A practical approach to the assessment of faltering growth in the infant and toddler

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Abstract

Faltering growth, previously called failure to thrive, in infants and toddlers is a common primary care presentation and reason for paediatric referral. This article suggests an approach to selection of cases for referral, the assessment and investigation required in secondary care and the identification of the less than 5% of cases with an underlying organic disease. A framework is suggested to aid advice to be given to parents with a child who has faltering growth due to inadequate nutritional intake for their energy requirements.

Keywords child; infant; child nutrition disorders; failure to thrive; growth disorders; faltering growth; growth monitoring

Introduction

Faltering growth is the growth pattern used to describe a child who is failing to reach their full genetic growth potential and who is deviating from the "norm". It should be used in preference to the older term failure to thrive which implies potential physical and emotional neglect. Weight concern is the commonest presentation under 2 years so this article concentrates on diagnosis and management of poor weight gain in this age group.

Referral

There are clear referral recommendations for primary care teams to identify those children with growth concerns who need further assessment. Many children will not have an identifiable pathology requiring treatment and will after review and assessment be a small or slow-growing normal child. (Table 1)

Recommendations for referral of faltering growth to paediatrician

- More than 10% loss of birth weight at day 5 (formula fed)
- More than 12.5% loss of birth weight at day 5 (breast fed)
- Sustained weight loss (falling through 2 centile lines)
- Weight below 0.4th centile
- Weight below 2nd centile which has failed to improve with primary care intervention
- Discrepancy of more than 2 centiles between height and weight (generally applicable if >2 years)

Table 1

Is it really faltering growth?

Inappropriate investigation of normal children can often be avoided with the following strategies:

Correct measuring

Always ensure accurate measuring by trained staff using calibrated and maintained equipment alongside use of a validated paediatric growth chart. The child growth foundation can provide training and the RCPCH website has fact sheets to aid the plotting and assessment of infants and children on the various WHO charts available and in the parental held "red book". WHO charts should be used in preference to older charts as they identify how children should grow when provided with optimal conditions and are based on a longitudinal study data of breast fed infants.

Monitoring preterm infants

Preterm infants should have their growth parameters plotted according to their corrected gestational age ideally on a Neonatal and Infant Close Monitoring chart, allowance for prematurity should continue until the corrected age of 24 months.

Catch down growth

At significant proportion of infants with high birth weights (98th centile) show regression to the mean — i.e. return to their genetic potential and appear to be falling across centile lines due to slow weight gain after birth; this is most commonly seen after excessive *in utero* growth e.g. infant of a diabetic mother. This requires no investigation or treatment in an otherwise healthy infant.

Small normal

Infants growing below the 0.4th centile should be assessed as only 1:250 infants fall into this category (UK—WHO 2009) however some normal asymptomatic intrauterine growth restricted infants will fall into this group.

Assessment

The key aim of a paediatric review is not simply to improve weight gain but to identify underlying treatable pathology, ensure adequate nutritional intake for the child's needs and to reassure concerned parents. Investigations should be carefully selected as most cases are due to inadequate intake of nutrition and organic disease is only found in only 5% of cases.

History and examination

Clinicians should establish whether there is an antenatal aetiology by enquiring about slow *in utero* growth, antenatal infection, gestational diabetes, prematurity and birth weight. Family history may identify a particular growth pattern or suggest risk of genetic conditions.

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Main Categories of faltering growth

Inadequate intake without increased energy requirement	Excess output and or malabsorption	Increased energy requirement	Unable to utilise
Dietary and feeding history	Quantity and frequency gastric output, diarrhoea and urine output	Cardiac or respiratory symptoms Physical activity — voluntary and involuntary Recurrent infection	
Not offered • Lack of knowledge: incorrect diet or quantities offered • Not available • Parental mental health eg depression • Child protection concern Not accepted • Poor appetite • Food aversion • Discomfort • Behavioural Not swallowed • Anatomical: cleft palate, micrognathia, ankyloglossia • Neurological (poor swallow or hypotonia) Not kept down • Reflux • Obstruction eg pyloric stenosis • Other vomiting cause — raised ICP, overfeeding, infection, intolerance	Abnormal anatomy • Short gut • Ileostomy Chronic diarrhoea • Coeliac • Lactose intolerance • Cows milk protein intolerance • Congenital malabsorption • Chronic infection Bowels not opening • Constipation • Ileus Polyuria • Diabetes • Psychogenic polydipsia • Renal disease	Abnormal breathing • Upper airway obstruction eg laryngomalacia, severe sleep apnoea • Infection eg immune-deficiency, cystic fibrosis, aspiration, congenital abnormality • Cardiac eg cardiac failure or hypoxia from congenital or acquired heart disease Increased muscle activity • Seizures • Hyperkinesisa • Behaviour Other • Other infection • Hyperthyroidism • Liver disease • Chronic pain	• Genetic Syndrome eg Russell Silver, Prader—Willi • Metabolic • Endocrine — diabetes, growth hormone • Liver pathology

Table 2

Assess nutritional intake

Take a breast feeding history and supplement with a review by a breast feeding specialist if necessary. Calculate milk intake if formula fed or 24 hour food diary recall (including quantities) for a toddler. Useful online resources include fact sheets from www.infantandtoddlerforum.org or the RCPCH e-learning Healthy child programme. Ask parents to describe a typical mealtime including physical and behavioural difficulties, timing and duration of meals or feeds and whether eating patterns change with different care providers. Estimate fluid intake and type in toddlers as this can impact significantly on appetite.

Feeding is a highly emotional experience and parental mental health issues can both cause and result from a child with faltering growth. The socioeconomic environment of the child may also indicate if there are educational, financial or child protection issues contributing to the child's intake.

Assess gastrointestinal losses by vomiting, stool and urine output. Always carefully establish an estimate of volumes as parental experience will influence descriptions given.

Screen for any other symptoms which would suggest an increased energy demand or chronic ill health, include respiratory symptoms, history of infections or excessive voluntary or involuntary activity (e.g. seizures) and past medical history of significant disease. Enquire about excessive crying or sleepiness which may indicate pain or underlying disease.

Examination

The examination should include assessment for nutritional deficiency; cutaneous fat, anaemia, jaundice, delayed closure of fontanelle (Vitamin D deficiency or hypothyroidism), health of mucosal membranes, hair, skin and nail, dysmorphic features or abnormal head circumference. Assess for cardiac or respiratory abnormalities, hepatomegaly, abdominal masses or distention.

Investigating the cause

The most common cause is inadequate intake relative to a child's specific energy requirements however if the intake is appropriate