthly</td>
</tr>
</tbody>
</table>
- Pamidronate should be diluted in 0.9% Sodium Chloride (concentration not to exceed 60mg in 250ml) and infused over 2 hours. See preparation of infusion below.
- The second infusion may be started 20 hours after the start of the first infusion.
- Further doses may be required on a 3 monthly basis (speak with paediatric rheumatology team).

<table>
<thead>
<tr>
<th>mg of Pamidronate to be infused in one day (mg/day) based on patient weight</th>
<th>Amount of 0.9% Sodium Chloride to add to obtain a total infusion volume of:</th>
<th>Infusion rate over 2 hours (ml/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 mg/day</td>
<td>50 mls</td>
<td>25 mls/hr</td>
</tr>
<tr>
<td>5.1-15 mg/day</td>
<td>100 mls</td>
<td>50 mls/hr</td>
</tr>
<tr>
<td>15.1-60 mg/day</td>
<td>250 mls</td>
<td>125 mls/hr</td>
</tr>
<tr>
<td>60.1-90 mg/day</td>
<td>500 mls</td>
<td>250 mls/hr</td>
</tr>
</tbody>
</table>

**Monitoring:**
- Bone profile - prior to each three monthly cycle and prior to the third dose of each cycle. If serum calcium is less than 2.1mmol/l – give or increase calcium supplements.
- A repeat DEXA scan should be completed after 2 years after starting therapy (i.e. after 8 cycles).
- A decision about continuing therapy after two years will be made when the response to therapy over the first 2 years has been evaluated.

**Side Effects:**
- Flu like symptoms associated with pyrexia and back and/or limb pain. These can be treated with paracetamol (not NSAID's). These usually only occur during the first cycle of treatment.
- Occasional transient hypocalcaemia

**Contacts for Paediatric Rheumatology Team**

1. Paediatric rheumatology advanced nurse practitioners 01865 737341
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2. Dr Wilkinson (Consultant Paediatric Rheumatologist) 01865 738049 via Hannah Trendell Nick.wilkinson@ouh.nhs.uk

3. Dr David (Consultant Rheumatologist) Via switchboard

Out of hours – Contact can be made with the on-call Doctor for rheumatology via switchboard at the NOC 01865 741155