Pharmaceutical changes on the path through childhood and adolescence

Paediatric pharmacists met recently to discuss the pharmaceutical care of adolescents. **Peter Mulholland** reports

In the keynote presentation on chronic illness in adolescents, Dennis Carson, consultant paediatrician at the Royal Belfast Hospital for Sick Children, said that the care of the adolescent patient with a chronic illness has been poorly organised in the UK compared with in other countries. Patients experience difficulties in moving from a child-centred to an adult-oriented health care system. Often the transfer to an adult clinic occurs during a crisis. Conversely, there is also long-term attendance at paediatric clinics as a result of failure "to let go" by paediatricians. As a result, many adolescents are lost within the system to the detriment of their clinical care. Transferring from a paediatric to an adult clinic is only one part of a transition process. Present practice is largely based on personal experience and requires further evaluation. Paediatricians must assume a greater responsibility to ensure transitional care is improved for the long-term benefit of their patients.

Adolescents comprise about 14 per cent of the population and will visit their GP on average once per year — but they have the shortest consultation of all patient types. Mortality in this group has fallen less than in any other age group in childhood. Adolescents have little concern on the long-term effects of their current lifestyle. Type 1 diabetes is often first diagnosed in adolescence but teenagers involved often do not believe it will affect them because they feel well. HbA_{1c} reflects plasma glucose over a two to three month period and the recorded levels in diabetic adolescents are much higher than in the general diabetic population. This leads to potential problems before their 30th birthday, eg, the need for laser eye treatment.

Dennis Carson: adolescent health care poorly organised in the UK

Treatment regimens should be as simple as possible to follow — the more frequent the injection the less the regimen is adhered to. A study in Dundee showed that only about 1/3 of all insulin prescribed was actually collected.

A survey of young adults showed the preferred age to transfer into adult care was between 17 and 20 years of age. They wanted informality and an approachable doctor. Belfast has now set up a number of transitional clinics where adolescent clinics are held in adult clinics, but with paediatricians present to smooth the transition. The service will be re-evaluated to assess it impact.

Child protection and ethical issues

Speaking on child protection, Andrew Thomson, consultant paediatrician at the Royal Belfast Hospital for Sick Children, said that pharmacists, like other professionals, often come into contact with children and their families.

Recent high profile child protection cases, and the inquiries that have ensued, have emphasised the importance of working together to protect vulnerable children. All professionals working directly with children must have an understanding of how to recognise abuse and know the procedures involved in the referral process set down in their local or area child protection policies and protocols.

The Royal Pharmaceutical Society has recently issued guidance to all practitioners regarding their roles and responsibilities in child protection (*PJ*, 6 August, p175). This document sets out to inform pharmacists of the potential indicators of abuse, their duty of care to report concerns to an appropriate authority and the sharing of information when this is deemed in the best interest of the child.

The National Society for the Prevention of Cruelty to Children website reports that 7 per cent of children experienced serious physical abuse at the hands of their parents or carers during childhood. Vulnerable children include those who were premature or the result of unwanted/unplanned pregnancies, and those who were disabled or had learning difficulties. Abuse crosses social boundaries.

There is a move away from preparations that could potentially lead to charges of abuse, eg, rectal diazepam for seizures is being replaced with buccal midazolam. Pharmaceutical companies need to explore alternative dosage forms, eg, transmucosal, nasal and transdermal forms, for children's medicines.

Bob Taylor: older children must be involved in their own care decisions

For infants and young children the best interests of the child are paramount said Bob Taylor, consultant anaesthetist, Royal Belfast Hospital for Sick Children. This may lead to conflict with the health care team and parents. It is not uncommon for doctors to seek a court ruling on difficult decisions. There have been several landmark court decisions in the US and the UK about whether futile or hopeless treatments should be undertaken in specific cases. In the Royal Belfast Hospital for Sick Children, a clinical ethics committee was formed five years ago. It provides advice and arbitration for clinicians and families to assist in the resolution of conflicts. With older children there is widespread acceptance that they must be involved in decisions about their own care.

Death and dying

In 1979, Campbell and Duff stated: "Modern medical technology has brought great benefits to patients but has blurred traditional concepts of life and death and created new dilemmas for practising doctors". They continued: "While this technology has given doctors great control over living and dying,

(Continued on p643)

The **Neonatal and Paediatric Pharmacists Group conference** was held in Belfast, Northern Ireland, from 28 to 30 October

(Continued from p638)

their dominance in critical decision making is being challenged." Dr Taylor said that it is this critical decision making that must be addressed.

Good written guidance is available from the General Medical Council and the Royal College of Paediatrics and Child Health. The RCPCH recognises five instances when life-sustaining treatments may be justifiably withdrawn or withheld.

There is a general acceptance that multi-professional team working is essential for providing high standards of care to patients. However only recently has inter-professional education (IPE) become a major issue for undergraduate teaching. At Queen's University Belfast a successful IPE course has been established for three years. This involves final-year medical, pharmacy and nursing students working through ethics cases and being facilitated by teachers from all three professions.

Supplementary prescribing for neonates

The introduction of supplementary prescribing for pharmacists enables pharmacists to extend their clinical role. Peter Mulholland, neonatal pharmacist, Southern General Hospital, Glasgow, reported the experience of introducing pharmacist supplementary prescribing in a neonatal intensive care unit (NICU).

Supplementary prescribing is designed for areas where there is a long-term relationship with a patient. As such, in many wards areas with high turnaround, it may not be suitable. In an NICU, where a baby may be an inpatient for many months, this relationship with the patient, and his or her parents, is developed during the period of care. The unique situation in the NICU also poses a different challenge in that the patient is not able to give consent. This is obtained, usually from the mother. However thought is needed as to when to obtain consent with the mother having gone through the emotional trauma of an early birth, with a potentially uncertain future for her child. To this end use is made of the provision for the clinical management plan (CMP) to be in electronic form and consent is recorded in the patient notes.

Treatments currently being prescribed under CMPs include neonatal total parenteral nutrition, anti-infective therapy, treatment for chronic lung disease, reflux treatment and medication for apnoea. The first prescription written was for an antibiotic for a 540g neonate. Although advice on the required dosage is something that the pharmacist would normally have been involved in, the act of writing this first prescription, knowing that the medicine would be given based on what was written, was an unusual experience.

Experience so far has shown that pharmacist prescribing of TPN makes no difference to the pharmaceutical care of the patient. This was to be expected since in the unit, as with many units, the pharmacist is already an integral part of the decision-making process for TPN. However the experience in the other treatment areas has shown that pharmacist supplementary prescribing has resulted in an improvement in the treatment plans for these patients. In addition this new role can assist with junior doctor training, rather than being seen as resulting in a potential deskilling of medical staff in prescribing, as the pharmacist is seen as an integrated member of the prescribing team, not as "policeman" checking up on prescribing.

Excipients and children

The National Service Framework for Children states that hospitals should have policies and procedures for safe medicine practice in paediatrics. This includes ensuring that the drug formulations used are appropriate to the age and capability of the child, although there are currently no national guidelines to aid formulation choices in children. Toxicity from excipients is uncommon, but the risk appears to be greater in children, who are often exposed to higher mg/kg doses than adults. Penny North-Lewis, paediatric liver pharmacist, Leeds Teaching Hospitals, reported on a project investigating the adverse effects of some commonly used excipients, especially those reported in children.

Information on the adverse effects and acceptable intakes of the chosen excipients was collected. A vast amount of information was available, much of which was contradictory, highlighting that there is still much research required in this area. A common excipient is ethanol. In the only commercially available preparation of phenobarbital (15mg/5ml elixir) it is present at a concentration of 38 per cent. In a 3kg baby given a dose of 5mg/kg this will result in a blood ethanol concentration of 83mg/100ml. The legal limit for drink driving is 80mg/100ml.

A table has been produced to be used by paediatric pharmacists as a reference on the effects of excipients in children, and the purchasing team as part of their criteria for selecting formulations to stock within the trust. The use of this information will be monitored and its impact on formulation choices assessed. In the future it is planned to expand the project to include more excipients such as dyes and colours.

It adds a new dimension to clinical pharmacy, with pharmacists having to calculate excipient concentrations as well as checking drug doses.

Evidence-based treatments in children

There is increasing international concern regarding the fact that many of the drugs used in children admitted to hospital have not been adequately tested for such use and so are used in an off-label or unlicensed way. Traditional pharmacokinetic studies used in the licensing of medicines, involving multiple sampling over prolonged periods of time, raise particular ethical issues in children and can be particularly problematic in neonates. To overcome these problems a research team at Queen's University Belfast, led by James

Penny North-Lewis: new results on effects of excipients in children

James McElnay: ethical issues over pharmacokinetic studies in children

McElnay, has been focusing on a population pharmacokinetics approach, coupled with the development of micro-analytical techniques to quantify blood concentrations of drugs. With this approach, blood samples (increasingly as dried blood spots) are obtained from neonates or children who have been prescribed an off-label medicine. The samples are usually obtained at times when a blood sample is being taken for another clinical purpose. The child is assessed for clinical outcome (eg, pain control) and the concentration of the drug is quantified. Data are collected from a range of children receiving individual medicines in this manner to allow population pharmacokinetic/pharmacodynamic analyses to be carried out for the drugs of interest. Drugs currently under investigation include diclofenac for pain, metronidazole for necrotising enterocolitis in neonates and ranitidine for stress ulceration. This is work in progress and it is hoped that via government support to industry and research networks, the next five to 10 years will see a major increase in evidence available for the safe and effective use of medicines in children.