

Immediate postnatal management of antenatally detected hydronephrosis

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Abbreviations used: APD-Antero Posterior Diameter, SFU-Society of Fetal Urology, ANH-Ante Natal Hydronephrosis, UTI-Urinary Tract Infection, USG-Ultrasonography, VCUG-Voiding Cysto Urethrogram

The detection of renal abnormalities during prenatal ultrasonography was first reported by Garrett et al in 1970 [1]. Since then routine use of ultrasonography for detection of congenital anomalies has become a part of routine care during the antenatal period. Currently it is estimated that genitourinary anomalies comprise nearly 20% of all prenatally detected fetal anomalies [2]. Amongst these hydronephrosis is one of the most commonly detected anomalies seen in approximately 1% to 5% of all pregnancies and it occurs due to various causes [3] (Table No.1).

Etiology	Incidence
Transient/ physiologic	50-70%
PUJ Obstruction	10-30%
Vesicoureteral Reflux	10-40%
Ureterovesical Junction Obstruction	5-15%
Ulticystic Dysplastic Kidney	2-5%
Posterior urethral valves	1-5%
Ureterocele	1-5%
Others like ectopic ureter etc	<1%

Thus we have an increasing number of patients who are presenting to the clinician with a presumptive diagnosis rather than a symptom and that too before they are born [4]. Logic dictates that this early detection should help in improving post natal outcomes and help in better preservation of the renal function. Lee et al in their meta- analysis found that 12-88% of these children will have demonstrable pathology

depending on the degree of prenatally detected hydronephrosis. Hence a thorough postnatal evaluation of the upper and lower tracts is mandatory postnatally [5]. But this also means that 88-12% of these children will have no demonstrable pathology postnatally. This is borne out by various studies showing that the most common cause of antenatally detected hydronephrosis is transient or non obstructive dilatation of the pelvicalyceal system [6-7]. Thus, postnatally, the clinician is faced with dilemma to differentiate the hydronephrosis which will resolve spontaneously from the one which will become clinically significant and would need surgery. This differentiation needs to be done by utilizing appropriate investigations using the lowest radiation and least invasive techniques so that timely surgical intervention can be done, in those who need it, to prevent renal function deterioration [4]. This article reviews the primary literature and provides guidelines pertaining to immediate postnatal management of antenatally detected hydronephrosis.

Post natal Management

“A perfection of means but a confusion of conclusion seems to be our problem-Albert Einstein”

There is no ambiguity regarding that all antenatally detected hydronephrosis should be evaluated by an ultrasound postnatally [5] (Level I evidence Grade A recommendation).

Since infants are relatively dehydrated at birth, the initial postnatal ultrasonography should be performed after 48 hours of birth. Day two of life is preferred to enable adequate hydration after delivery but circumstances pertaining to early discharge following delivery may not allow this. Also breast fed neonates may not be adequately hydrated until a steady milk flow is established. Hence the first postnatal ultrasound is preferably done between 5-7 days after birth [8-10]. The exceptions to this caveat are-(1) Suspected lower tract obstruction e.g. Posterior urethral valves (2) Severe bilateral hydronephrosis with or without hydroureter (3) Solitary kidney with hydronephrosis especially if the APD is > 15 mm or it is SFU grade 2 or more in the third trimester. Early sonography in these situations has obvious bearing on further management

Should Chemoprophylaxis be started immediate postnatally?

Whenever there is hydronephrosis the treating clinician is worried about two things-obstruction and infection. The obstruction needs to be established in most cases with ANH. However the clinician is worried about the possibility of infection in a dilated system with stasis of urine. So, should neonates and infants with ANH be put on antibiotic prophylaxis? Till date there are no prospective studies providing level I evidence to support the use of prophylaxis. The available literature is conflicting. Studies have shown that the risk of infection increases with the degree of hydronephrosis [11-14]. Coelho et al found the incidence of UTI to be 10% for those with mild hydronephrosis, 20% for those with moderate and 40% for those with severe hydronephrosis [11]. Girls appear to be at greater risk than boys [12]. However these studies are observational in nature and not standardized as regards, the method of urine collection, definition of infection, selection of patients for voiding cystourethrogram and use of prophylactic antibiotics.

More and more data is coming regarding the limited usefulness of prophylactic antibiotics and with the varying practice patterns due to variations in geographic location, clinician experience and above all variable health care practices in developing countries, as of yet, no standardized uniform guidelines have been proposed. However undeniably patients with mild hydronephrosis are at much less risk of infection

as compared to those with moderate to severe hydronephrosis [8, 15-19]. If prophylaxis is started then the choice of antibiotics are Amoxicillin (15mg/kg) or Cephalexin (2 mg/kg)

Based on the available evidence we propose the following to be done within the first 48 hours after birth in neonates born with antenatally diagnosed hydronephrosis (Table No.2)

Table-2: Measures to be taken within first 48 hours after birth in infants diagnosed with ANH	
USG	Suspected lower tract obstruction eg-Posterior urethral valves, prune belly syndrome Bilateral Hydronephrosis with or without hydroureter Solitary Kidney with APD>15 mm or SFU grade 2 or more
Antibiotic prophylaxis	Suspected lower tract obstruction APD > 10 mm or SFU grade 2 or more in the third trimester Solitary Kidney with hydronephrosis of any grade Bilateral Hydronephrosis
VCUG	Suspected posterior urethral valves antenatally
Catheterization	Suspected lower tract obstruction-posterior urethral valve or prune belly syndrome

Ultrasound at 5-7 days after birth

All infants detected to have ANH should be evaluated by a postnatal ultrasound, which is usually done at 5-7 days after birth [20-21] (for the reasons described above). The following should be the aim of doing this evaluation using a tool which is easily available, provides good anatomical information, is non invasive and is not associated with any radiation-

- Confirm the presence of hydronephrosis
- Grade the degree of hydronephrosis
- Plan further tests and evaluation and management strategies based on the ultrasound findings
- Decide the need for antibiotic prophylaxis.

The ultrasonography should be done with the baby being well fed. It is the practice of one of the authors (AS) to start the examination of these babies by scanning the bladder first. If the bladder is full, usually the baby voids and the degree of bladder emptying is known immediately giving a fair idea regarding the absence of outflow obstruction. Also once the bladder is empty, the effect of a distended bladder on the filling and emptying of the collecting system resulting in fallacious diagnosis of pyelectasis is avoided. The mechanism by which a full bladder causes dilatation of the renal pelvis and the maximal degree of normal dilatation is not known. However it is accepted that when urinary bladder is distended than false positive cases may occur [10]. Hence if a sonologist sees mild degree of

hydronephrosis than whether it persists or disappears after bladder emptying should be looked for and mentioned in the report.

Ultrasonography at 5-7 days would show one of the following scenarios

1. No Hydronephrosis-Normal pelvicalyceal system
2. Unilateral Hydronephrosis
3. Bilateral Hydronephrosis
4. Unilateral Hydronephrosis with hydroureter
5. Bilateral Hydronephrosis with bilateral hydroureter

Each scenario needs to be evaluated and managed differently.

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