Subsequent primary cancers

Increased risk

C **Healthcare professionals should be aware that survivors of childhood cancer are at particular and lifelong increased risk of developing a subsequent primary cancer and that this may occur at any site on the body.**

C **Healthcare professionals should be aware that all survivors of childhood cancer who were treated with radiotherapy are at risk of subsequent primary cancer and should adopt a high index of suspicion when assessing health concerns.**

C **Healthcare professionals should be aware that chemotherapy exposure is associated with increased risk of subsequent primary cancers in patients treated for childhood cancer. The effect is most consistently seen with alkylating agents and epipodophyllotoxins.**

Cancer screening and surveillance

✓ General practitioners should:

- use practice information systems to actively identify survivors of childhood cancer
- be aware that those survivors of childhood cancer who have underlying genetic abnormalities are at additional increased risk of subsequent primary cancer
- provide regular review focusing on patient awareness and early identification of health problems
- be aware of patterns of presentation of subsequent primary cancers and have a lower threshold for referral to specialist services in this patient group, indicating their concerns on that referral
- promote participation in national screening programmes and emphasise the importance of healthy lifestyle behaviours in this patient group.

✓ End of treatment summaries for patients with childhood cancer should provide guidance around the lifelong increased risk of subsequent primary cancers.

Fertility issues

✓ Specialist referral should be considered where there is patient or professional concern around fertility in survivors of childhood cancer.

✓ Fertility counselling should be provided for survivors of childhood cancer.

✓ Good links are required between paediatric and adolescent oncology units and fertility services to promote rapid referral and pre-treatment assessment of young patients who may benefit from fertility preservation.

C **Healthcare professionals should provide reassurance to survivors of childhood cancer that their offspring are not at increased risk of congenital abnormality.**

Males

D **The potential impact of cytotoxic treatment in young male patients with cancer should be considered in discussion with the patient and their parents in order to offer appropriate fertility preservation options.**

D **Teenage boys should be referred for semen cryopreservation if their fertility is considered to be at risk.**

✓ Assessment of male pubertal development and fertility should include: assessment of testicular volume using the Prader orchidometer, Tanner staging of secondary sexual development, measurement of serum FSH, luteinising hormone, testosterone and semen analysis.

D **Pubertal onset should be closely monitored in boys who have received radiotherapy to the testes, with early testosterone supplementation considered.**

D **Men who have received cytotoxic treatment or gonadal radiotherapy should be offered access to fertility testing.**

Females

D **Cryopreservation of ovarian tissue** (within the context of a clinical trial) **should be considered in girls at high risk of premature ovarian insufficiency.**

D **Pubertal onset should be closely monitored in girls who have received abdominopelvic radiotherapy or cytotoxic therapy.**

D **Assessment of adult ovarian function should be offered to women who have received abdominopelvic radiotherapy or cytotoxic therapy.**

C **Women who have had radiotherapy treatment to a field which included the uterus are at increased risk of adverse pregnancy outcome. Pre-conception counselling may be appropriate and women should be advised that pregnancy should be supervised in a high risk obstetric unit.**

Cardiac effects

C **Survivors of childhood cancer who received either anthracyclines or radiation to a field that included the heart should be assessed with respect to cardiac muscle function.**

D **Healthcare professionals should reassure survivors of childhood cancer who did not receive anthracyclines or radiation to a field that included the heart that the lifelong risk of treatment-related cardiac problems is very low.assessment for cardiac problems**

Assessment for cardiac problems

D **Survivors of childhood cancer who have had anthracyclines or radiation to a field that includes the heart should have long term monitoring for cardiac dysfunction using echocardiography to determine fractional shortening and ejection fraction.**

✓ Patients with asymptomatic left ventricular dysfunction after cancer therapy require long term echocardiographic monitoring since prognosis is uncertain.

✓ The frequency of echocardiographic surveillance should be individualised to the risk of anthracycline induced cardiotoxicity with a maximum interval of five years for those at low risk who received cumulative anthracycline doses less than 250 mg/m^2.

✓ Patients at high risk of anthracycline induced cardiotoxicity (cumulative anthracycline doses greater than 250 mg/m2) or who have also received radiotherapy to a field that includes the heart should be screened every two to three years.

✓ Women who are pregnant or planning a pregnancy do not require repeat echocardiograph if they have had a normal test result in the previous three years.

Bone health

Assessment

D **Survivors of childhood cancer who have had the following interventions are at increased risk of BMD deficits and should have a baseline evaluation of BMD at around two years after completion of treatment:**

- **high cumulative doses of steroids**
- **high cumulative doses of methotrexate**
- **cranial irradiation**
- **bone marrow transplantation.**

Evaluation of bone mineral density should also be undertaken in survivors whose treatment puts them at risk of endocrine dysfunction.

✓ Repeat measures in patients with results within the normal range are not required unless there is a change in the clinical situation.

✓ Interpretation of bone mineral density measurements should include consideration of whether a patient's final height is compromised and the possibility of pubertal delay.

✓ Endocrine evaluation is recommended for childhood cancer survivors who have a significant reduction in bone mineral density and/or recurrent fractures.

Metabolic syndrome

D **Survivors of childhood cancer** (particularly those who have been treated for acute lymphoblastic leukaemia or brain tumours) **should be advised that they may be at higher risk of developing metabolic syndrome than the general population.**

✓ Healthcare professionals should be aware that survivors of childhood cancer may exhibit features of metabolic syndrome even with a normal body mass index, particularly if their treatment involved bone marrow transplantation.

✓ Management of metabolic syndrome in survivors of childhood cancer should follow evidence based guidelines for the general population.

Cognitive and psychosocial outcomes

D

- **Healthcare and education professionals should be aware that the treatment of childhood cancer may have an impact on neurological function in later life, particularly if irradiation of the brain occurs at a young age.**
- **Regular review of neurological function should be part of normal follow up.**
- **If a problem is suspected, the patient should be referred to a psychologist for a neuropsychological assessment.**

✓ Children with cancer who are due to receive cranial irradiation should undergo a neuropsychological assessment at the start of treatment. The assessment should be repeated annually, to monitor changes over time.

D

- **Healthcare and education professionals should be aware that the treatment of childhood cancer may have an impact on educational and social function in later life.**
- **Regular review for possible educational and psychosocial dysfunction or morbidity should take place.**
- **If a problem is suspected, the patient should be referred appropriately.**

Growth problems

Monitoring for growth problems

B **All children who have survived childhood cancer should have their height measured regularly until they reach final adult height. Sitting height should also be measured in children who have received craniospinal irradiation.**

C **Children with impaired growth velocity should be referred to a paediatric endocrinologist for growth hormone level measurement.**

B **Causes of poor growth, other than growth hormone deficiency, including potential deficiencies of other pituitary hormones or problems related to early or delayed puberty, should be considered and treated as necessary.**

B **Children with craniopharyngioma should be tested at presentation for growth and other pituitary hormone deficiencies, and at regular intervals thereafter.**

B **Prepubertal girls receiving cranial radiotherapy should be closely monitored for clinical signs of precocious puberty.**

✓ Growth assessment requires integration of information including height measurements, bone age and puberty staging, all of which should be plotted onto growth charts.

✓ Healthcare professionals should be aware that puberty growth can be mistaken for catch-up growth.

Obesity

C **Regular growth monitoring should include evaluation of body mass index and be related to growth charts.**

✓ Advice on healthy eating and exercise should be given early and reinforced regularly.

✓ Healthcare professionals should be aware that obesity can result in normal growth at the expense of inappropriately rapid bone age advancement resulting in reduced height prognosis.

Treatment with growth hormone

B **On confirmation of growth hormone deficiency, growth hormone replacement therapy is indicated. For children with craniopharyngioma, the need for growth hormone replacement may be from presentation.**

C **If the cause of growth impairment is unclear, a trial of growth hormone treatment may be appropriate.**

B **Survivors of childhood cancer should be informed that current evidence indicates that there is no increased risk of cancer recurrence from growth hormone replacement therapy.**

✓ Growth hormone should be prescribed under the supervision of a paediatrician with an expertise in growth disorders. Detailed and comprehensive shared care protocols should be available, with prescribing normally done by the general practitioner.

Dental and facial problems

D **Children undergoing cancer treatment, and their parents/carers, should be advised about the possible effects on orofacial and dental development. Specialist paediatric dentists should have a role in the care of these children.**

Thyroid dysfunction

B **Survivors of childhood cancer who received radiotherapy to the neck, spine or brain should have their thyroid function checked after completion of treatment and regularly thereafter. Survivors are likely to require lifetime surveillance.**

✓ Survivors who are at risk of thyroid nodules or second primary thyroid cancers should be advised of the risk of thyroid cancer and to seek urgent medical attention if they notice palpable neck masses.

✓ Annual thyroid function tests are recommended for survivors at risk of thyroid dysfunction.

Sources of information

Cancer Research UK/CancerHelp UK
Tel: 0800 800 4040
Email: cancerhelpuk@cancer.org.uk
Website: www.cancerhelp.org.uk

Cancer Support Scotland
Tel: 0141 211 0122
Email: info@cancersupportscotland.org
Website: www.cancersupportscotland.org

Macmillan Cancer Support (Scotland)
Tel: 0131 260 3270
Email: southscotland@macmillan.org.uk
Website: www.macmillan.org.uk

Maggie's Centres Scotland
Email: enquiries@maggiescentres.org
Website: www.maggiescentres.org

Marie Curie Cancer Care (Scotland)
Tel: 0800 716 146
Website: www.mariecurie.org.uk

This Quick Reference Guide provides a summary of the main recommendations in **SIGN 132 Long term follow up of survivors of childhood cancer**. Recommendations are graded **A B C D** to indicate the strength of the supporting evidence.

Good practice points ✓ are provided where the guideline development group wishes to highlight specific aspects of accepted clinical practice.

Details of the evidence supporting these recommendations can be found in the full guideline, available on the SIGN website: www.sign.ac.uk.

This Quick Reference Guide is also available as part of the SIGN Guidelines app.

Available on the App Store

Available from Android Market

Healthcare Improvement Scotland

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SIGN 132 • Long term follow up of survivors of childhood cancer

Quick Reference Guide *March 2013*

Evidence