

9. Hypothalamic pituitary axis

ALL PATIENTS

- 1) Measure and chart height and weight at least six monthly until growth complete.
- 2) Measure sitting height at same time as height and weight if possible. Essential for recipients of TBI, craniospinal or abdominal radiotherapy.
- 3) Pubertal staging at least six monthly. Includes testicular volume assessment using an orchidometer in boys.
- 4) Regular (consider annually) bone age in recipients of cranial irradiation, TBI, or patients with brain tumours even in absence of radiotherapy.

RISK FACTORS

- Radiotherapy to field including CNS / spine (including TBI)
- Brain tumours even in absence of radiotherapy
- Bone marrow transplantation – recipients of TBI conditioning after previous cranial radiotherapy are at highest risk

REFER FOR ENDOCRINE ASSESSMENT IF:

- 1) Height velocity <25th percentile
- 2) Evidence of puberty at less than **9 years (female)** / **10 years (male)**
- 3) Radiotherapy dose to HP axis >30 Gy
- 4) TBI
- 5) Height <10th percentile
- 6) Discrepancy between pubertal stage and growth; watch for attenuated pubertal growth spurt

AFTER CRANIAL RT PATIENTS ARE AT RISK OF:

- Growth hormone deficiency (GHD)
- Attenuated pubertal growth spurt
- Early puberty
- Delayed puberty
- Multiple pituitary hormone deficiency; pituitary hormones lost sequentially in order of GH (first and commonest), LH/FSH, ACTH, TSH; risk increases with increasing dose and time from treatment

GROWTH HORMONE DEFICIENCY

- Most children treated with cranial radiotherapy for brain tumours will be GH deficient by 2 years from treatment
- Early diagnosis and treatment is important as response to GH is poorer than in idiopathic GHD especially in children who have received spinal RT
- Risk of GHD at initial presentation in patients with craniopharyngioma
- GHD is a risk factor for reduced bone mineral density
- There is no evidence of an increased risk of relapse or recurrence in children treated with GH
- Cardiac monitoring is important in children who have received anthracyclines and are receiving treatment with GH
- IGF-1 and IGFBP3 should be monitored in patients receiving GH
- At completion of growth, GH should be discontinued and re-evaluation of the hypothalamic pituitary axis undertaken. If GHD meeting the adult criteria is present, consideration should be given to adult GH replacement in discussion with an adult Endocrinologist. There is evidence to suggest that GH replacement is important for maintaining normal bone mineral density and body composition, as well as quality of life and cardiovascular lipid profile, in adult life.

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