Although childhood cancer is rare, it is important to maintain good communication between primary, secondary and tertiary care. Children with cancer have open access to hospital and the local team will always be happy to discuss specific issues with you.

**Background**

It has been estimated that around one child in every 500 will develop some form of cancer by 14 years of age in Great Britain. A dramatic improvement in prognosis means that now 82% of children with cancer will survive for five years or more[^1], compared with just 28% in the late 1960s. Improvements in survival rates have been attributed to advances in treatment and supportive care, centralising treatment to specialist centres and inclusion of patients in clinical trials[^2].

The spectrum of cancer in children differs markedly from that in adults. The three most common types of cancer diagnosed in children are leukaemias, brain and CNS tumours and lymphomas, collectively accounting for around two-thirds of all cancers diagnosed in 0-14 year olds[^3]. The remaining cancers diagnosed in children are embryonal tumours such as Wilms tumour, bone cancers and soft tissue sarcomas. Carcinomas and melanomas are very rare in children. Childhood cancer may present initially with symptoms and signs associated with common conditions. Further information on diagnosis may be found in the NICE Referral guidelines for suspected cancer[^4].

Surgery, chemotherapy and radiotherapy remain the three basic therapeutic modalities for treating cancer. High-dose chemotherapy or total body irradiation may be indicated for certain poor-risk patients, accompanied by autologous (from oneself) or allogeneic (from a histocompatible donor) haematopoietic stem cell transplant (HSCT). Children may be referred to a transplant centre for such treatments.

**Problems during treatment**

Families will be given clear instructions about what to do, and what medication can be taken, when the child is unwell. Non-steroidal anti-inflammatory drugs should not be used, and there are various drugs which are contraindicated in paediatric oncology patients.

The treating team can be contacted at all times via the ward or emergency number, which the family will be given.

**Bone marrow suppression**

- **Neutropenia**
  - Children receiving chemotherapy are at greater risk of infection.
  - Neutropenia usually occurs 7-10 days after an intensive block of treatment.
  - If neutropenic and febrile, children will be started on IV broad spectrum antibiotics empirically.
  - Paracetamol not recommended to reduce fever at home. Families will have analgesia and a plan of what to do when the child has a fever.

**Central venous access**

- Central venous catheters or other implantable vascular access devices are routinely used for children receiving intensive therapy.
- Parents or Community Nurses flush these regularly at home with saline.
- Lines can become blocked or infected, and occasionally need replacement.

**Gastrointestinal effects**

- Mouth ulcers and oral thrush are common and good mouthcare is essential including brushing teeth twice daily with a soft toothbrush and fluoride toothpaste.
- Dental work should be done when the blood count is normal and in direct liaison with the patient’s treating clinician.
- Anti-emetics are routinely prescribed during intensive treatment courses.
- Early dietician involvement is recommended as some children require nasogastric feeds or parenteral nutrition.

**Alopecia**

- Many cytotoxic drugs and cranial irradiation cause alopecia.
- Usually reversible on stopping treatment.
- Children with leukaemia regrow their hair during maintenance therapy.
- Children are offered wigs before their hair falls out, but many prefer a hat or headscarf.

**Viral infections**

- Measles and chickenpox can be fatal in immunosuppressed children.
- Children who have a significant chickenpox contact will require rechecking or serostatus at time of exposure. It may be necessary to treat them with Aciclovir and the treating clinician will advise.
- Children who have a significant measles contact receive passive immunisation regardless of antibody status.
- Immediate admission for treatment is advised if measles or chickenpox or shingles is suspected clinically.
- Other common viral infections rarely cause problems, except in the post bone marrow transplant setting.

[^1]: Ref: [1].
[^2]: Ref: [2].
[^3]: Ref: [3].
[^4]: Ref: [4].
Vaccinations
• All live vaccines must be avoided in children actively receiving treatment and up to 6 months after cessation of treatment.
• Non-live vaccines may be considered during treatment but response is often poor and they are best delayed until 6 months after treatment has been completed.
• Influenza vaccine is recommended annually in autumn for all children receiving chemotherapy and up to 6 months after completion of treatment.
• Influenza vaccine is also recommended for all close family contacts (parents and siblings).
• Decisions around immunisation during treatment and/or whether to give booster vaccines following treatment will be made by the treating clinician.
• Children who have had a matched sibling allogenic HSCT or autologous HSCT should receive a re-vaccination programme at 12 months post-HSCT.
• Children who have had any other allogenic HSCT should receive a re-vaccination programme at 18 months post-HSCT.
• Further details on the recommended re-vaccination programme can be obtained from your local hospital.
• Siblings of the child with cancer should be fully immunised in order to minimise the risk of infecting the patient with the natural disease. There is no risk of vaccine strain spread.
• Seronegative family members may receive varicella vaccine to provide indirect protection for susceptible patients during treatment.

Late effects of treatment
The risks of late effects are directly related to the treatment received:

Radiotherapy
• Depending on the field of radiotherapy, late effects may include: secondary malignancy, hypothalamic/pituitary dysfunction, reduced bone mineral density, gonadal dysfunction, growth problems and cardiac or respiratory dysfunction.

Chemotherapy
• Many cytotoxic drugs have cumulative toxicity, e.g. anthracyclines and cardiac dysfunction or cisplatin and renal dysfunction.
• Patients are monitored carefully during treatment and dose modifications usually prevent clinically important organ damage.
• Potential late adverse effects depend on specific drugs received but may include secondary leukaemia, gonadal dysfunction and auditory dysfunction.

Surgery
• Potential late effects will depend on the site of surgery.
• Intracranial surgery may lead to potential neuropsychological dysfunction, hypothalamic/pituitary dysfunction or motor/sensory dysfunction.
• Bone surgery may lead to deformity, scoliosis or asymmetrical growth.
• Nephrectomy may cause long-term renal dysfunction and hypertension.

Specific late effects

Quality of life
• Some survivors of childhood cancer may experience impaired quality of life.
• This may include relationship difficulties, anxiety and depression, poor work performance and sexual dysfunction.
• Some may experience difficulties obtaining employment in certain fields (especially the Armed Forces) or life insurance.

Gonadal dysfunction
• Fertility may be affected and if this is likely, this will be discussed early in treatment.
• Survivors with poor growth, delayed pubertal development and risk of hypogonadism are referred to an endocrinologist.
• If endocrine function is impaired, replacement therapy will be prescribed to induce puberty and maintain secondary sexual characteristics.
• Cryopreservation of semen before cytotoxic treatment is considered for young male patients, where appropriate.
• There is no evidence of an increased risk of congenital anomalies in the offspring of childhood cancer survivors.

Secondary malignancy
• Patients are educated regarding the risk of secondary malignancy and reduction of risk behaviour, especially smoking and sunbathing.
• It is important to encourage prompt reporting of new symptoms or masses.

Palliative care
Sadly, a few children die in remission due to complications of their cancer therapy. Most deaths however, are due to recurrent or uncontrollable disease. When it is clear that the child cannot be cured, a definite decision is usually made with the family to discontinue active treatment and to change to palliative care.

Most parents want their child to die at home and with adequate support this is usually possible. The period of terminal care is often short, sometimes as little as a week or two for children with leukaemia, although maybe several months for those with solid tumours.

A network of Paediatric Oncology Outreach Nurses liaise with the General Practitioner during this time.

References

CCLG supports the 1,700 children who develop cancer each year in Britain and Ireland. As an association for healthcare professionals involved in their care, it works to benefit children through development of the highest standards of care.

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