

with local anaesthetics. For mild pain paracetamol seems safe even in very young infants. Data on its efficacy in young children are scarce, and dosing is based primarily on the dose that is effective for controlling fever. Several non-steroidal anti-inflammatory drugs have been shown to provide analgesia in children as young as 3. Ketorolac, ibuprofen, indomethacin, and diclofenac all reduce opioid requirements after surgery.^{11 12}

The use of morphine in infants has been greatly feared. Recent work suggests that some of the "sensitivity" of newborn babies to morphine results from their slow metabolism of opioids; this matures by about 3 months of age. Morphine infusions provide a more steady effect than intermittent bolus administration, and they have been used safely and effectively in infants and children.¹³⁻¹⁵ In infants less than 6 months of age initial morphine infusion rates should be reduced (for example, 0.015 mg/kg/h versus 0.025 mg/kg/h for older infants and children). With titrated administration and an increased level of observation, morphine infusions can be used safely even in infants. Patient controlled analgesia has become extremely popular in adults because it permits the patient a sense of control and allows doses to be adjusted to individual differences. It has been shown to be extremely safe and effective in children as young as 5-7 years and may permit analgesia equivalent to continuous infusions with a smaller overall dose of morphine and fewer side effects.

Regional anaesthesia has emerged as an excellent method of pain relief in infants and children after surgery. For minor surgery peripheral nerve blockade or single shot caudal epidural blockade with the long acting local anaesthetic bupivacaine can serve as a useful adjunct to light general anaesthesia. For a child undergoing hernia repair, for example, ilioinguinal or iliohypogastric blockade can be performed either percutaneously or by the surgeon through the operative field. This approach facilitates a light plane of anaesthesia and a rapid, comfortable emergence with better analgesia and fewer side effects than with systemic analgesia.

For major thoracoabdominal or pelvic operations epidural analgesia with local anaesthetics or opioids, or both, can

provide outstanding analgesia with excellent effects on pulmonary function postoperatively. Epidural analgesia is particularly useful for children with chronic respiratory disease, such as bronchopulmonary dysplasia or cystic fibrosis.¹⁶

Pain is a complex multidimensional phenomenon, and its historical undertreatment in children reflects both the nature of pain and the attitudes towards and values concerning pain and children. Unfortunately, this lack of treatment has allowed the persistence of unnecessary suffering in children, particularly in those most vulnerable—infants and chronically and critically ill children.

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- 1 Schechter NL. The undertreatment of pain in children: an overview. *Pediatr Clin North Am* 1989;36:781-94.
- 2 LeDez KM, Lerman J. The minimum alveolar concentration (MAC) of isoflurane in preterm neonates. *Anesthesiology* 1987;67:301-7.
- 3 Anand KJS, Hickey PR. Pain and its effects in the human neonate and fetus. *N Engl J Med* 1987;317:1321-9.
- 4 Fitzgerald M. The course and termination of primary afferent fibres. In: Wall PD, Melzack R, eds. *Textbook of pain*. Edinburgh: Churchill Livingstone, 1984:34.
- 5 Benini F, Johnston C, Faucher D, Aranda JV. Topical anesthesia during circumcision in newborn infants. *JAMA* 1993;270:850-3.
- 6 Anand KJS, Sippell WG, Aynsley-Green A. Randomized trial of fentanyl anaesthesia in preterm neonates undergoing surgery: effects on the stress response. *Lancet* 1987;i:243-8.
- 7 Artand KJS, Sippell WG, Schofield NM, Aynsley-Green A. Does halothane anaesthesia decrease the metabolic and endocrine stress responses of newborn infants undergoing operation? *BMJ* 1988;296:668-72.
- 8 Anand KJS, Hansen DD, Hickey PR. Hormonal-metabolic stress response in neonates undergoing cardiac surgery. *Anesthesiology* 1990;73:661-70.
- 9 Anand KJS, Hickey PR. Halothane-morphine compared with high-dose sufentanil for anesthesia and postoperative analgesia in neonatal cardiac surgery. *N Engl J Med* 1992;326:1-9.
- 10 Hickey PR, Retzac SM. Acute right ventricular failure after pulmonary hypertensive responses to airway instrumentation: effect of fentanyl dose. *Anesthesiology* 1993;78:372-6.
- 11 Maunukela EL, Olkkola KT, Korpela R. Does prophylactic intravenous infusion of indomethacin improve the management of postoperative pain in children? *Can J Anaesth* 1988;35:123-7.
- 12 Maunukela EL, Kokki H, Bullingham RE. Comparison of intravenous ketorolac with morphine for postoperative pain in children. *Clin Pharmacol Ther* 1992;52:436-43.
- 13 Lynn AM, Ophelm KE, Tyler DC. Morphine infusion after pediatric cardiac surgery. *Crit Care Med* 1984;12:863-6.
- 14 Lynn AM, Slattery JT. Pharmacokinetics of morphine sulfate in early infancy. *Anesthesiology* 1985;63:A349.
- 15 Koren G, Butt W, Chinyanga H, Soldin S, Tan YK, Pape K. Postoperative morphine infusion in newborn infants: assessment of disposition characteristics and safety. *J Pediatr* 1985;107:963-7.
- 16 Ecoffey C, Dubouset AM, Samii K. Lumbar and thoracic epidural anesthesia for urologic and upper abdominal surgery in infants and children. *Anesthesiology* 1986;65:87-90.

Clinical genetics meets primary care

Patients should benefit

With its high technology image, clinical genetics may seem a no go subject to many general practitioners. Yet, genetic screening tests that influence general practice are developing rapidly. In this week's journal Modell describes the current state of screening for cystic fibrosis in primary care (p 849).¹

As community awareness increases, patients will expect their general practitioners to understand the implications of the new genetic tests. There may be medicolegal implications if they do not provide accurate genetic information or if they fail to refer patients. As one in 20 people will have developed evidence of a genetic condition by the age of 24,² departments of clinical genetics will clearly be unable on their own to accommodate the expected demand for genetic counselling.

Genetic services of first call will have to be based in the community.³ To achieve this two approaches have evolved; the ideal model might use both. Firstly, specialised hospital services might establish screening centres in the community, as occurred in Cyprus for the haemoglobinopathies.⁴ Alter-

natively, primary health care teams could expand their role to include basic clinical genetic services.^{5,6} Basic educational programmes and support from genetic services need to be developed⁷ because general practitioners' understanding of clinical genetics may be limited.⁸ Without education the doctor can provide merely a patient led referral service.

The primary care approach has several advantages. Genetic counselling relies on the dissemination of accurate information through families, and general practitioners can facilitate this by knowing most members of the immediate family. It is a bonus if key members of the extended family are on the same practice list. The general practitioner's knowledge of family dynamics could help in ethical dilemmas such as when a proband blocks dissemination of genetic information to the wider family.

Opportunistic contact with the family facilitates discussion of genetic issues in both the short and the long term. As general practitioners see nearly all their patients in any five

year period this strength should be used. Also, if the primary health care team is involved early, it is in a better position to provide continuing support for couples and families later found to be "at risk." General practice provides an opportunity for later targeted cascade screening—that is, investigating close relatives of people who have screened positive.^{1 6}

The rationale for genetic screening services is to provide patients with informed choice. Some doctors voice the understandable concern that demand does not exist for these services. But recently 86% of older schoolchildren favoured screening for cystic fibrosis carrier status.⁹ In Trent region, antenatal patients have responded favourably to offers of screening for cystic fibrosis discussed opportunistically by a general practitioner (J W Fenby-Taylor, personal communication) and to screening for the haemoglobinopathies.

The primary care team's role goes beyond genetic screening tests; drawing an accurate family tree must be developed as an essential basic skill.^{10 11} Family histories have begun to be recorded in family practices in North America and are often pictorially represented as a genogram.¹² Patients and general practitioners can successfully collect basic genetic information.⁶ Recording of the pedigree in primary health care would also be useful in deciding whom to refer to genetics services.

Information on families has to be collected and recorded within a reasonable time.¹⁰ Two techniques have been considered: the self administered family history questionnaire (which takes one to two hours¹³) and the structured interview (which takes about 20 minutes.¹²) Furthermore, we are extremely impressed by our patients' ability to understand pedigrees and suggest that the value of family trees prepared by patients should be researched. We need to be confident that patients' recall is accurate and that the yield of information is worthwhile; research suggests that this is likely.^{14 15} In this district we are evaluating new approaches to collaboration between general practitioners and geneticists in providing a service to a specific ethnic minority group.

The timing of the recording of the family history may be important. Although some authors advocate incorporating this into the preconceptional screening services offered to patients, older members of the family may be required to confirm and extend the information.

After such enthusiasm a few notes of caution should be sounded. Firstly, patients need to be informed fully of the consequences—for example, the implications of pre-symptomatic genetic screening for life insurance.¹⁶ Secondly,

a recent circular from the Department of Health states that future genetic services will have to be funded from present resources. Genetic services in primary care require financial backing; above all, funding for population screening should not be based on targets (as occurs for cervical cytology) as this could lead to unintentional pressure to offer the service ("supply push"⁵) at the detriment of a person's informed choice to opt out of screening.

The primary care team should have the genetic knowledge and counselling skills to offer pre-test counselling and to record family information (Modell recommends that one member of the team should be specially trained for this¹),⁶ and collaboration with departments of clinical genetics should allow coordination of post-test counselling. In this way the general practitioner would act as a filter to specialised genetic services, ensuring their most efficient use.

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- 1 Modell M. Screening for carriers of cystic fibrosis—a general practitioner's perspective. *BMJ* 1993;307:849-52.
- 2 Baird PA, Anderson TW, Newcombe HB, Lowry RB. Genetic disorders in children and young adults: a population study. *Am J Hum Genet* 1988;42:677-93.
- 3 Royal College of Physicians of London. *Prenatal diagnosis and genetic screening: community and service implications*. London: RCP, 1989.
- 4 Angastiniotis M, Kyriakidou S, Hadjiminias M. How thalassaemia was controlled in Cyprus. *World Health Forum* 1986;7:291-7.
- 5 Bekker H, Modell M, Dennis G, Silver A, Mathew C, Bobrow M, *et al*. Uptake of cystic fibrosis carrier testing in primary care: supply push or demand pull? *BMJ* 1993;306:1584-7.
- 6 Harris H, Scotcher D, Hartley N, Wallace A, Craufurd D, Harris R. Cystic fibrosis carrier testing in early pregnancy by general practitioners. *BMJ* 1993;306:1580-3.
- 7 Burn J. Screening for cystic fibrosis in primary care. *BMJ* 1993;306:1558-9.
- 8 Firth HV, Lindenbaum RH. UK clinicians' knowledge of and attitudes to the prenatal diagnosis of single gene disorders. *J Med Genet* 1992;29:20-3.
- 9 Cobb E, Holloway S, Elton R, Raeburn JA. What do young people think about screening for cystic fibrosis? *J Med Genet* 1991;28:322-4.
- 10 Zander LL, Beresford SAA, Thomas P. *Medical records in general practice*. London: Royal College of General Practitioners, 1978. (Occasional paper No 5.)
- 11 Royal College of Physicians of London. *Teaching genetics to medical students*. London: RCP, 1990.
- 12 Rogers J, Durkin M. The semi-structured genogram interview. I: Protocol, II: Evaluation. *Family Systems Medicine* 1984;2:176-87.
- 13 Cole J, Conneally PM, Hodes ME, Merritt AD. Genetic family history questionnaire. *J Med Genet* 1978;15:10-8.
- 14 Love RR, Evans AM, Josten DM. The accuracy of patients' reports of a family history of cancer. *J Chronic Dis* 1985;4:289-93.
- 15 Langer A, Kudart E. Construction of a family pedigree in genetic counselling before amniocentesis. *J Reprod Med* 1990;35:715-8.
- 16 Harper PS. Insurance and genetic testing. *Lancet* 1993;341:224-7.

Presenting expert evidence in criminal proceedings

Recommendations will help expert witnesses

Presenting evidence in criminal courts can be stressful and even intimidating. In the wake of recent serious miscarriages of justice, highlighted by the release of the Guildford four and the Birmingham six in particular, the Royal Commission on Criminal Justice has investigated in detail the role of expert evidence in criminal cases.¹ Although scientific evidence has come under particularly close scrutiny, the commission has emphasised that the objectivity and presentation of all expert evidence are important, from whichever discipline it comes.

The commission has accepted that scientific evidence has not always been presented in such a way that counsel, judges, and juries have been able to understand its nature and

meaning. Its recommendations aim to ensure that evidence is presented by properly qualified experts who perform this task objectively and impartially and that the quality of evidence should conform to measurable standards whenever possible.

Because of the need for expert witnesses to understand legal as well as scientific issues the commission has recommended the development of specific qualifications over and above professional qualifications to allow courts to assess the competence of experts. It acknowledges, however, that any new qualifications could never be more than desirable additions to professional qualifications. It also recommends that visits to laboratories should be part of the vocational