**Introduction**

Haemangioma are benign skin lesions caused by proliferating endothelial cells. They appear shortly after birth, and grow rapidly to reach 80% of maximal size by 3 months. Most stop growing by 6 months, but some continue to grow until 18 months of age or more. Subsequently they involute over years, being largely resolved by 5 years of age, although some may leave permanent residua such as telangectasia, scarring or excess fibro-fatty tissue.

Following case reports of rapid resolution of haemangioma in children on propranolol for cardiomyopathy, propranolol has been used as a treatment for this condition. Although corticosteroids remain the gold-standard treatment at this time, many clinicians are opting to use propranolol off-licence due to its better side effect profile. Propranolol has been used for both cutaneous and subglottic/tracheal haemangioma. The mechanism of action of propranolol may include vasoconstriction, decreased expression of VEGF and bFGF genes, down regulation of the RAF-mitogen-activated protein kinase pathway, or triggering of apoptosis of endothelial cells.

For many haemangioma treatment is not required, however haemangioma in some locations need treatment to prevent complications such as disruption to visual pathways, risk to the airway/feeding, ulceration, or poor cosmetic outcome.

There does seem to be response from haemangiomas even after the proliferative phase ie treatment has been effective in some children aged up to 4 years.

**Potential Indications for Treatment**

1. Subglottic and/or tracheal haemangioma
2. Periorbital or retrobulbar haemangioma
3. Perioral haemangioma
4. Large facial segmental haemangiomas (can be associated with PHACES syndrome)
5. Nasal tip, ear, lip, central cheek, large facial haemangioma
6. Nappy area and flexural haemangiomas – risk of ulceration
7. Lumbrosacral haemangioma (can be associated with underlying spinal and urogenital anomalies)
8. Multiple haemangiomas (ie visceral)
9. Ulcerated haemangiomas
Children will be assessed by ENT or Dermatology depending on the location of the haemangioma. Most children can commence treatment in Daystay, however for very young babies (i.e. <6 weeks) or those with airway involvement admission overnight admission should be considered. This would be at the discretion of the managing team. Children will be admitted under ENT or Dermatology/General Paediatrics.

**Propranolol**

Risks and benefits of propranolol should be discussed with the family. Whilst it is still a new therapy, there are a number of case series in literature. Reviews comparing propranolol with corticosteroids have found propranolol to be more effective. Other beta blockers are also being studied.

**Benefits**
- Relatively low risk medication (compared with other treatment modalities)
- Non-surgical approach

**Risks**
- New treatment option, off-licence use of a medication
- Bradycardia
- Bronchoconstriction
- Hypotension
- Hypoglycaemia (esp if reduced feeding secondary to illness)

**Propranolol dose**

1mg/kg/day in two divided doses as starting dose, then 2mg/kg/day in two divided doses. In selected patients higher doses are used at the discretion of physician based on clinical indication.

Propranolol 4mg/ml (Roxane) commercial preparation is available on NPPA application. This is preferable due to better stability data and does not need refrigeration.

Alternatively Propranolol liquid 2mg/ml can be mixed by a pharmacist and has a shelf life of 30 days (see Appendix 1). It needs to be stored in the refrigerator. For those starting treatment as outpatients, families should be asked to fill the prescription beforehand and bring the medicine with them to the Daystay unit.

**Investigations**

**Initial Investigations**

1. Cardiovascular examination (incl femoral pulses)
2. ECG
3. Bloods: FBC, renal function, liver function, TFTs
4. Clinical photography – to include front and side-on views

Other investigations at the discretion of the managing team:

- For segmental head and neck haemangiomas at risk of PHACES syndrome: consider echocardiogram, laryngoscopy & bronchoscopy, MRI/MRA head under GA, ophthalmology assessment
For segmental lumbar region haemangiomas at risk of PELVIS/SACRAL syndrome: consider x-ray &/or USS spine, renal USS

For multiple haemangiomas: consider USS abdomen, USS/MR head, echocardiogram

**Inpatient Management**

Consider for those <6 weeks, airway haemangioma or other complications. Baseline cardiovascular examination, observations (HR, BP) and investigations (ECG, bloods etc as above).

Give Propranolol at starting dose – 1mg/kg/day in 2 divided doses
- Hourly HR & BP observations
- Glucose to be checked after 3 hrs

Increase dose when stable until on 2mg/kg/day in 2 divided doses

**Daystay Management**

Ensure prescription for propranolol is filled prior to admission and baseline investigations have been performed.

Admit to Daystay in the morning (0830hrs).

Baseline cardiovascular examination, observations (HR, BP) ECG. Bloods if not done prior.

Give Propranolol at starting dose – 1mg/kg/day in 2 divided doses
- Hourly HR & BP observations
- Glucose to be checked after 3-4hours.
- If observations and glucose stable, then discharge home.

Patient to return in 4-7 days for increase in Propranolol dose to 2mg/kg/day in 2 divided doses

**Complications**

Risk of hypoglycaemia 1-3% If hypoglycaemia (BSL <3.5 mmol/L), then feed and recheck BSL. If <2.0, consider IV dextrose.

Parents to be aware of symptoms of hypoglycaemia (i.e. jitteriness, lethargy, sweatiness). Parents need to be aware that the risks of hypoglycaemia and/or hypotension are increased if the child is unwell, taking reduced feeds, and/or having vomiting/diarrhoea.

If hypotensive, then consider fluid bolus.
Follow-up

Dermatology patients
Outpatient review with dermatology to be arranged within 2-4 weeks to assess response.

ENT patients
Repeat L&B to be scheduled at 1 week, 4 weeks, and then every 6 months until age 18 months.

If no response then consider introduction of corticosteroids or other treatments.

Treatment may be continued for up to 9 – 24 months. Propranolol should be weaned and stopped over a minimum two week period to prevent rebound tachycardia, but usually over a longer period to prevent rebound growth.

Regular weight checks by GP or specialist to increase Propranolol dose accordingly.

References

DermNet NZ. Infantile Haemangioma.


