haemorrhage due to any cause is extremely rare. It may occur after maternal trauma, although it is rare in the absence of skull fractures or other severe fetal or maternal injuries.[6]

This patient's clotting disorder rendered her more liable to haemorrhage after minor trauma. Her mother's fall down stairs at 33 weeks' gestation was a likely cause of her subdural haemorrhage. Because the haemorrhage had been detected antenatally it was possible to deliver the infant by caesarean section, thus minimising the risk of further trauma. This also permitted a diagnosis to be arrived at and treatment to be instituted within hours of birth. This case emphasises the importance of recognising intracranial haemorrhage on obstetric ultrasound, and the need to identify potentially treatable coagulation disorders in such patients. In some disorders, such as this one, it should be possible to arrive at a diagnosis even before delivery, thus optimising management in the postnatal period.

We thank Professor MG Elder and Dr M Silverman for permission to report these patients who were under their care.

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Weight, length, and head circumference curves for boys and girls of between 20 and 42 weeks' gestation

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SUMMARY The value of available growth curves for preterm infants is limited because they exclude infants of less than 28 weeks' gestation. We describe growth curves for weight, length, and head circumference for boys and girls of between 20 and 42 weeks' gestation.

We have previously reported an analysis of fetal and infant birth weights derived from data from Sheffield from 1976 to 1984, and compiled a weight chart for those between 20 and 42 weeks' gestation.[1] At certain gestational ages there were significant differences between our data and the weight curves in current use, and subsequently the Gairdner-Pearson chart was revised using this and other data.[2]

Despite the considerable developments in neonatology resulting in the treatment of increasing numbers of infants born at less than 28 weeks' gestation, the practical value of most of the available growth charts is limited by the exclusion of this group of infants. We have therefore expanded our data to include length and head circumference and produced a comprehensive chart suitable for use in neonatal units.

Sample and methods

The sample was derived from three subgroups from the Sheffield area: live born infants, fetuses from therapeutic abortions, and fetuses from spontaneous abortions; only morphologically normal singletons were included. The following were excluded: hydropic infants, infants of diabetic mothers, and macerated fetuses. The previously published data were expanded to include fetuses and infants born in 1984 and 1985 at between 20 and 28 weeks' gestation in four local maternity units. This increased the total number of fetuses and infants below 28 weeks' gestation from 192 to 281 and enabled us to provide separate curves for boys and girls.

The data were taken retrospectively from the babies' records. All babies were weighed and measured while still on the labour ward or directly after admission to the special care baby unit. Dead

fetuses were measured at necropsy, which usually took place within 48 hours of delivery. The curves for dead fetuses did not deviate from those of live born infants, so the figures for the two groups were amalgamated for analysis. Gestational age was calculated by comparing estimations of time from last menstrual period, by study of early antenatal ultrasound scans, and by the Dubowitz score, or pathological examination. Where there was any ambiguity, the anthropometric data were excluded.

Means and standard deviations were calculated for weight, length, and head circumference at each completed week of gestation. Calculations were made for the whole group, and for boys and girls separately.

Results

The means for the whole group are in close accord with those reported by Kitchen *et al* for between 24 and 42 weeks' gestation.[3] Although size differences between boys and girls were apparent by the third trimester they could not be distinguished graphically until about 32 weeks' gestation.

The raw data are shown in the table and the smoothed curves constructed from those data in figs 1 and 2.

Discussion

We recognise that the use of cross sectional data in the derivation of postnatal growth norms for preterm infants has inherent weaknesses. This is particularly apparent for head circumference, and caution should be exercised when any such chart is used to assess growth longitudinally.[4] Almost all the data from which published charts are compiled have excluded some infants. We excluded hydropic infants, infants of diabetic mothers, and macerated fetuses. We thought it appropriate, however, to include morphologically normal babies who were thought to have retardation of growth before delivery; their exclusion would have biased the results. Previous studies, for example Gruenwald,[5] have excluded babies whose measurements were at the extremes of the range, usually because of the lack of certainty about gestational age. We were more certain of the gestational ages of the babies in our studies and so have not excluded extreme measurements; nor have we excluded babies from ethnic minorities. These made up less than 5% of the total sample and so their data are unlikely to cause bias. We believe that these charts may be of practical use in neonatal units, especially those dealing with extremely premature infants.

Table *Means (SD) weight, length, and head circumference by week of gestation*

Gestation (weeks)	*No*	*Weight (g)*		*Length (cm)*		*Head circumference (cm)*	
20	49	340(54)		26·4(2·2)		18·6(0·5)	
21	28	455(90)		27·0(0·8)		21·0(0·8)	
22	20	508(97)		29·6(0·6)		27·0(1·1)	
23	21	575(63)		31·3(2·4)		21·3(1·3)	
24	24	676(115)		31·3(2·1)		22·0(1·5)	
25	37	752(117)		33·3(2·1)		23·4(1·1)	
26	51	909(155)		33·8(2·7)		24·2(1·4)	
27	51	1083(130)		37·6(2·3)		25·8(1·1)	
28	85	1126(227)		37·2(3·2)		26·3(1·4)	
29	52	1285(203)		38·4(2·6)		26·7(1·2)	
30	89	1433(404)		41·4(3·3)		28·4(3·1)	
31	60	1547(241)		40·2(4·4)		28·8(1·0)	
		*Boys	Girls	Boys	Girls	Boys	Girls
32	101	1894(423)	1523(320)	44·6(4·5)	41·3(4·3)	30·5(2·3)	29·6(4·3)
33	114	2020(376)	1696(365)	44·7(3·0)	42·4(4·0)	30·7(1·3)	29·6(2·4)
34	156	2177(431)	1960(329)	46·8(4·3)	45·8(2·9)	32·1(1·8)	31·1(1·2)
35	60	2588(347)	2592(452)	47·1(4·4)	49·3(1·6)	33·4(1·2)	32·8(1·3)
36	60	2640(298)	2693(467)	48·2(2·2)	47·5(3·8)	33·2(1·2)	33·1(1·4)
37	60	3047(431)	2945(365)	50·4(2·4)	50·2(3·0)	34·3(0·9)	33·9(1·2)
38	120	3350(422)	3130(394)	52·2(2·3)	51·1(3·1)	35·0(1·2)	34·0(1·5)
39	120	3527(502)	3379(497)	51·9(3·2)	51·8(2·9)	35·2(1·4)	34·4(1·2)
40	120	3726(341)	3438(334)	53·7(2·3)	52·7(1·8)	35·6(0·9)	34·7(1·2)
41	60	3584(409)	3467(537)	53·2(2·8)	53·0(2·7)	35·9(1·2)	34·8(1·4)
42	60	3788(429)	3599(483)	54·5(3·6)	53·2(2·5)	35·5(1·2)	35·2(1·2)

*We could not distinguish accurately between boys and girls until 32 weeks' gestation.

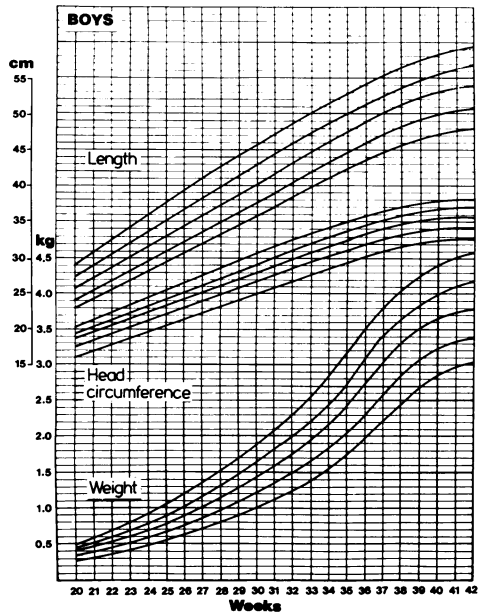

Fig 1 *Growth parameters: boys (means±1 and 2 SDs).*

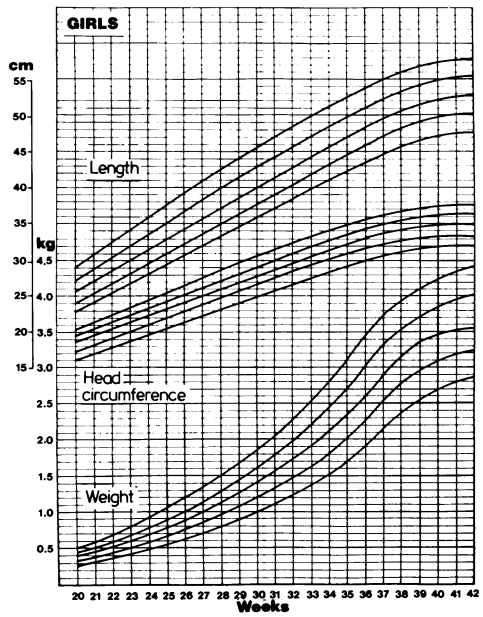

Fig 2 *Growth parameters: girls (means±1 and 2 SDs).*

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Pansystolic murmur in the newborn: tricuspid regurgitation versus ventricular septal defect

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SUMMARY Neonates with a pansystolic murmur who had Doppler echocardiography were reviewed. Ten infants had tricuspid regurgitation (detected at a mean age of 25 hours), 12 had a ventricular septal defect (detected at 65 hours), and seven had both. Tricuspid regurgitation is the more likely cause of a pansystolic murmur at the lower left sternal border in the first day of life.

When we began peforming Doppler echocardiography in neonates with murmurs that suggested a ventricular septal defect, we found that many of them had neither an image of a ventricular septal defect nor flow disturbance; instead, we found turbulent systolic flow of tricuspid regurgitation. Further, we had the impression that the infants with tricuspid regurgitation had the onset of murmurs during the first day of life. We decided to investigate this in all newborn infants in our hospital who were