seconds to hypoxaemia (oxygen saturation less than 60%) and baseline transcutaneous $PO_2$ values are reproducible from sitting to sitting. In addition this monitor may also detect other potential causes of life threatening events where there is peripheral vasoconstriction due to metabolic shock or low cardiac output, although this function has yet to be fully validated.

Pulse oximetry was given more support than transcutaneous $PO_2$ in your article. In our experience, the former is much too prone to movement artifact to use at home. Exceptionalusive alarms are common and occur when the infant has normal body movements (false positives). Of more concern is the failure to alarm which may occur when these movements arise in association with cyanotic episodes (false negatives).

All infants in our programme are supervised closely by doctors and clinical nurse specialists. The project is funded by three charities as well as the Department of Health and the National Heart and Chest Hospitals. The Foundation for the Study of Infant Death is only one of a number of charities that help parents and supports research into the mechanisms responsible for sudden infant death. In our opinion, the views given in your article on home monitoring should have been balanced by the experience of charities and departments who have used transcutaneous $PO_2$ monitors in the home.

The article purports to show that development status is affected by diet, with a disadvantage being found in the group given human donor milk when compared with a group getting preterm formula. Their conclusion, however, was based only on the analysis of those babies who were not neurologically impaired. It is unsatisfactory to exclude the neurologically impaired babies in an analysis of developmental outcome. This is especially true as there were more neurologically impaired babies in the group fed preterm formula. The difference between the developmental quotients of the two groups was no longer significant when the neurologically impaired babies were added.

The manufacturers are keen to quote this article as support of their recommendation of preterm formula. Perhaps the most important bit of this paper is the demonstration that there is absolutely no difference between the group fed only breast milk and those fed only preterm formula.

Access for peritoneal dialysis in neonates and infants

Sir,—Lewis et al describe the use of a tapered polyurethane catheter which can be introduced into the abdomen via the Tenckhoff technique to provide access for acute peritoneal dialysis in small infants. They argue that the method of introducing the cannula makes the technique safer than using a stylet or trocar, but describes the occurrence of problems including the death of one baby after the catheter eroded through the gut wall.

We agree that the Tenckhoff technique is the safest method of introducing peritoneal dialysis catheters at any age, but we believe the Tenckhoff catheter which we use has major advantages over other designs. Although Lewis et al describe the "Pendlebury" catheter as being "soft and pliable", it is designed to be stiff enough to be "forced through the skin with a "screwing" action" and it tapers to a tip of about 1.5 mm diameter. By contrast, the Tenckhoff catheter has a soft silicone outer sheath with no taper; the risk of it causing perforation must be negligible. They are designed for permanent peritoneal dialysis and are available as a Fr 16 French gauge (FG) catheter with side holes extending to between 3 and 15 cm from the tip, and as "curled" catheters with holes extending 20-5 cm along a helical end of approximately 6 cm diameter.

Although Tenckhoff catheters are usually inserted surgically, they may be introduced percutaneously using a technique similar to that described by Lewis et al but with some modifications. We apply local anaesthetic (as EMLA cream, Astra) to the site one hour before the procedure which is done with sedation, analgesia, and infiltration of local anaesthetic. A small skin incision is made using a number 15 scalpel blade used vertically to produce a cut of no more than 3.5 mm, to avoid leakage. The opening is then gently dilated using artery forceps. It is not necessary to use two needles in order to introduce fluid and pass a wire as Lewis et al describe, as there are cannulas that are designed to fulfill both roles (two part needle, Kimal). With about 30 ml/kg fluid in the peritoneum the peel away sheath and its introducer are simply inserted into the abdomen in a similar way to the Pendlebury catheter. The sheath itself is a thin walled plastic outer catheter rather like a drinking straw which is passed through a small groove each side along its inside surface, and two moulded wings at the top. Once the introducer is in the abdominal cavity the sheath can be slid over it to its tip, and the introducer and the wire removed. The Tenckhoff is then slipped through the lumen of the sheath into the abdomen. At this point the wings of the sheath can be snapped apart and the two halves of the sheath easily torn apart along their length. The Tenckhoff is advanced simultaneously, until the sheath is pulled completely out of the patient as two separate halves.

Tenckhoff catheters are available with and without Teflon cuffs which are designed to be buried beneath the peritoneum and in subcutaneous tunnels, when used as a permanent catheter. We use a cuffed design to aid safe anchorage of the catheter by inserting a skin stitch about 1 cm from the entry site and tying the thread around the cuff (and outside the patient); this provides a firm grip for the tie. The catheter can then be cut to any convenient length and the connector inserted.

We have used standard (16 FG) diameter Tenckhof in newborns, but not in the

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Letters to the editor
smallest preterm infants. This group are very vulnerable to minor trauma, however, and a truly soft catheter is essential; we have successfully used Argyle 10 FG chest drains. These can be introduced directly over a wire (although with greater difficulty than the Pendlebury catheter as they are so much softer) or through a 10 FG peel away sheath. We have modified them by cutting very small extra holes along their length, and have then introduced the drain right up to the point of its widening. In this way the catheter curls up in the abdomen and the drain fits tightly into the skin entry site. There is no ideal connection available, but the drain end can be cut off at the point on its widening diameter where the male end of a Luers lock will fit in snugly. Currently a manufacturer is developing a Tenckhoff type catheter but of 11 FG diameter, which should provide a better solution for this particular group of patients.

We have had very few problems with our Tenckhoff catheters which we have used in 18 patients aged 2 days to 15 years, weighing 2·6 to 64 kg. One repeatedly blocked in a boy with extensive intra-abdominal malignancy. We use short straight catheters in newborns, and randomly allocate older children to have straight or curled catheters to assess whether either has any advantage; so far both types have been equally trouble free.

H LAMBERT
K MORRIS
J SHARP
M COULTHARD
Children's Department, Royal Victoria Infirmary, Queen Victoria Road, Newcastle upon Tyne, NE1 4LP

Increasing incidence of retinoblastoma?

Sir,—It has been apparent to clinical staff here at the Children's Hospital, Birmingham, that the occurrence of sporadic retinoblastoma cases has been increasing in recent years. In particular, patients presenting bilaterally seem to be increasing in proportional terms. The Children's Hospital in Birmingham is the regional referral centre for paediatric malignancies in the West Midlands Health Authority Region (WMHAR) and so the simplest explanation would be an increase in the referral of cases. This seemed an unlikely explanation as referral was thought to have been high for several years. We sought therefore to investigate the incidence of all forms of retinoblastoma in the WMHAR during the five year period 1984–8, this latter year being the most recent date for which population based data is available. We proposed to compare this with the two preceding five year periods in order to assess whether this anecdotal observation was sustainable. This study was undertaken by the West Midlands Regional Children's Tumour Registry, which collects data on all cases of cancer in children resident in the WMHAR. In order to ensure completeness and accuracy, for retinoblastoma cases in particular, we chose to validate the data in two ways. In the first instance a letter was sent to all consultant ophthalmologists in the region requesting details of all cases known to them through their practice. A subsequent letter was then sent to the general practitioner of each identified case to confirm the information abstracted from the hospital notes assessing laterality and the possible presence of a family history.

The results in the table show that sporadic cases were indeed raised in number during the latest time period. While the incidence of sporadic unilateral cases has remained relatively constant during all three time periods under study, however, the sporadic bilateral cases have more than doubled in frequency in the period 1984–8 compared with the two previous five year periods. During this latest period there were more bilateral than unilateral sporadic cases. This is at odds with the currently accepted usual ratio of approximately 70% of sporadic cases being unilateral, and which was also seen in our two earlier time periods. Population change cannot account for the overall change in incidence, as this has been decreasing during the study period.

Thus the interesting clinical observation appears to be borne out in the population based series derived from this region. As the number of cases involved is very small, however, it will be important to see if this finding is substantiated by the much larger national database of cases which is currently being assembled and to which we are contributing these data. It will also be important to monitor the incidence in future years to see if the trend continues.

K R MUIR
H SMITH
S E PARKES
H WILLSHAW
J HARRY
J R MANN
M C G STEVENS
West Midlands Regional Children's Tumour Registry, The Children's Hospital, Ladywood, Middlesbrough, Yorkshire.

Complication of a central venous line in the newborn

Sir,—Coincident with the report of Gladman et al on Staphylococcus epidermidis and the retention of a neonatal percutaneous central venous catheter,1 a baby died in our unit at 8 weeks of age due to superior vena cava obstruction and heart failure caused by a large thrombus in the right atrium, which was related to an indwelling central venous line (figure). This baby, born at 24 weeks' gestation and weighing 740 g at birth, had a surgically placed venous catheter on day 13 of life because of the many difficulties in peripheral venous access. The line was used for continuous infusion of 10% dextrose and Vamin amino acid mixture (KabiVitrum) until day 50, when he was successfully weaned off the ventilator and enteral feeding was started. The central venous line, however, was allowed to remain in situ because of the baby's unstable clinical condition and uncertainty about the success of enteral feeding, and kept patent by a slow infusion of heparinised normal saline. A week later, this baby developed acute respiratory failure due to a large pleural effusion on the right side requiring further mechanical ventilation. The pleural effusion continued to accumulate despite repeated aspiration of 30–40 ml of serous fluid at a time. He subsequently developed generalised oedema and oliguria which proved resistant to various therapeutic manoeuvres including fluid restriction, maintenance serum albumin in 'normal' range by infusions of 20% salt poor albumin, and administration of diuretics. He died on day 62 due to cardiorespiratory failure. An attempt to remove the catheter at this time failed despite a firm continuous traction because of it's tethering to the vein; this was confirmed at necropsy.

Central venous lines are increasingly being used in neonatal units when peripheral venous access becomes near impossible in very immature babies. It remains unclear, however, whether the true incidence of complications with the use of central venous lines is increasing, and this needs to be studied.

P DE SILVA
U EARL
S SINHA
Neonatal Unit, South Cleveland Hospital, Middlesbrough, Cleveland TS4 3DW

Incidence of retinoblastoma in WMHAR, 1974–88

<table>
<thead>
<tr>
<th>Period</th>
<th>Population*</th>
<th>Sporadic/unilateral</th>
<th>Sporadic/bilateral</th>
<th>Sporadic/all</th>
<th>Familial/unilateral</th>
<th>Familial/bilateral</th>
<th>Familial/all</th>
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<td>1974–8</td>
<td>1·24</td>
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<td>10</td>
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<tr>
<td>1979–83</td>
<td>1·10</td>
<td>9</td>
<td>4</td>
<td>13</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>1984–8</td>
<td>1·01</td>
<td>8</td>
<td>10</td>
<td>18</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

*Mid period population estimate (x10, aged 0–14 years).

Thrombus in right atrium (T), superior vena cavae (small arrow), and brachiocephalic vein (large arrow).

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H Lambert, K Morris, J Sharp and M Coulthard

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