Subdural fat effusion complicating parenteral nutrition

clavian veins, superior vena cava, and intra-
cerebral venous sinuses showed no evidence of
thrombosis or anatomical abnormality. Cystic
changes were evident in both occipital poles of
the brain.

Discussion
Percutaneous central venous catheters provide
reliable venous access in the newborn1 and are
widely used for delivering parenteral nutrition.2
In contrast to the major complication of sepsis,
serious mechanical catheter related problems are
rarely encountered.3 4 Two previous cases of
parenteral feeding solution accumulating in the
subdural space have been described in preterm
infants but neither case came to postmortem
examination.5 6 In one of these patients the
catheter tip was situated in the superior vena
cava and swelling of the neck several hours after
onset of neurological symptoms suggested a
relationship between subdural effusion and
superior vena cava thrombosis.7 In the second
case report the catheter tip was left in the
temporal vein with no clinical evidence of vessel
occlusion, although the authors postulated a
probable septic thrombosis.8

In the only case that has been subjected to
a full postmortem examination our findings indicate that a subdural collection of intra-
venous feeding fluid may occur in the absence of
venous thrombosis or apparent anatomical
abnormality. This being the case, we would
agree with suggestions that retrograde flow of
parenteral nutrition infusion along the internal
jugular vein to the transverse sinus, sagittal
sinus and, via a ruptured bridging vein into the
subdural space, is the likely mechanism.
Together with bronchopulmonary dysplasia,
raised pulmonary vascular resistance might have
been the cause of increased venous pressure giving rise to retrograde flow.
Subdural accumulation of intravenous
feeding fluid appears to be a very rare complica-
tion of parenteral nutrition given via a mis-
placed central venous catheter. It would seem
prudent whenever possible to site the tip of the
catheter within the mid right atrium in an
attempt to minimise the risk of venous throm-
bosis or retrograde flow. Acute onset of neu-
rological symptoms in an infant with a central
venous catheter should raise the possibility of a
subdural effusion.

We would like to thank Dr S Varian for his help with the postmortem examination of this case.

A national survey of nebuliser use

Helena J Childs, Carol A Dezateux

Abstract
Nebuliser drug delivery units were reused in
15% of paediatric wards participating in a
national survey, while routine servicing and
written information was provided by only half
the wards issuing home nebulisers. Written
information should be developed as a national
resource, and further research on optimal
cleaning practices is required.

Nebulisers are commonly used to treat children
with severe asthma or cystic fibrosis in hospital
and are increasingly prescribed for home treat-
ment of very young children and those with
chronic disease. While this may reduce the need
for hospital admission, particularly of children
with chronic conditions, it has been suggested
that over-reliance on nebulised bronchodilators
and inadequate supervision and education may
increase the risk of life threatening asthmatic
episodes.1 Nebuliser drug delivery units are
manufactured for use by a single patient only,
and though reuse may save money, potential
hazards include bacterial contamination2 and
loss of efficiency of drug delivery. A recent
King's Fund conference concluded that reuse of
items manufactured for single patient use was
undesirable and recommended development of
guidelines governing reuse at district levels.3
This survey aimed to determine current
cleaning and reuse practices and to obtain
information on the advice and support given to
parents issued with a home nebuliser in a
nationally representative sample of paediatric
wards in England. We also sought to establish
whether guidelines governing reuse were avail-
able at district health authority level.
Methods
Three district general hospitals selected at random from each of the 14 regional health authorities in England, and all regional, teaching, and specialist hospitals were included. Verbal informed consent to take part was obtained from the nurse in charge of each ward and a standard questionnaire administered at a subsequent prearranged time. All contact was by telephone (HJC).

Information was obtained for each ward on the following: (i) number of beds, (ii) number of children with asthma and cystic fibrosis admitted in the preceding calendar month; (iii) type of nebuliser drug delivery unit used, (iv) cleaning and reuse practices during an individual child’s course of treatment and between children, and (v) existence of a written ward policy for cleaning and reuse of drug delivery units. Staff responsible for issuing home nebulisers were identified, and details of advice on medical treatment, written material available for parents and children, as well as cleaning, operating, and servicing of home nebulisers obtained.

All district general managers in England were contacted by post to establish whether written guidelines on the cleaning and reuse of drug delivery units were available in their district.

Results
Two of the 77 wards contacted between February and August 1990 had closed and the nurse in charge of one ward refused to participate. Questionnaires were completed for 74 wards (96%) of which 43 were general paediatric, 29 medical paediatric, and two specialist respiratory wards. Most wards (n=60) had less than 30 beds. Information on admissions was available for 54 wards (73%): all had admitted children with cystic fibrosis in the calendar month preceding the questionnaire.

The System 22 or Hudson nebuliser drug delivery units were most frequently used (44 wards). The drug delivery unit was not changed in 56 wards (76%) during an individual child’s course of treatment. Between drug doses, the drug delivery unit was not cleaned in 29 wards (39%), while in the remaining 45 the most frequent method of cleaning was washing with soap and water and drying. The drug delivery unit was kept at the child’s bedside in 69 wards, and in 54 of these it was stored open to the atmosphere.

Although discarded in most wards when an individual child’s course of treatment had been completed, the drug delivery unit was reused for another child in 11 wards (15%), 10 of which were admitting children with cystic fibrosis as well as asthma. Before reuse, the drug delivery unit was cleaned with soap and water and dried (six wards), or cleaned in sterilisation solution (two wards), or sent to be resterilised (three wards). A ward policy on cleaning and reuse of nebuliser drug delivery units was available in only 17 wards.

All but two wards issued home nebulisers. In 52 (72%) of these, nursing and medical staff were jointly involved in educating parents on issues such as drug dose, frequency of doses and when to seek medical advice. In 51 wards (71%), nursing staff alone were responsible for instructing parents on the operation of the home nebuliser and cleaning of the drug delivery unit.

Written information for parents was provided in only 42 in charge of each ward and a standard questionnaire administered at a subsequent prearranged time. All contact was by telephone (HJC).

Information was obtained for each ward on the following: (i) number of beds, (ii) number of children with asthma and cystic fibrosis admitted in the preceding calendar month; (iii) type of nebuliser drug delivery unit used, (iv) cleaning and reuse practices during an individual child’s course of treatment and between children, and (v) existence of a written ward policy for cleaning and reuse of drug delivery units. Staff responsible for issuing home nebulisers were identified, and details of advice on medical treatment, written material available for parents and children, as well as cleaning, operating, and servicing of home nebulisers obtained.

All district general managers in England were contacted by post to establish whether written guidelines on the cleaning and reuse of drug delivery units were available in their district.

Two of the 77 wards contacted between February and August 1990 had closed and the nurse in charge of one ward refused to participate. Questionnaires were completed for 74 wards (96%) of which 43 were general paediatric, 29 medical paediatric, and two specialist respiratory wards. Most wards (n=60) had less than 30 beds. Information on admissions was available for 54 wards (73%): all had admitted children with cystic fibrosis in the calendar month preceding the questionnaire.

The System 22 or Hudson nebuliser drug delivery units were most frequently used (44 wards). The drug delivery unit was not changed in 56 wards (76%) during an individual child’s course of treatment. Between drug doses, the drug delivery unit was not cleaned in 29 wards (39%), while in the remaining 45 the most frequent method of cleaning was washing with soap and water and drying. The drug delivery unit was kept at the child’s bedside in 69 wards, and in 54 of these it was stored open to the atmosphere.

Although discarded in most wards when an individual child’s course of treatment had been completed, the drug delivery unit was reused for another child in 11 wards (15%), 10 of which were admitting children with cystic fibrosis as well as asthma. Before reuse, the drug delivery unit was cleaned with soap and water and dried (six wards), or cleaned in sterilisation solution (two wards), or sent to be resterilised (three wards). A ward policy on cleaning and reuse of nebuliser drug delivery units was available in only 17 wards.

All but two wards issued home nebulisers. In 52 (72%) of these, nursing and medical staff were jointly involved in educating parents on issues such as drug dose, frequency of doses and when to seek medical advice. In 51 wards (71%), nursing staff alone were responsible for instructing parents on the operation of the home nebuliser and cleaning of the drug delivery unit.

Written information for parents was provided in only 42 in charge of each ward and a standard questionnaire administered at a subsequent prearranged time. All contact was by telephone (HJC).

Information was obtained for each ward on the following: (i) number of beds, (ii) number of children with asthma and cystic fibrosis admitted in the preceding calendar month; (iii) type of nebuliser drug delivery unit used, (iv) cleaning and reuse practices during an individual child’s course of treatment and between children, and (v) existence of a written ward policy for cleaning and reuse of drug delivery units. Staff responsible for issuing home nebulisers were identified, and details of advice on medical treatment, written material available for parents and children, as well as cleaning, operating, and servicing of home nebulisers obtained.

All district general managers in England were contacted by post to establish whether written guidelines on the cleaning and reuse of drug delivery units were available in their district.

Two of the 77 wards contacted between February and August 1990 had closed and the nurse in charge of one ward refused to participate. Questionnaires were completed for 74 wards (96%) of which 43 were general paediatric, 29 medical paediatric, and two specialist respiratory wards. Most wards (n=60) had less than 30 beds. Information on admissions was available for 54 wards (73%): all had admitted children with cystic fibrosis in the calendar month preceding the questionnaire. The System 22 or Hudson nebuliser drug delivery units were most frequently used (44 wards). The drug delivery unit was not changed in 56 wards (76%) during an individual child’s course of treatment. Between drug doses, the drug delivery unit was not cleaned in 29 wards (39%), while in the remaining 45 the most frequent method of cleaning was washing with soap and water and drying. The drug delivery unit was kept at the child’s bedside in 69 wards, and in 54 of these it was stored open to the atmosphere.

Although discarded in most wards when an individual child’s course of treatment had been completed, the drug delivery unit was reused for another child in 11 wards (15%), 10 of which were admitting children with cystic fibrosis as well as asthma. Before reuse, the drug delivery unit was cleaned with soap and water and dried (six wards), or cleaned in sterilisation solution (two wards), or sent to be resterilised (three wards). A ward policy on cleaning and reuse of nebuliser drug delivery units was available in only 17 wards.

All but two wards issued home nebulisers. In 52 (72%) of these, nursing and medical staff were jointly involved in educating parents on issues such as drug dose, frequency of doses and when to seek medical advice. In 51 wards (71%), nursing staff alone were responsible for instructing parents on the operation of the home nebuliser and cleaning of the drug delivery unit.

Written information for parents was provided in only 42 in charge of each ward and a standard questionnaire administered at a subsequent prearranged time. All contact was by telephone (HJC).

Information was obtained for each ward on the following: (i) number of beds, (ii) number of children with asthma and cystic fibrosis admitted in the preceding calendar month; (iii) type of nebuliser drug delivery unit used, (iv) cleaning and reuse practices during an individual child’s course of treatment and between children, and (v) existence of a written ward policy for cleaning and reuse of drug delivery units. Staff responsible for issuing home nebulisers were identified, and details of advice on medical treatment, written material available for parents and children, as well as cleaning, operating, and servicing of home nebulisers obtained.

All district general managers in England were contacted by post to establish whether written guidelines on the cleaning and reuse of drug delivery units were available in their district.

Two of the 77 wards contacted between February and August 1990 had closed and the nurse in charge of one ward refused to participate. Questionnaires were completed for 74 wards (96%) of which 43 were general paediatric, 29 medical paediatric, and two specialist respiratory wards. Most wards (n=60) had less than 30 beds. Information on admissions was available for 54 wards (73%): all had admitted children with cystic fibrosis in the calendar month preceding the questionnaire. The System 22 or Hudson nebuliser drug delivery units were most frequently used (44 wards). The drug delivery unit was not changed in 56 wards (76%) during an individual child’s course of treatment. Between drug doses, the drug delivery unit was not cleaned in 29 wards (39%), while in the remaining 45 the most frequent method of cleaning was washing with soap and water and drying. The drug delivery unit was kept at the child’s bedside in 69 wards, and in 54 of these it was stored open to the atmosphere.

Although discarded in most wards when an individual child’s course of treatment had been completed, the drug delivery unit was reused for another child in 11 wards (15%), 10 of which were admitting children with cystic fibrosis as well as asthma. Before reuse, the drug delivery unit was cleaned with soap and water and dried (six wards), or cleaned in sterilisation solution (two wards), or sent to be resterilised (three wards). A ward policy on cleaning and reuse of nebuliser drug delivery units was available in only 17 wards.

Discussion
Given the reported increase in hospital admissions for asthma in the UK and the rising number of nebulisers bought or supplied for use at home, the findings from this survey give cause for concern. Although manufactured specifically for single patient use, drug delivery units were reused in a number of paediatric wards. Almost all of these admitted children with cystic fibrosis, and reuse may increase the risk of bacterial cross infection to all children receiving nebulised therapy. It is unclear to what extent a drug delivery unit may be reused, even for a single child, and to what extent its reuse may impair the efficiency of drug delivery. This could be of particular importance in the home when repeated use may occur for many months. Further research is needed on the optimal duration of use of the drug delivery unit.

It was of concern that there was no routine servicing of home nebulisers in almost half the wards, and servicing twice a year in only one third. District general managers need to be alerted to recently published guidelines on nebuliser maintenance. No policy on cleaning and reuse was available in more than half of district health authorities, and, even when available, nurses in charge of paediatric wards were frequently unaware of its existence.

There is a dearth of written information for parents and children issued with home nebulisers. Producing clear written information is a major undertaking and this should be developed as a national guideline for departments of specialist hospitals as well as children, who, as they grow up, become increasingly responsible for their own treatment.

We would like to thank all of the nurses and district general managers who participated in this survey and Mark Whiting for commenting on questionnaire design. HJC was supported by the National Asthma Campaign and CAD by a Wellcome Research Training Fellowship in Clinical Epidemiology and the National Asthma Campaign.
Familial infantile oesophageal achalasia

T K Kaar, R Waldron, M S Ashraf, J B G Watson, M O'Neill, W O Kirwan

Abstract

Oesophageal achalasia is uncommon in children and in its familial form it is a rarity. The presentation and management of two male siblings who presented with oesophageal achalasia as infants are reported. A high degree of consanguinity in the parents of the children existed, suggesting autosomal recessive transmission.

Oesophageal achalasia is a disease of unknown aetiology characterised by a functional obstruction of the lower oesophagus due to failure of relaxation of the lower oesophageal sphincter and altered motility of the body and distal oesophagus. It is an uncommon disease, usually presenting in adult life, and its occurrence in childhood is rare. Occasionally it occurs in a familial form. We report two male siblings who presented with oesophageal achalasia during infancy and who underwent corrective surgical treatment.

Case reports

The parents of the children were first cousins. Clinical examination and laboratory investigations excluded any syndromic type of achalasia in both cases.

CASE 1

A first born boy presented at 5 months of age with recurrent respiratory tract infection, abdominal distension, and failure to thrive. A barium swallow performed showed typical features of achalasia. At operation at the age of 10 months the child underwent a trans-abdominal modified Heller's anterior oesophagomyotomy of 8 cm length and Nissen fundoplication. The child is now well and thriving after three years of follow up.

CASE 2

The second and only other child in the family was also male and presented at 8 months of age with a history of respiratory tract infections, regurgitation and vomiting, and failure to thrive since birth. Barium swallow was performed which again showed the features of well established achalasia (figure). Operation was performed at 10 months of age and again a transabdominal modified Heller's anterior oesophagomyotomy (8.5 cm long) with Nissen fundoplication was performed. The child made a good recovery postoperatively and is now thriving after six months of follow up.

Discussion

Achalasia of the oesophagus is uncommon with an incidence estimated at approximately one per 100 000 population per year.1 In children achalasia is rare with only 2% of all cases presenting before the age of 6 years.2

A familial form of achalasia presenting in infant siblings was first described by Thibert et al in 1965.3 Before this in 1962 Tyce and Brough reported a family with multiple diseases inherited including mental retardation, oesophageal achalasia, speech disorder, and neurological diseases.4 Dayalan et al in 1971 reported the presentation of three siblings with achalasia during the first year of life.5 In the case they reported the parents of the affected children were closely consanguineous, the father being the maternal uncle of the mother; there were two boys and one girl.

Westley et al in 1975 proposed that infantile achalasia is inherited as an autosomal recessive disorder when describing its occurrence in an Apache Indian kindred.6 He postulated that the high degree of inbreeding allowed a rare recessive gene to be expressed in several members. The existence of consanguinity in the parents of the children in this report lends further weight to this argument. Although vertical transmission of oesophageal achalasia has been described, the lack of consistent vertical transmission is also thought to indicate a probable autosomal recessive gene disorder. Further support for autosomal recessive inheritance is the well documented occurrence of achalasia in association with other conditions having a similar mode of inheritance.
A national survey of nebuliser use.

H J Childs and C A Dezateux

Arch Dis Child 1991 66: 1351-1353
doi: 10.1136/adc.66.11.1351

Updated information and services can be found at:
http://adc.bmj.com/content/66/11/1351

These include:

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/