whom hydronephrosis has been diagnosed before birth. If the presence of hydronephrosis is confirmed, various approaches can be considered. Based on our data, the routine use of cystography would be useless in 70% of the cases. As all our patients were treated with antibiotic prophylaxis once VUR had been diagnosed, we do not know how many episodes of infections or how many scars were prevented by the early recognition of the malformation, so we cannot comment on the cost benefit ratio of early cystography. Alternatively the patient with a mild dilatation can be followed up without cystography. In this case urinary tract infections should be monitored the family informed of the risks and symptoms of these infections and of VUR. However, cystography seems indicated in cases with additional risk factors such as poor compliance with follow up and where distance restricts access to health care.

This study was supported financially by Associazione del Bambino Nefropatico, Milan, Italy and by Regione Lombardia.

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Commentary

During the past decade since the advent of routine antenatal ultrasound scanning fetal hydronephrosis has emerged as a common and potentially pathological condition. It has been suggested that a pelvicaliceal diameter of more than 5 mm is abnormal. In many cases fetal hydronephrosis is transient and resolves spontaneously in the latter part of pregnancy or after delivery, but in other cases the hydronephrosis persists or worsens. Mild fetal hydronephrosis may be due to mild or transient obstruction or may reflect urinary tract dilatation or vesicoureteric reflux (VUR). When the postnatal scan is done very soon after delivery the infant urine production rate is very slow and the size of the renal pelvis may be underestimated. Using the international

VUR grading system grades I and II are not associated with dilatation on cystography but grades III, IV, and V are associated with mild to severe dilatation at cystography but not necessarily on ultrasound. The screening method used in the paper by Marra *et al* is therefore more likely to have underestimated than overstated the prevalence of VUR.

VUR is essentially a silent condition and was initially detected only after the investigation of severe recurrent urinary tract infection often in children with grossly abnormal urinary tracts. In 1960 Hodson and Edwards demonstrated that VUR was a common finding in children with urinary tract infection particularly when kidney scars were present,¹ and after their work many children with a history of urinary tract infection underwent micturating cystourethrography. As more girls than boys develop infections, particularly recurrent infections, VUR was demonstrated more often in girls, although the incidence of VUR in children with urinary tract infection has not been shown to be different between the two sexes.

Recently the observation that VUR had a familial distribution has led to family studies and the routine counselling of families about the risk of VUR and urinary tract infection in newborn infants. As Marra *et al* have suggested the mode of presentation or case selection may have a profound effect on the perceived incidence of VUR. When infants are investigated soon after birth the prevalence of VUR in the first degree relatives approaches 50%.^{2,3} The natural history of VUR is for improvement with increasing age, however,⁴ and it is not surprising that in those studies which included older children or adults a lower incidence of VUR was found.⁵

In 1971 Cussen, studying necropsies, showed that there were more cases in boys.⁶ However in his series the cause of death is not clearly stated. Infant boys are particularly prone to urinary tract infections and there is an increased risk of serious illness at this age. In addition, renal failure due to reflux nephropathy is more common in boys than girls in early childhood. It is therefore possible that the increased incidence of VUR in boys in his study was due to a bias in case selection. Similarly the increased incidence of VUR in boys in the paper by Marra *et al* may be due to the fact that mild fetal hydronephrosis is more common in infant boys. Kenda *et al* also observed VUR to be more common in infant boys than girls in his families.²

The incidence in girls in the community can be estimated from studies in girls with asymptomatic bacteriuria, which has a prevalence of 1–2%. As asymptomatic bacteriuria is an intermittent condition it is likely that the population at risk is greater than this. A third of these girls have demonstrated VUR giving a minimum incidence of 0.5% of the female population and as VUR improves with age the incidence at birth may be much more. In boys there are no comparable data because asymptomatic infection is rare, however family studies in infants and women who had symptomatic infection in childhood have shown that infant boys are affected as often as infant girls.³

It seems likely therefore that the incidence of VUR at birth is at least 1% in both sexes but that it is associated with mild fetal hydronephrosis more often in boys and that in both sexes the condition may remain silent or undetected unless urinary infection develops.

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