Fetal renal measurements to establish the outcome of urological anomalies

M. DE GENNARO, A. ZACCARA, C. GIORLANDINO *, E. BILANCIONI *, S. MALENA **, N. CAPOZZA and P. CAIONE

Division of Pediatric Urology
Bambino Gesù Children Hospital, Roma (I)
** Artemisia Obstetric Center, Roma (I)*
*** Division of Radiology, Bambino Gesù Children Hospital, Roma (I)*

INTRODUCTION

The more and more widespread use of real time prenatal ultrasound (US) has greatly affected the postnatal treatment and outcome of congenital uropathies .

To date, while a well established diagnosis of pathological kidneys by the 18th week of gestional age (1) (2) (3) , the need is felt of obtaining a series of numerical parameters to be correlated to the postnatal outcome in order to ensure a better antenatal counselling. However , though several attempts have been made in the past to make an antenatal diagnosis as accurate as possible, the large number of pitfalls has driven US toward different forms of counselling, based upon the simple prediction of operation, irrespective of the underlying urological anomaly.

This attitude matches well with parents expectancies aiming to know whether or not their baby will be, in the future, candidate to surgical intervention.

MATERIALS AND METHODS

We have considered in our study 105 fetuses (140 renal units) consecutively referred to our Institution by the same third level obstetric Department, between Genuary 1990 and June 1991.
All obstetrical US were taken between 30 and 38 weeks of gestational age. During the examination we have consedered the following fetal parameters: pelvic size (transverse diameter) and parenchymal thickness taken on a midline transverse section; both measurements were taken in the same standardized way after birth and compared.Multicystic dysplastic kidneys were exclused from these measurements . All referred newborns underwent the same measurements postnatally, at an age ranging from 2 to 4 weeks in order to visualize any evolution of the aforementioned parameters.
Depending the results of postnatal renal scan , either further diagnostic workup was started or renal ultrasound was repeated at least twin, six months and 1 year after birth, respectively. After this period patients were divided into three groups: normalized Group A, with no further need of examinations; affected non operated Group B, with urinary tract anomalies requiring close surveillance and follow-up); operated Group C, who had required an operation at birth or thereafter).

RESULTS

The relationships between fetal pelvic dilatation and outcome were as follows (table I).

TABLE I

RELATIONSHIPS BETWEEN PRENATAL PELVIC DILATATION AND OUTCOME

DILATATION (mm)	RENAL UNITS	NORMALIZED (group A)	AFFECTED (group B)	OPERATED (group C)
< 12	51	26 (50.9%)	19 (37.2%)	6 (11.7%)
13-20	70	31 (44.2%)	33 (47.1%)	6 (8.5%)
> 20	19	3 (15.7%)	6 (31.5%)	10 (52.6%)
	140	60 (42.8%)	58 (41.4)	22 (15.7%)

Six out of 51 mild dilatations underwent operation

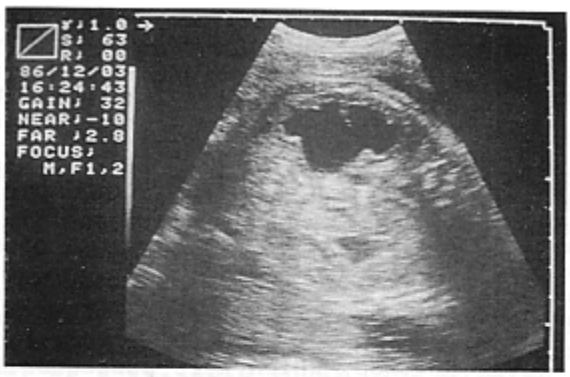

Fig. 1.: Antenatal ultrasound showing a pelvic dilatation of 22 mm and parenchimal thickness> 10mm. It became normal (group A) postnatally.

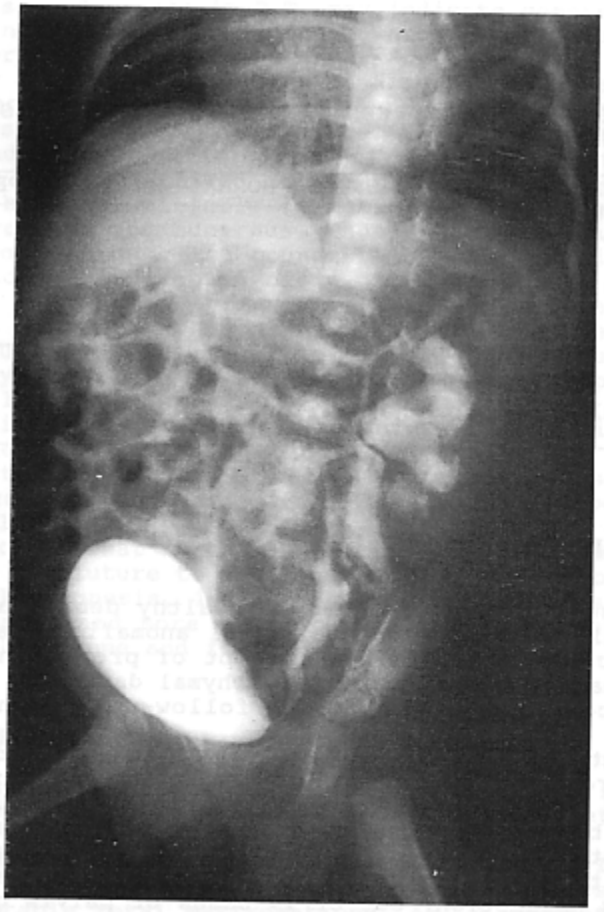

Fig. 2: E.V. pyelogram of megaureter, whose pelvic prenatal dilatation was < 12 mm at 36 weeks of gestational age.

while 3 (15.8%) of severe dilatations became normal.
As far as parenchymal thickness (PT) is concerned, patientes were divided into two categories: those with P.T. less than 10 mm and those with P.T. equal ore more than 10 mm.
Nine out of ten operated renal units (90%) exhibited parenchimal thickness less than 10 mm: on the contrary in 34% of not operated ones (group B) P.T. was of such size; finally 54/60 (90%) of normalized renal units had a P.T. equal or more than 10 mm.
Pertaining evolution of such parameters on postnatal ultrasound, twenty-seven (19.3%) out of the 140 renal units showed postnatal worsening of fetal dilatation: seven of thse, which were subsequently operated upon had an increment of postnatal seze ($\triangle$dil) more than 10 mm; on the contrary, in 19 out the 20 operated units $\triangle$ dil was less than 10 mm.
Parenchymal thickness was prenatally less than 10 mm in 7 out of the 9 (18%) operated renal units and in 8 it further decreased postnatally: they were seven cases of pyelo-ureteric junction obstruction (PUJO) and one case of obstructive megaureter.

TABLE II

RELATIONSHIPS BETWEEN PARENCHYMAL THICKNESS AND OUTCOME

PARENCH.THICK	RENAL UNITS	NORMAL	AFFECTED	OPERATED
< 10 mm	35	6	20	9
> 10 mm	93	54	38	1
	128*	60	58	10

* multicystic kidneys (12 unit) excluded.

DISCUSSION

In these letest year there is healthy debate about antental diagnosis of urological anomalies, namely obstructive ones, in the attempt of preventing to the greatest extent renal parenchymal damage by surgical correction or by close follow-up of infection.
Many Authors have drawn their attention to the fetal renal pelvic size; however, though there is general agreement that a pelvis greater than 15 mm should be regarded as pathological (4) (5), under no circumstances can these parameters be predictive for necessity of surgical operation. Our data demonstrate this assumption: out of 19 cases of pelvis greater than 20 mm, only 10 underwent surgical correction; of the remaining 9 cases, 3 were normalized after birth while in the other six dilatation per-

sists with signs of obstruction on DTPA scan; this justifies, according to the vast majority of current views a conservative attitude. In substance, early one half lf cases with severe antental dilatation did not require any kind of surgical operation.

On these considerations, it is clear that other numerical parameters should be taken into account, such as parenchymal thicckness, as it was in our series. I this was significantly greater in the group of patients who did not require surgical repair, this presumably indicating parenchymal compression in utero : on the other hand, a good parenchymal thickness, even in presence of a dilated pelvis, may be a reliable index of a dilated non obstructed pelvis that is a spontaneous resolution of intrauterine obstruction. In summary evaluation of P.T. along with pelvic size can give successful guidelines when counselling parents for the ongoing pregnancy: after birth, great attention should be paid, as previously mentioned, to evolution of such parameters : an increase in pelvic size more than 10 mm strongly suggests onset of obstruction; likewise a decrease in P.T. may indicate compression shifting to parenchymal atrophy and prompting surgical correction, should be necessary.

As far as the mere problem of antenatal counselling is concerned, on the basis of repeated US scan as well as of numerical parameters, th most of the Authors advocate identification of urological abnormalities prior to birth to the greater possible extent: however, pitfalls in making such a diagnosis are frequent and numerous. Thus, we are of the impression the antenatal counselling should be limited only to the indication of surgical operation after birth, irrespective of underlying pathology: parents should be aware if the baby is going to be operated upon just after birth, if it is going to become completely normal or if it will need a variable period of follow-up. In practice, we believe that a renal unit with P.T.< 10 mm and pelvic size >20 mm is very likely to undergo surgical operation after birth no matter of the urological malformation, whose nature goes beyond the aims of the first urological counselling.

It is clear that further investigations will be needed in the future to ameliorate possibilities of antenatal diagnosis, in order to give as soon as possible more and more accurate information about postnatal outcome and follow-up.

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