PERSONAL PRACTICE

Pain management

Ann Goldman

Interest in pain in children, both in clinical practice and research, has been increasing recently after many years of neglect. However it is still a difficult area; different opinions and practices are common and while some aspects have attracted attention others are still poorly understood. Pain is a complex sensation, partly related to the physical damage causing it, but also influenced by many psychological, social, and cultural factors. While this can make the situation more confusing it also offers the possibility of combining different approaches to relieve pain.

The subjective nature of pain has always made it difficult to assess. In children there are extra problems because of their wide range of mental and physical development and their limited experience and communication skills. Pain is not only a subjective experience for the child who is suffering but also for the observers – parents, nurses, and doctors. We each bring our own, sometimes unrecognised, moral and cultural attitudes. Ideas such as ‘strength through suffering’, ‘respect for stoicism’, or ‘pain as punishment’ are widespread in our history and literature and can influence our practice. Many myths, particularly about opioids and their use, still exist both for medical and nursing staff and parents; these too can affect the treatment a child in pain receives. From a practical point of view, the immediate management problems on the ward often fall to the junior staff, whose lack of experience and information in the use of analgesics in children often makes them over cautious.

Assessment

Careful assessment of a child in pain is essential before an effective plan of management can be developed. Although this can present problems it has been an area of active research, especially by psychologists and nurses, and there are now a number of imaginative, practical, and well validated methods available.^{1,2} The method used needs to be chosen carefully to reflect the child’s age, cognitive development, and the clinical situation. If possible subjective methods are preferable; visual analogue and numerical scales are suitable for older children and more concrete variations of these have been designed for younger children. Graded scales of facial expression, either as drawings³ or photographs^{4,5} have been designed for those as young as 3–4 years. Other ideas include colour scales,^{6,7} body charts,

and a ‘poker chip tool’,⁸ which encourages the child to represent pain as pieces of hurt, which they can then quantify. More detailed questionnaires that look at the broad picture of the child’s pain, including history and affective aspects, are available and may be more helpful for chronic and recurrent pain.^{3,9}

In babies, infants, and handicapped children subjective methods are not possible. Behavioural scales are being developed using observation of facial expression, body movements, and cry patterns but parents’ and nurses’ opinions are still relied on in most situations. Physiological measures such as cardiovascular changes, hormonal concentrations, and palmar sweating, have been used to reflect stress after acute pain in neonates, and work continues to try to correlate these with the babies’ behavioural state and to try to understand what the changes mean in terms of feelings.^{10,11}

Although formal pain measures are often part of pain studies, routine clinical use is not yet common. Introducing them can help raise staff awareness of children’s pain and their concern to treat it. They can help the child, enabling him or her to explain the pain more clearly and so give the staff a full picture. When a form of treatment has been started regular use of a scoring system can help assess its value.

Management

It is helpful when planning management to consider whether the pain is acute, chronic, or recurrent and also to identify both the physical and psychological components. Acute pains include those clearly linked with tissue damage such as trauma, burns, or diseases such as cancer or sickle cell crisis. Many acute pains are a result of medical intervention such as procedures or surgery. Chronic pain may occur with prolonged illness, for example arthritis or cancer, or pain which continues beyond the expected time for recovery, as with reflex sympathetic dystrophy. Chronic persistent pain such as backache is uncommon in children but recurrent episodic pain, in the form of headaches, abdominal and limb pains, do occur quite frequently and can prove difficult management problems.

According to the circumstances, treatments can be chosen and combined from a variety of approaches. I will review these briefly and then focus on some particular clinical situations in which there have been developments and improvements.

Department of
Haematology and
Oncology, Hospital for
Sick Children, Great
Ormond Street, London
WC1N 3JH

Correspondence to:
Dr Goldman.

DRUGS

Drugs form the backbone of treatment for many children, especially those with a strong physiological component to their pain. Adequate and regular doses are important, with frequent review, so they can be adjusted according to the individual patient's needs. Oral administration is preferable, unless it is not possible, when intravenous, subcutaneous, or rectal routes can be used. Intramuscular injections, particularly repeated ones, should be avoided.

In general, with analgesics, a progression from a mild drug such as paracetamol, to a moderate weak opioid such as codeine, and then a strong opioid such as morphine, is followed. As paracetamol acts peripherally and the opioids centrally, they can be combined. Although a variety of other, newer drugs are available, they have not shown advantages over the familiar ones, which are well tried and effective.

Additional drugs are useful in particular situations. The non-steroidal anti-inflammatory agents are effective moderate strength pain relievers, especially for pain such as arthritis, with a prominent inflammatory component, and the pain of bony metastases from cancer. Pain from nerve damage, which has a characteristic burning, tingling, and shooting nature, is relatively unresponsive to opioids, but may be helped by antiepileptics such as carbamazepine and low dose amitriptyline.

PSYCHOLOGICAL APPROACHES

These should not be reserved for children whose pain has no clear pathological cause. Fear, anxiety, and stress contribute to all painful experiences and concern to reduce them should be part of every comprehensive treatment plan. At the simplest level this involves providing information, preparation, and reassurance and as parents are likely to give the child the greatest sense of security, they should be involved and included. Work with books, play, and art under the guidance of a play specialist can help a child's understanding and sense of control.¹²

Behavioural and cognitive treatment approaches can be used to try to modify behaviour associated with pain and to teach self management, relaxation, and coping skills. These have been helpful with some forms of chronic and recurrent pains¹³ and also for children facing multiple procedures.¹⁴

The response to a noxious stimulus is reduced when attention is focused elsewhere and deliberate distraction techniques can be employed, especially during procedures. The activity needs to be age appropriate and of sufficient interest: blowing bubbles, reading an interactive story, or a new computer game might qualify.

Hypnosis has been used as a tool in pain management and, although its mode of action is not well understood, it can be very effective.¹⁵⁻¹⁷ Children are often excellent subjects, there are no side effects and they enjoy the experience. A therapist with skill and imagination can help the child get pain relief as they take part in fantastic adventures, travel to magical lands, or learn to 'turn off' painful parts of their body.

ANAESTHETIC PROCEDURES

Many types of techniques can be used successfully in children, including extradurals, plexus and regional blocks, and wound infiltration. They are being used increasingly perioperatively and are reviewed in the anaesthetic literature.¹⁸ It is unusual to use them in other circumstances, although occasionally they may be of help for children with malignant disease. Local anaesthetic creams such as Emla (mixture of lignocaine/prilocaine, Astra) applied to the skin can reduce the pain of venepuncture and have also been used with some effect before lumbar puncture. Transcutaneous electrical nerve stimulation (TENS) is a procedure whereby one or more electrodes are placed on the skin, and it delivers a low intensity, high frequency current at the site of the pain, from a portable unit. It has been used in adult practice to treat chronic pain, particularly of sympathetic or neural origin, and there are some reports of success with similar pains in children.

Cancer

Management of children with progressive malignant disease has benefited from the developments of palliative care in adult medicine and from the introduction of paediatric oncology nurse specialists, who extend the experience of the specialist centres into the community, enabling families to care for their dying child at home if this is their desire.

Although the majority (80%) of children dying from progressive cancer will require strong analgesia,¹⁹ good pain relief is possible for almost all of them. Detailed assessment is important to distinguish between different pains and, if possible, their causes so that a logical plan of management can be made. Analgesics are important but benefit may be gained from combining them with other modalities. The plan should be made in cooperation with the child and family so they can retain their sense of control. It is essential to spend time with all families, and particularly those who are caring for a child at home: answering their questions, exploring their fears, ensuring that they are able to manage not only the routine analgesia but also that they have confidence to deal with fluctuations in pain and have a plan in case of problems.

The introduction of long acting morphine sulphate preparations has been very helpful for children, reducing the frequency of medication and making care at home easier. If the child's pain is no longer relieved by a moderate strength analgesic, an appropriate starting dose of morphine sulphate is 1 mg/kg twice daily.²⁰ This should be titrated with the child's pain and increased accordingly. It is always necessary to prescribe a short acting morphine preparation at the same time, which can be used for breakthrough pain and also prophylactic laxatives. Long acting analgesia is also possible with crushed slow release morphine sulphate tablets taken orally or whole tablets administered rectally, although these are not the manufacturers recommendations.^{20,21} If oral medication is no longer possible, the use of a simple pump to give a continuous subcutaneous infusion of opioids is

invaluable, and most families are willing and able to learn how to draw up drugs, reload the pump, and even resite subcutaneous needles.

Patient controlled analgesia (PCA)

With PCA the child himself can trigger bolus doses of intravenous or subcutaneous analgesia by using a hand held button connected to a microprocessor controlled infusion pump. The system can be preset to give a background dose. Safety is ensured by setting the level of the bolus, the lockout time between boluses, and the total dose over a period of time. It has been used effectively in adults and has been extended to children recently.¹⁸

PCA helps to compensate for individual variation in the perception of pain and also individuals' different responses to opioids. It seems particularly suited to the management of pain after surgery and the acute pain of sickle cell crises, both of which tend to be severe initially, require intravenous opioids, and resolve over a period of days. Time is needed to explain the system beforehand, and while some children appreciate the increased sense of control and responsibility given with PCA, others prefer a conventional continuous infusion. Disadvantages include the expense of the system and limitations in dose programmes and handsets suitable for younger children.

Neonates

There is, now, a powerful body of literature refuting past beliefs that neonates do not experience pain.^{10 22 23} This has influenced attitudes to management, particularly in the intensive care unit and postoperatively, though optimal techniques are still evolving. Neonates do have an increased susceptibility to the respiratory depressant effects of opioids,²⁴ which means that care and experience are needed to ensure their safe use. Those receiving ventilatory support can be effectively and confidently treated with infusions of opiates (fentanyl 2–4 µg/kg/hour or morphine 10 µg/kg/hour). For those who are breathing spontaneously, continuous infusion of morphine at a lower dose (5–7 µg/kg/hour) with careful monitoring is suggested and is preferable to bolus doses with high peaks and troughs, risking periods of respiratory depression and periods of inadequate analgesia. Increasing use of good local and regional anaesthesia during surgery can also provide good and safe analgesia.

Conclusion

Pain causes considerable distress and fear to sick children and their families. Acknowledging and treating it should be a key component of paediatric care. Many of those involved: paediatricians, nurses, psychologists, and anaesthetists, have contributed to recent research and innovations in the management of children with pain. Each bring different and complementary skills, all of which should be available to provide the best possible care for every child.

- McGrath PA. *Pain in children: nature, assessment and treatment*. Guilford: Guilford Press, 1990.
- McGrath PJ, Unruh A. *Pain in children*. Amsterdam: Elsevier, 1987.
- McGrath PA, de Veber LL, Hearn MT. Multidimensional pain assessment in children. In: Fields HL, Dubner R, Cervero F, eds. *Advances in pain research and therapy*. New York: Raven Press, 1985; 9: 387–93.
- Beyer J, Aradine C. Content validity of an instrument to measure young children's perceptions of the intensity of their pain. *Journal of Paediatric Nursing* 1986; 1: 386–95.
- Beyer J, Aradine C. Patterns of pediatric pain intensity: a methodological investigation of a self-report scale. *Clinical Journal of Pain* 1987; 3: 130–41.
- Eland JM, Anderson JE. The experience of pain in children. In: Jacox AK, ed. *Pain: a source book for nurses and other health professionals*. Boston: Little Brown, 1977: 453–71.
- Eland JM. Minimising injection pain associated with pre-kindergarten immunizations. *Issues in Comprehensive Pediatric Nursing* 1982; 5: 361–72.
- Hester NO. The preoperational child's reaction to immunisation. *Nurs Res* 1979; 28: 250–4.
- Varni JW, Thompson KL, Hanson V. The Varni/Thompson pediatric pain questionnaire: 1. Chronic musculoskeletal pain in juvenile rheumatoid arthritis. *Pain* 1987; 28: 27–38.
- Anand KJS, Hickey PR. Pain and its effects in the human neonate and fetus. *N Engl J Med* 1987; 317: 1321–47.
- Johnston CC. Pain assessment and its management in infants. *Paediatrician* 1989; 16: 16–23.
- Peterson G. Let the children play. *Nursing* 1989; 3: 22–5.
- Masek BJ, Russo DC, Varni JW. Behavioural approaches to the management of chronic pain in children. *Pediatr Clin North Am* 1984; 31: 1113–29.
- Zeltzer LK, Jay SM, Fisher DM. Management of pain associated with paediatric procedures. *Pediatr Clin North Am* 1989; 36: 941–64.
- Zeltzer LK, Dash J, Holland JP. Hypnotically induced pain control in sickle cell anemia. *Pediatrics* 1979; 64: 533–6.
- Olness K, Macdonald J. Self-hypnosis and biofeedback in the management of juvenile migraine. *J Dev Behav Pediatr* 1981; 2: 168–70.
- Hilgard JR, LeBaron S. *Hypnotherapy of pain in children with cancer*. Los Altos, CA: William Kaufmann, 1984.
- Lloyd-Thomas AR. Pain management in paediatric patients. *Br J Anaesth* 1990; 64: 85–104.
- Goldman A, Beardsmore S, Hunt J. Palliative care for children with cancer: home, hospital, or hospice. *Arch Dis Child* 1990; 65: 641–3.
- Goldman A, Bowman A. The role of oral controlled release morphine for pain relief in children with cancer. *Palliative Medicine* 1990; 4: 279–85.
- Kaiko RF, Fitzmartin RD, Thomas GB, Goldenheim PD. Bioavailability of morphine in controlled release 30 mg tablets per rectum compared with immediate release 30 mg rectal suppositories and controlled release 30 mg oral tablets. *Pharmacotherapy* 1992; 12: 107–13.
- Fitzgerald M, Millard C, McIntosh N. Cutaneous hypersensitivity following peripheral tissue damage in new born infants and its reversal with topical anaesthesia. *Pain* 1989; 39: 31–6.
- Rogers MC. Do the right thing. Pain relief in infants and children. *N Engl J Med* 1992; 326: 55–6.
- Purcell-Jones G, Dormon F, Sumner E. The use of opioids in neonates. A retrospective study of 933 cases. *Anaesthesia* 1987; 42: 1316–20.