appropriate at the time. No important general disease had been discovered. Similarly all patients had been examined under anaesthesia and no evidence of a local cause for the bleeding had been found.

Discussion

It is evident from the information set out in the Table and that contained in the previous report by Heller *et al.*[1] that the disorder of premature menarche is a transient one although the duration of the premature bleeding may be several years. It is reassuring to know that normal pubertal development with the resumption of menstruation occurs at an appropriate age and has no effect on the subsequent fertility of the patient. It is reassuring, too, to realise that the disorder of premature menarche does not appear to result in any limitation of the final height of the patient, so there need be no concern over short stature, unlike the case with other forms of sexual precocity.

We believe that the diagnosis of premature menarche can be strongly suspected on clinical grounds on the basis of recurrent vaginal bleeding in the absence of other signs of secondary sexual development; however, we believe it important to exclude the presence of a local lesion of the genital tract by examination under anaesthesia or by sonography, or both. It must be remembered that when the first episode of bleeding occurs there is no indication that it will be recurrent, so the possibility of an intravaginal neoplasm must be excluded. Once other investigations have excluded the presence of an intracranial lesion which might be presenting in this unusual fashion, treatment is probably not indicated, since the disorder appears to be self limiting and has no long-term effect on the patient's menstrual pattern or fertility.

Reference

[1] Heller M E, Dewhurst John, Grant D B. Premature menarche without other evidence of precocious puberty. *Arch Dis Child* 1979; **54**: 472–5.

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Infection in neonatal hypothermia

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SUMMARY Infection, particularly of the respiratory tract, was present in 80 of 138 children with neonatal hypothermia. The most common lesion was right upper lobe atelectasis and was probably due to aspiration pneumonia. In children older than 3 days infection elsewhere, mainly owing to *Escherichia coli* bacilli, was common.

Hypothermia in tropical and subtropical areas is a major cause of infant mortality.[1] Neonatal hypothermia, often with classical cold injury,[2] is common in Baghdad, and the neonatal death rate related to hypothermia is second only to that of respiratory infection during the winter.

Previous reports on hypothermia in developed countries[2–4] and in developing ones[5] have not stressed the role of infection. We present an analysis of 138 children admitted to our hospital with hypothermia.

Patients and methods

During the winters of 1978–79 and 1979–80, 138 newborn infants with hypothermia (rectal temperature below 35°C) admitted to this hospital were studied.

Al-Thawrah district is one of the poorest areas of the city. Details of the infants are shown in Table 1. There were 82 boys and 56 girls aged between 1 day and 4 weeks. Twenty-seven were younger than 4 days (early-onset hypothermia). As nearly all children are born at home, the birthweight is not known. On arrival to the hospital 79 weighed less than 2·5 kg, and probably had low birthweight. The 138 patients were investigated as follows: (1) Blood culture. (2) Urine chemistry, microscopical examination, and culture. (3) Cerebrospinal fluid chemistry, microscopical examination, and culture. (4) Chest *x*-ray film.

With the exception of 2 patients, all those with late-onset hypothermia (older than 3 days) were treated with intramuscular gentamicin in a dose of 4–6 mg/kg a day. The 2 children had osteomyelitis and were given cloxacillin 100 mg/kg a day. Only 3 children with early-onset hypothermia were treated with antibiotics, 2 with penicillin because of infection

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Table 1 *Details of 138 children with neonatal hypothermia*

Age (days)	*Number*		*Weight (g)*		*Temperature °C*		*Mortality*
	Boys	*Girls*	*<2500*	*>2500*	*Mean*	*Range*	
1–3	17	10	15	12	32·4	30–34·8	1
4–7	18	11	17	12	31·7	22–34·6	8
8–14	21	19	26	14	32	27·7–34·7	11
15–21	11	8	10	9	33·3	32–34·8	6
22–28	15	8	11	12	30·7	23–34	9

with B group of streptococcus and 1 with a combination of ampicillin-cloxacillin because of congenital pneumonia. Most children were put in a cubicle so that the environmental temperature could be maintained at 30–32°C by means of electric heaters. Children who appeared very ill or had signs of respiratory distress were nursed in incubators and the temperature was increased gradually until it reached 32–33°C.

Results

The results of the investigations are summarised in Table 2. The blood grew *Escherichia coli* in 28 and coagulase-positive staphylococci in the 2 children with osteomyelitis. Three (11%) out of 27 patients with early-onset hypothermia had infection, compared with 80 (72%) out of 111 children with late-onset hypothermia.

Twenty-five (18%) children showed radiological evidence of pneumothorax; all were older than 3 days and 15 of them had low birthweight. Isolated pneumothorax without other radiological abnormalities occurred in 16 while 9 pneumothoraces were associated with pneumonia. Pneumothorax was found nearly twice as frequently on the right as on the left (R : L = 1·9 : 1) and 2 infants had bilateral pneumothorax. No pneumomediastinum was encountered and no case showed a shifting of mediastinum. Only a few patients with pneumonia or pneumothorax showed clinical signs of respiratory distress. Crepitations on chest ausculation, mainly on the right side, were common and probably indicated the presence of pneumonia.

Table 2 *Results of the investigation in 138 children with neonatal hypothermia*

Site of infection	*Number of infections**	*%*
Urinary tract infection	30	22
Meningitis	19	14
Septicaemia	30	22
Pneumonia	64	46
Osteomyelitis	2	1
Pneumothorax (isolated)	16	12
Number of children with infection	83*	60
No evidence of infection	55	40

*Some children had more than one infection.

The overall mortality rate of the 138 children was 35 (25%). Few children died from massive pulmonary haemorrhages. Cardiac arrhythmias have been reported in neonates with hypothermia and may have been responsible for some of these deaths. Death generally occurred 2 to 3 days after admission and typically the body temperatures failed to rise during that time.

Discussion

The results show that only a few children with early-onset hypothermia have infection and most cases are probably caused by exposure to environmental cooling. Hypothermic children older than 3 days often do have infection and the most common single infection is pneumonia which is probably owing to aspiration. Neonatal hypothermia may lead to aspiration because lethargy causes swallowing reflexes to be more impaired than suckling reflexes. Some hypothermic children can suckle although only weakly, and then become cyanosed a few seconds later because of aspiration. Although hypothermia is less common in breast-fed babies because of close body contact with the mother during breast feeding, most of the babies in our study were breast fed.

The various radiological lesions seem to have one basic patho-physiological mechanism, namely aspiration. This is supported by the fact that pneumothorax and pneumonia were more common radiologically on the right side of the lung, where aspiration occurs more frequently. If one of the main bronchi is completely blocked by milk or secretions, atelectasis of the affected lobe will ensue. However, if partial blockage occurs, a check-valve obstruction is produced resulting in emphysema and pneumothorax. On the other hand, pneumothorax may be seen radiologically without emphysema if the calibre of the obstructed bronchus is small and the respiration more vigorous. The absence of mediastinal shift in every case of pneumothorax can be explained by the shallow and slow respiration generally found in children with hypothermia.

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Measurement of renal size in preterm and term infants by real-time ultrasound

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SUMMARY The kidneys in term and preterm infants were visualised by real-time ultrasound scanning. A cross-sectional centile chart has been plotted for kidney length in 100 unselected infants ranging in gestational age from 26 to 42 weeks. The ratio of kidney length to crown-to-heel length appeared to remain constant despite abnormalities in intrauterine growth rate.

Evaluation of the fetal kidneys by ultrasound has been reported.[1] By 15 to 17 postmenstrual weeks half of fetal kidneys can be visualised on ultrasound examination and by 20 postmenstrual weeks 95% of fetal kidneys can,[2] thus allowing abnormalities in growth or structure to be diagnosed prenatally. In the newborn period abdominal ultrasound is being increasingly used as a diagnostic tool, the main indications being palpable masses, suspicion of obstructive uropathy, and the presence of congenital abnormalities. Descriptions of the ultrasound diagnosis of renal vein thrombosis and adrenal haemorrhage in the neonate have been reported.[3 4] Despite the variety of renal disease recognised by ultrasound there are no data on normal renal size and architecture in the preterm or term infant, probably because of the lack of good resolution portable high frequency real-time equipment. We report here a study of kidney growth in preterm and term infants.

Subjects and methods

An ATL real-time mechanical sector scanner was used to visualise the kidneys. Scanning was performed with a 7·5 MHz transducer with the child lying either supine or prone. In the supine position the liver could be used as an acoustic window to visualise the right kidney (Fig. 1) and the left kidney was approached from the flank, by scanning through the spleen. In the prone position

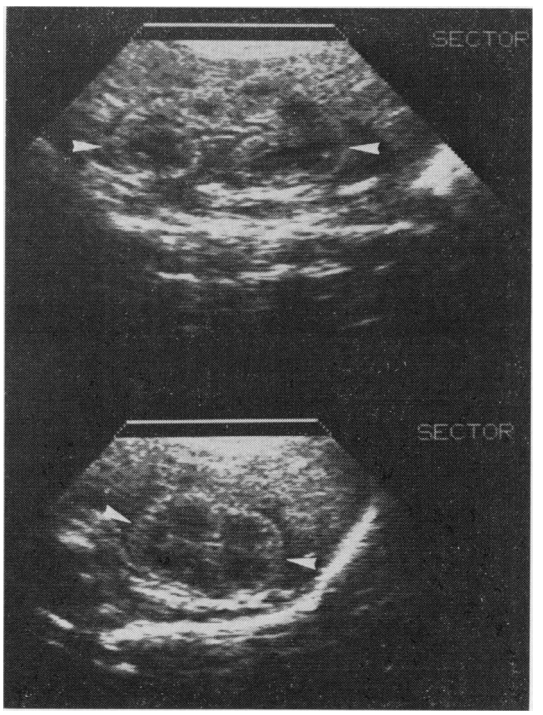

Fig. 1 *Longitudinal scan of right kidney (upper) and cross-sectional scan at the level of the renal pelvis (lower) using a 7·5 MHz mechanical sector scanner. Arrows indicate the points at which measurements are made.*

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