Clinical guidelines for the management of childhood stroke

Clinical guidelines have recently been published by the Royal College of Physicians (RCP) relating to the diagnosis, management and rehabilitation of stroke in children (Royal College of Physicians, 2004). Stroke affects several hundred children in the UK each year and is in the top ten causes of childhood death (Fullerton et al, 2002). One in ten children with sickle cell disease will have a stroke before their 20th birthday and a quarter will have evidence of brain injury as a result of overt or clinically silent stoke.

Many children who have a stroke have another medical condition and therefore are already vulnerable to adverse neurodevelopmental effects (Lanthier et al, 2000; Ganesan et al, 2003). Affected children and parents face lack of awareness that children can be affected by stroke, among both the lay public and professionals. An important aim of the paediatric stroke guidelines published by the RCP is to raise awareness and provide information about this condition.

EFFECTS OF CHILDHOOD STROKE

Injury to the developing brain has the potential to impact on the individual's functioning throughout the rest of his/her life. The plasticity of the child's brain is a concept which is widely discussed both in the popular and scientific literature. However, although the most obvious, usually motor, impairments resulting from childhood stroke may, in some cases, recover to a remarkable extent, the wider consequences of acquired injury to the developing nervous system are often relatively invisible.

Such difficulties particularly affect the domains of cognition or behaviour; they may not be apparent in childhood but may only emerge later as the demands on the individual increase. Thus childhood stroke has potential long-term personal, social and economic consequences.

CARE AFTER CHILDHOOD STROKE

In contrast to adult stroke, where the model is to develop specialist stroke services, the relative rarity of childhood stroke means that existing primary, secondary and tertiary systems of child health will, appropriately, be involved in care of the child affected by stroke.

A key recommendation relating to service organization is that all children affected by acute stroke should be referred to a consultant paediatric neurologist. This may entail discussion with the tertiary unit, or transfer of care from acute secondary to tertiary unit. Multidisciplinary assessment and coordination and provision of long-term care are usually undertaken by community child health services. The guidelines encourage any member of the multidisciplinary team to seek advice from tertiary specialists where this is necessary but stress that ongoing management and coordination between health and educational services should be by the secondary level paediatric services.

DIAGNOSIS AND INVESTIGATION

The most common presentation of childhood stroke is with acute hemiparesis. Accurate clinical assessment can be challenging, especially in very young children. Involving colleagues experienced in evaluation of children, as well as having increased awareness of the diagnosis, particularly in high-risk groups (e.g. a child with congenital heart disease), may improve early recognition of childhood stroke. Brain imaging is mandatory to accurately identify the underlying pathology (ischaemia or haemorrhage).

The range of risk factors for stroke encountered in the paediatric age group are different to those contributing to stroke risk in adults and a different diagnostic approach is required. Key investigations in the paediatric age group are imaging the cervical and intracranial arterial circulation with magnetic resonance angiography, cardiac echocardiography and screening for procoagulant states.

TREATMENT AND SECONDARY PREVENTION

The guidelines contain detailed recommendations relating to both acute treatment and secondary prevention. However, as there are no clinical trials to guide medical management of childhood stroke, most are based on consensus views. Aspirin may be used in both acute and longer-term treatment of arterial ischaemic stroke in children, depending on the risk factors identified. The consensus view of the working party and other expert bodies is that the potential benefits of aspirin in this group of children outweigh the small risk of Reye's syndrome and justify its use in this clinical context.

As yet thrombolysis is not recommended for the treatment of acute arterial ischaemic stroke in children. Arterial ischaemic stroke recurs in between 6 and 20% of all children and in over 60% of children with sickle cell disease. Identification of the underlying risk factors is important in ensuring appropriate secondary prevention strategies are instituted.

REHABILITATION AND LONGER TERM CARE

There is a paucity of rehabilitation services for children with acquired brain injury in the UK; most such children

will be managed by services primarily targeted at management of children with congenital, often relatively slowly changing, conditions, most commonly cerebral palsy.

All professionals should be aware that the functional consequences of acquired brain injury are likely to change with growth and maturity. Cognition and emotion are commonly affected but impairments in these domains may be relatively invisible to professionals unless specifically sought. Coordination between professionals is important in order to minimize duplication of appointments and assessments for the child and family. Formal or informal use of a key worker is likely to help with this.

Transition from paediatric to adult services will depend on the current and future needs of the individual and occurs between 16 and 19 years of age. Children with active medical needs (surveillance and management of an active condition, e.g. cardiac disease or sickle cell disease, or management of chronic disability) will require transfer of health care. Adult health-care professionals should be aware of the potentially wide-ranging effects of childhood stroke and that functional difficulties may emerge after a 'silent' interval.

CONCLUSIONS

Stroke is a completely unexpected illness in a child, and parents and children feel emotionally devastated by the diagnosis. This is compounded by the lack of awareness of childhood stroke among professionals, which means that it is often left up to the child and family to actively pursue information, treatment, rehabilitation and appropriate educational support. The guidelines contain a list of helpful organizations, which can provide support and information and are accompanied by child and family information (www.rcplondon.ac.uk/pubs/books/childstroke/childstroke_patientcarer.pdf).

The guideline development process has highlighted the need for research in this field to improve the quality of evidence on which clinical care is based. Research in this field is now gaining momentum, both nationally and internationally, and is likely to contribute significantly to future revisions of this document. HM

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KEY POINTS

- Childhood stroke is associated with significant morbidity and is an important cause of mortality in children.
- Acute diagnosis and investigation of children affected by stroke should be undertaken in conjunction with a tertiary paediatric neurology service; longer-term care should be undertaken jointly by hospital and community child health services, in liaison with educational and social services.
- A different diagnostic approach is required when investigating childhood rather than adult stroke.
- Acute management and secondary prevention will depend on the underlying risk factors identified and are discussed in detail in the guidelines.
- Longer term effects of stroke, particularly on cognition or behaviour, may only become apparent over time as the individual grows and develops.