

**HYDRONEPHROSIS-A COMPREHENSIVE REVIEW OF ITS ETIOLOGY,
PATHOPHYSIOLOGY, DIAGNOSIS AND MANAGEMENT IN MODERN AND UNANI
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ABSTRACT

Respiratory disorders are a major cause of illness and death. Treating them often involves taking medicines, which can lead to problems. This study was done over a period of six months with 128 patients in Pulmonology Department at S.S. Institute of Medical Sciences and Research Centre in Davangere. The goal was to see how medicines were prescribed, check for polypharmacy and related problems and to find risk factors. Most patients were men from rural areas with common symptoms, like cough and breathlessness. The main diagnosis were infectious lung diseases. Patients were prescribed with antibiotics, bronchodilators, corticosteroids and other supportive medications, which showed high polypharmacy. The World Health Organizations prescribing indicators showed that on average patients took 7.6 drugs per encounter with generic prescribing and excessive use of antibiotics and injectables. Polypharmacy was common, linked to drug interactions. The study found that patients had respiratory symptoms, prior illnesses, hospital stays, smoking exposure and occupational hazards. The study suggests that doctors should prescribe medicines carefully review prescriptions regularly and involve pharmacists more to improve patient safety and outcomes with Respiratory disorders and its treatment.

KEYWORDS: Respiratory disorders, Prescription pattern, Drug-related problems, Polypharmacy, Drug-drug interactions, Risk factors.**I. Hydronephrosis: Historical Background in Ancient Greek and Allopathic Medicine**

Hydronephrosis is a pathological dilatation of the renal pelvis and calyces caused by impaired drainage of urine from the kidney to the urinary bladder. Persistent urinary obstruction can lead to increased intra-renal pressure, progressive thinning of the renal parenchyma, recurrent urinary tract infection, and deterioration of renal functions. Hydronephrosis is therefore regarded in modern medicine primarily as a consequence of urinary tract obstruction or impaired urine flow, rather than as an independent disease. The understanding of hydronephrosis has developed gradually from ancient descriptions of urinary obstruction and renal enlargement

to modern anatomical, physiological, radiological, and surgical concepts.^[1-10]

A. Hydronephrosis in Ancient Greek Medicine

The physicians of Ancient Greece did not possess the modern concept of hydronephrosis or the terminology used today. However, Greek physicians made important observations concerning the kidneys, urine, urinary retention, renal disease, and enlargement of internal organs, which contributed to the early development of urological knowledge.

➤ Hippocratic medicine

Hippocrates (c. 460–370 BCE) and the Hippocratic physicians regarded urine as an important indicator of disease. Examination of urine—including its quantity, colour, sediment and other visible characteristics—was used in clinical assessment. The Hippocratic writings contain descriptions of disorders associated with the kidneys and urinary tract, including difficulty in passing urine, urinary retention, painful urination and the presence of urinary stones. Although these observations cannot be equated directly with modern hydronephrosis, they demonstrate an early recognition that obstruction of urinary flow could produce significant pathological consequences. The Hippocratic approach emphasized

clinical observation and prognosis rather than detailed anatomical explanation. Renal and urinary disorders were interpreted within the contemporary theory of bodily fluids and humoral balance. Urinary stones were recognized as an important cause of urinary difficulty in ancient medicine. Obstruction of urine could produce pain, retention and changes in the urinary system. Ancient Greek physicians also recognized that diseases of the urinary organs could become chronic and could affect general health. However, hydronephrosis as a distinct pathological entity was not clearly differentiated from other causes of renal enlargement or urinary disease.

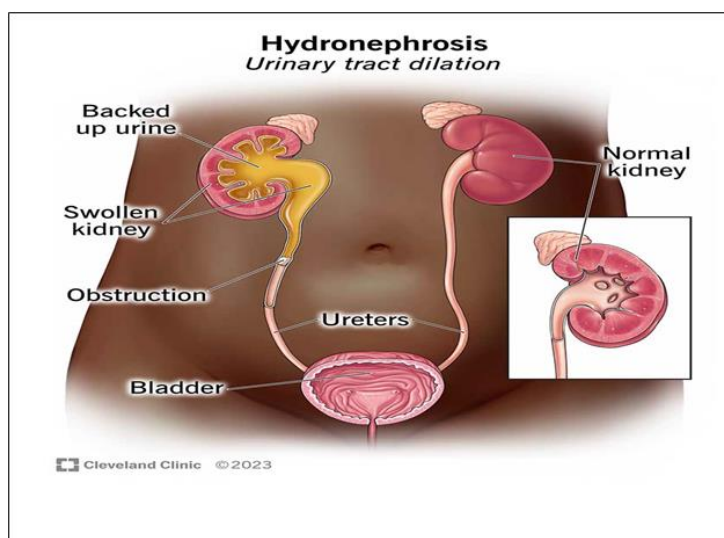


Fig. 01: Hydronephrosis-Urinary Tract infection in male and female.

➤ Herophilus and Erasistratus

During the Hellenistic period, physicians such as Herophilus (c. 335–280 BCE) and Erasistratus (c. 304–250 BCE) contributed substantially to anatomical knowledge through human and animal dissection. Their work helped establish a more accurate understanding of the:^[1-10]

- Kidneys,
- Ureters,
- Urinary bladder,
- Blood vessels, and
- Relationships between internal organs.
- This anatomical knowledge was an important foundation for later understanding of urinary obstruction and renal pathology.

➤ Galen

Galen (c. 129–216 CE) greatly influenced medical thought for many centuries. His writings included descriptions of the kidneys and urinary system and discussed the formation and passage of urine. Galen's physiological explanations were based largely on the prevailing concepts of humoral medicine and his anatomical observations, much of which came from animal dissection. Nevertheless, his systematic approach

to anatomy and physiology influenced subsequent European medicine and the development of later urological knowledge.^[1-10]

B. Development of the Concept in Medieval and Renaissance Medicine

During the medieval period, Greek medical knowledge was preserved, interpreted and expanded by physicians in the Byzantine, Islamic and later European traditions. With the development of anatomical dissection during the Renaissance, physicians began to understand the urinary tract more accurately.

The anatomical studies of Andreas Vesalius (1514–1564) represented a major change in European medicine. His detailed descriptions and illustrations of human anatomy corrected several anatomical errors inherited from Galenic medicine. Improved knowledge of the kidneys, ureters and bladder provided the anatomical basis for understanding how an obstruction could cause dilatation of the upper urinary tract.^[1-10]

C. Hydronephrosis in Allopathic/Modern Medicine

The modern allopathic understanding of hydronephrosis developed principally during the nineteenth and

twentieth centuries, with advances in pathology, physiology, urology and diagnostic imaging. The term **hydronephrosis** is derived from Greek:

- **Hydro** = water
- **Nephros** = kidney

Thus, hydronephrosis literally refers to a water-filled or urine-distended kidney.

The condition came to be recognized as a consequence of obstruction or impaired drainage of urine. The

obstruction may occur at different levels of the urinary tract, including the:

- Ureteropelvic junction,
- Ureter,
- Vesicoureteral junction,
- Urinary bladder
- Urethra.

Modern medicine established that obstruction to urine flow increases pressure within the renal collecting system. Prolonged obstruction can result in:^[1-10]

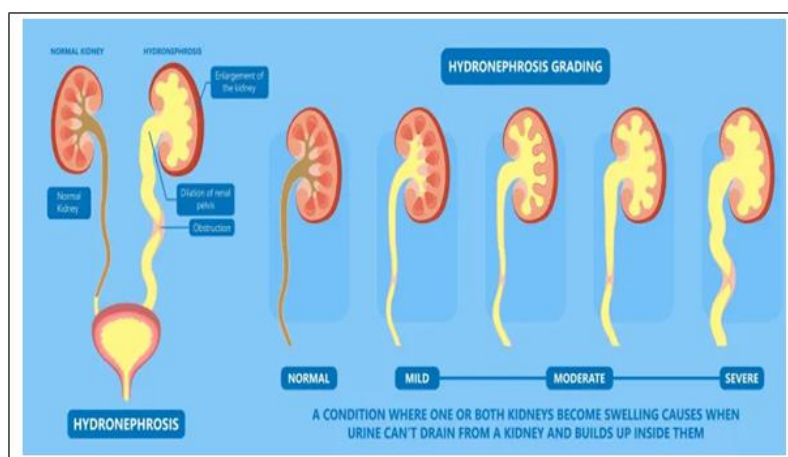


Fig. 02: Hydronephrosis grading from Normal to severe.

- Dilatation of the renal pelvis
- Dilatation of the renal calyces
- Compression of renal parenchyma
- Tubular and interstitial damage
- Reduction in renal blood flow
- Progressive renal functional impairment
- Potential irreversible renal failure if severe and prolonged

The severity depends on whether the obstruction is partial or complete, unilateral or bilateral, acute or chronic.

II. Hydronephrosis: Possible Causes and Unani Perspective

In the Unani system of medicine, there is no exact one-to-one classical equivalent of modern hydronephrosis. The condition can be discussed through the classical descriptions of disorders involving the kidneys (Kulyatayn), urinary passage, urinary retention, obstruction and abnormal accumulation of fluid. Therefore, the Unani interpretation should be presented as a conceptual correlation, rather than claiming that classical physicians described modern hydronephrosis exactly.

Urine (*Baul*) is produced through the kidneys and conveyed through the urinary passages. Any disturbance in the normal passage of urine—particularly obstruction (*Sudda*), narrowing, calculus, or weakness of the urinary organs—may lead to retention or accumulation of urine.

From a Unani perspective, the important pathological mechanisms that may correspond to hydronephrosis include:

Sudda (obstruction) → impaired urinary flow → accumulation/retention of urine → dilatation of the urinary collecting system → renal damage

III. Important Causes / Reasons in Unani Perspective

A. Sudda – Obstruction: Sudda is one of the most relevant Unani concepts for understanding obstructive urinary disorders. An obstruction in the urinary tract can interfere with the normal passage of urine. Possible causes of *Sudda* include:

- Renal or urinary calculi
- Thick or viscid urinary material
- Accumulation of abnormal humours
- Narrowing of urinary passages
- Inflammatory swelling
- Masses or growths
- Congenital abnormalities

B. Hasat-ul-Kulya – Renal Calculus: Hasat-ul-Kulya (kidney stone) is particularly relevant. A calculus may obstruct the ureter or urinary outlet and interfere with the normal passage of urine.

The sequence may be represented as:

Hasat-ul-Kulya → obstruction of urinary passage → impaired urine drainage → urinary accumulation → dilatation of renal pelvis/calyces

C. Ihtibas al-Baul – Retention of Urine: Ihtibas al-Baul refers to retention or difficulty in the passage of urine. Persistent obstruction causing urinary retention may increase pressure within the urinary system. Depending upon the site and severity of obstruction, prolonged urinary retention may ultimately affect the upper urinary tract.

D. Waja-ul-Kulya – Renal Pain: Pain in the kidney region is described in Unani literature under renal disorders. Renal pain may accompany calculi, obstruction and other urinary tract disorders. However, pain itself should not be regarded as the cause of hydronephrosis; rather, it may be a manifestation of the underlying condition.

E. Waram – Inflammation/Swelling: Waram involving the kidney or urinary passages may produce narrowing of the urinary pathway. Such narrowing can interfere with urine flow. A conceptual sequence is:

Waram → narrowing of urinary passage → obstruction → impaired urine drainage → renal dilatation

F. Su'-i-Mizaj of the Kidney: A disturbance of the normal temperament (Su'-i-Mizaj) of the kidney may be considered in Unani pathology when discussing renal dysfunction. However, it should be stated carefully that Su'-i-Mizaj is a broad traditional pathological concept and is not equivalent to the modern anatomical diagnosis of Hydronephrosis.

G. Weakness of the Kidney – Zu'f al-Kulya: Zu'f al-Kulya (weakness of the kidney) may be discussed in relation to impaired renal function. Nevertheless, renal weakness alone does not necessarily cause Hydronephrosis. It may be relevant when renal dysfunction occurs together with obstruction or impaired urinary drainage.

H. Abnormal Humoral Accumulation: Classical Unani medicine explains disease partly through disturbances of the Akhlat (humours). Abnormal accumulation or altered consistency of humours may contribute to obstruction according to the traditional framework. This concept should be presented as a traditional explanatory model, rather than as a direct anatomical mechanism established by modern renal pathology.

Table No. 03: Hydronephrosis causes in Unani system of medicine.

Unani concept / cause	Description	Possible modern correlation
Sudda (Obstruction)	Obstruction in the urinary passage preventing normal flow of urine	Ureteric/urethral obstruction
Hasat (Urinary calculi)	Formation or movement of stones in the kidney or urinary tract may obstruct the passage of urine	Renal/ureteric calculi
Tafarruq / Imtila or accumulation of abnormal matter	Accumulation of morbid material may interfere with normal urinary passage	Obstructive debris or pathological narrowing
Warām (Inflammation/swelling)	Swelling of tissues of the urinary tract can narrow the urinary passage	Inflammatory edema/stricture
Quruh (Ulceration)	Ulcerative lesions may produce structural changes and narrowing	Scarring and obstruction
Tashannuj (Spasm)	Spasm or abnormal contraction of urinary passages can interfere with urine flow	Functional obstruction/spasm
Dayq / Su-e-Hay'at (Narrowing or structural alteration)	Narrowing or alteration of the urinary passage	Ureteric or urethral stricture
Awrām (Masses / swelling)	Abnormal growth or swelling may compress the urinary tract	Tumour or mass causing obstruction
Weakness of urinary organs	Disturbance in the normal function of the kidneys or urinary passages may impair urinary evacuation	Functional urinary disturbance
Congenital abnormalities	Structural abnormalities present from birth may interfere with urinary drainage	Congenital ureteropelvic junction obstruction, reflux, etc.

IV. Unani Causes Correlated with Modern Causes

Unani concept	Possible clinical correlation	Relationship to hydronephrosis
Sudda	Urinary tract obstruction	Important mechanism
Hasat-ul-Kulya	Renal/ureteric calculus	Common cause of obstruction
Ihtibas al-Baul	Urinary retention	May cause upper urinary tract dilatation when obstruction is significant
Waram	Inflammation/swelling	May narrow urinary passage
Tahayyuj / irritation of	Irritation/inflammatory urinary	May contribute to impaired drainage

urinary passages	disease	
Zu'f al-Kulya	Renal functional weakness	May coexist but is not itself equivalent to hydronephrosis
Su'-i-Mizaj	Disturbance of renal function in the Unani framework	General pathological concept
Accumulation of abnormal material	Obstructing material	Traditionally proposed mechanism
Growth / mass	Tumour or other space-occupying lesion	May cause obstruction

V. Epidemiology

Hydronephrosis is a common radiological and clinical finding resulting from impaired drainage of urine from the kidney. Its epidemiology is difficult to define precisely because hydronephrosis is usually secondary to another condition, such as urinary calculi, congenital obstruction, ureteric stricture, malignancy, or bladder outlet obstruction. Consequently, reported prevalence varies according to age, sex, underlying cause, diagnostic method, and whether unilateral or bilateral disease is considered.^[1-3]

A. Prevalence and incidence^[1-3]

Hydronephrosis can occur at any age, from the prenatal period to old age. It is frequently detected incidentally during ultrasonography, computed tomography (CT), magnetic resonance imaging (MRI), or antenatal screening. In adults, the reported prevalence of hydronephrosis varies considerably between populations because many cases are asymptomatic and because studies use different definitions and grading systems. It is more appropriate to consider hydronephrosis as a manifestation of urinary tract obstruction rather than as a single epidemiological disease.

B. Hydronephrosis in children^[1-3]

Hydronephrosis is particularly important in the paediatric and antenatal population. A substantial proportion of cases are detected during routine prenatal ultrasonography. Antenatal urinary tract dilatation is among the most frequently identified fetal urinary abnormalities. The causes include:

- Ureter pelvic junction obstruction (UPJO)
- Vesicoureteral reflux
- Posterior urethral valves
- Ureterovesical junction obstruction
- Other congenital abnormalities of the urinary tract

Many cases detected antenatally are mild and may resolve spontaneously, whereas persistent or severe obstruction requires postnatal assessment.

C. Hydronephrosis in adults^[1-3]

In adults, acquired causes become increasingly important. Common causes include:

Urinary calculi → ureteric obstruction → Hydronephrosis

Other important causes are:

- Benign prostatic hyperplasia
- Ureteric strictures

- Malignancies
- Retroperitoneal fibrosis
- Neurogenic bladder
- Blood clots
- Pelvic masses
- Iatrogenic injury
- Congenital abnormalities persisting into adulthood

The epidemiology therefore differs substantially according to age and sex.

D. Sex distribution

The sex distribution depends largely on the underlying cause.

- **In children**, congenital urinary tract abnormalities are important determinants, and some obstructive conditions—particularly posterior urethral valves—occur exclusively in males.
- **In adult males**, bladder outlet obstruction related to benign prostatic hyperplasia (BPH) becomes an important cause of upper urinary tract dilatation.
- **In females**, pregnancy, pelvic masses, gynaecological malignancies and other pelvic conditions can contribute to urinary tract obstruction.

Therefore, hydronephrosis does not have a consistent male-to-female ratio across all age groups.

E. Hydronephrosis during pregnancy

Hydronephrosis or urinary tract dilatation is relatively common during pregnancy. It may result from a combination of:

- Mechanical compression of the ureters by the enlarging uterus
- Hormonal effects, particularly smooth-muscle relaxation
- Increased urinary flow

Pregnancy-associated dilatation is often more prominent on the right side. Physiological dilatation should be distinguished from pathological obstruction, particularly when there is severe pain, infection, renal impairment or marked asymmetry.^[1-3]

Table No. 04: Epidemiological Factor For Hydronephrosis.

Epidemiological factor	Pattern
Age	Occurs from fetal life through old age
Children	Congenital abnormalities are major causes
Adults	Stones, strictures, prostate disease, malignancy and other acquired causes
Sex	Varies according to age and underlying cause
Laterality	Can be unilateral or bilateral
Pregnancy	Urinary tract dilatation is relatively common
Common adult cause	Urinary tract obstruction, particularly calculi
Detection	Frequently identified by ultrasonography and other imaging
Symptoms	May be asymptomatic or present with pain, infection or urinary symptoms
Major concern	Prolonged obstruction may compromise renal function

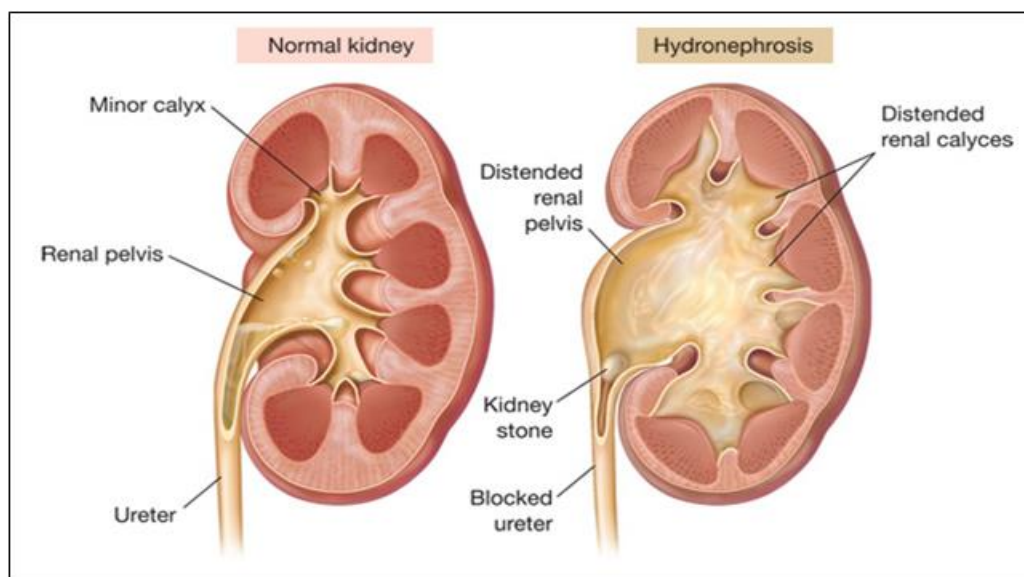
VI. Pathophysiology of Hydronephrosis

The obstruction of the outward flow of urine leads to an increase in the hydrostatic pressure of the collecting system. This causes an increase in intra-glomerular pressure, which will ultimately affect the glomerular filtration rate. The duration and severity of obstruction determine the extent of loss of kidney function. If the obstruction is not relieved, it can lead to kidney scarring and permanent kidney damage with the compromise of glomerular and tubular function. Hence Hydronephrosis can be considered acute if kidney function recovers completely when an obstruction is relieved. In contrast, the kidney function does not recover in chronic Hydronephrosis even after the obstruction is relieved. The prolonged obstruction causes a dilated collecting system, compression of papillae, and thinning of parenchyma leading ultimately to cortical atrophy and tubulointerstitial fibrosis. Impairment of sodium reabsorption, disruption of urinary acidification leading

to metabolic acidosis, and urinary concentrating ability are some of the physiologic effects.

Infants are typically asymptomatic. However, in more severe cases of congenital hydronephrosis, lack of appetite, and frequent urinary tract infections may be present.^[4]

Adults with acute urinary outflow obstruction typically present with constant dull pain thought to be the result of stretching of the renal capsule, with intermittent episodes of severe pain due to genitourinary peristalsis transiently increasing the pressure. Many patients report nausea and vomiting, as well as dysuria or urinary urgency. On exam, these patients have tenderness at the costovertebral angle and often cannot find a position of comfort in the exam room.^[5] Patients with more distal obstruction from prostate hypertrophy may report severe lower abdominal pressure and the urge to urinate.^[6]

**Fig. 03: Physiology of Hydronephrosis.**

VII. Evolution

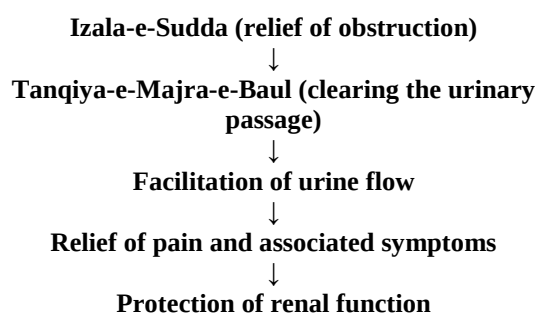
Infants with congenital hydronephrosis should undergo a voiding cystourethrogram to identify patients with vesicoureteral reflux.^[7] When presenting with fever, abdominal pain, nausea, or decreased oral intake, a urinalysis should be obtained as these patients are

predisposed to urinary tract infections (UTIs). A basic metabolic panel should be ordered to establish a baseline renal function which can be followed to indicate the resolution of Hydronephrosis as well as indicate surgical management in patients with worsening renal function.

Adult patients with renal colic due to Hydronephrosis should have a basic metabolic panel to evaluate renal function, as well as a urinalysis. Imaging is indicated in these cases based upon their medical history. A computed tomography (CT) scan is highly sensitive and specific when nephrolithiasis or external compression from neoplastic disease is the cause of symptoms. Additionally, CT will be sufficient to evaluate other causes of acute severe flank pain. In patients with a history of frequent kidney stones and symptoms consistent with prior episodes, an ultrasound is sufficient to evaluate for Hydronephrosis.^[8] Ultrasound is also the imaging modality of choice in pregnant patients with Hydronephrosis.^[9]

VIII. Treatment of Hydronephrosis in Unani Systems of Medicine^[10-12]

Hydronephrosis is dilatation of the renal pelvis and calyces caused by impaired urinary drainage. Since it is usually a consequence of an underlying obstruction or urinary tract abnormality, treatment in both traditional and modern systems should primarily address the underlying cause and preserve renal function. There is no exact classical Unani equivalent of modern hydronephrosis diagnosed by ultrasonography. Therefore, treatment should be discussed through the Unani concepts of Sudda (obstruction), Hasat-ul-Kulya (renal calculus), Ihtibas al-Baul (urinary retention), Waram (inflammation/swelling) and disorders of the kidneys and urinary passages. The broad therapeutic objectives are:



A. Management of urinary calculus^[10-12]

When obstruction is related to a urinary calculus, traditional Unani management may include medicines described as:

- **Mufattit-e-Hasat** – lithotriptic /stone-fragmenting agents
- **Mudirr-e-Baul** – diuretics
- **Musakkin** – analgesic agents
- **Mufattih-e-Sudad** – agents traditionally described as relieving obstruction

Examples of drugs traditionally discussed in Unani literature for urinary calculi include Hajr-ul-Yahud, Tukhm-e-Kharbuza, Tukhm-e-Kahu, Kasni, and Zarawand, depending on the formulation and clinical context. However, these should not be assumed to dissolve or remove an obstructing stone reliably, particularly when hydronephrosis is significant.

B. Ihtibas al-Baul

When urinary retention is present, the underlying cause should be identified. Unani treatment may include measures aimed at facilitating urination, but acute urinary retention requires urgent medical assessment and drainage when indicated.

C. Waram and inflammatory conditions^[10-12]

Where urinary tract inflammation is suspected, treatment in the Unani framework may be directed toward the underlying inflammatory condition using appropriate Musakkin, Muhallil and other traditionally indicated drugs.

D. Dietary and lifestyle measures

Traditional management may emphasize:

- Adequate fluid intake where not contraindicated
- Avoidance of excessive salt
- Appropriate dietary modification according to the cause
- Avoidance of factors believed to aggravate urinary disorders
- Regular urinary habits

Fluid intake, however, should not be aggressively increased in a patient with significant urinary obstruction, because management depends on the degree and site of obstruction.

Table No. 05: Unani formulation in the treatment of Hydronephrosis.

Unani formulation/drug	Traditional therapeutic orientation	Possible relevance
Sharbat-e-Bazoori Motadil	Traditionally used in urinary tract disorders and as a diuretic	Supportive management of urinary disturbances
Majun Najah	Traditionally employed in renal/urinary disorders	May be discussed in urinary obstruction/stone-related conditions
Habb-e-Quruth	Used traditionally in certain urinary and renal disorders	Potential supportive role depending on indication
Jawarish Zarooni Sada	Traditionally associated with kidney and urinary tract disorders	Renal/urinary supportive therapy
Dawa-ul-Misk	Used traditionally for certain renal/urinary	Supportive treatment

Mutadil	functional disorders	
Arq-e-Mako	Traditionally used in inflammatory conditions and urinary disorders	Supportive use where inflammation is considered
Arq-e-Kasni	Traditionally regarded as a cooling/diuretic preparation	Supportive urinary therapy
Habb-e-Hasat	Traditionally indicated for urinary calculi	Particularly relevant where calculus is the cause of obstruction

IX. Allopathic Treatment of Hydronephrosis^[10-12]

Modern treatment is based on the cause, severity, duration, laterality and effect on renal function.

A. Observation: Mild Hydronephrosis without significant obstruction, infection or renal impairment may sometimes be managed with:

- Observation
- Periodic ultrasonography
- Renal-function monitoring
- Treatment of the underlying condition

Some cases, particularly mild congenital or pregnancy-associated dilatation, may resolve without intervention.

B. Treatment of urinary stones: If Hydronephrosis is caused by a ureteric stone, management depends on stone size, location, symptoms and obstruction.^[10-12]

Treatment may include:

- Analgesics
- Medical expulsive therapy in selected patients
- Extracorporeal shock-wave lithotripsy (ESWL)
- Uteroscopy with stone removal or laser lithotripsy
- Percutaneous nephrolithotomy for selected larger renal stones

C. Ureteral stent: A ureteral stent can be inserted to bypass an obstruction and restore urine drainage from the kidney to the bladder.

D. Percutaneous nephrostomy: A percutaneous nephrostomy provides drainage directly from the renal collecting system through a tube inserted through the skin. It may be particularly important when there is severe obstruction and immediate decompression is required.

E. Treatment of ureteropelvic junction obstruction: In patients with significant ureteropelvic junction obstruction, surgical correction such as pyeloplasty may be required.

F. Treatment of bladder outlet obstruction: When Hydronephrosis is caused by bladder outlet obstruction, treatment may include:

- Urinary catheterization when appropriate
- Medical treatment of benign prostatic hyperplasia
- Endoscopic procedures
- Surgical treatment when required

DISCUSSION

Hydronephrosis is an important urinary tract condition characterized by dilatation of the renal pelvis and calyces resulting from impaired drainage of urine. It is generally considered a consequence of urinary tract obstruction or impaired urinary flow rather than an independent disease entity. Persistent obstruction can increase pressure within the renal collecting system and may progressively compromise renal parenchyma and renal function. The clinical significance of Hydronephrosis therefore depends largely upon the site, severity and duration of obstruction, as well as whether the obstruction is unilateral or bilateral and acute or chronic.

The historical development of knowledge concerning Hydronephrosis demonstrates a gradual transition from clinical recognition of urinary disorders to modern anatomical and physiological understanding. Ancient Greek physicians, particularly the Hippocratic physicians, recognized urinary retention, difficulty in urination, renal disorders and urinary calculi. Although these descriptions cannot be considered direct descriptions of modern Hydronephrosis, they demonstrate an early understanding of the pathological consequences of impaired urinary flow. Later anatomical contributions from Herophilus, Erasistratus and Galen, followed by Renaissance anatomical studies, progressively improved understanding of the kidneys, ureters and urinary bladder. This anatomical knowledge ultimately provided the basis for understanding how urinary obstruction can produce dilatation of the upper urinary tract.

From the modern medical perspective, obstruction may occur at different levels of the urinary tract, including the ureteropelvic junction, ureter, vesicoureteral junction, urinary bladder or urethra. Obstruction increases hydrostatic pressure within the collecting system and, when prolonged, may produce dilatation of the renal pelvis and calyces, compression of renal parenchyma, tubular and interstitial injury, reduction in renal blood flow and progressive impairment of renal function. Severe and prolonged obstruction may ultimately result in irreversible renal damage. Thus, early identification of the underlying cause and restoration of urinary drainage are important components of management.

A significant finding of the present review is that there is no exact one-to-one classical Unani equivalent for the modern radiological diagnosis of Hydronephrosis. Consequently, it would be inappropriate to identify Hydronephrosis directly with a single classical Unani

disease entity. Instead, it can be conceptually correlated with the classical descriptions of disorders involving the kidneys (*Kulyatayn*), urinary passages, urinary retention and obstruction. In particular, the Unani concept of *Sudda* provides an important conceptual framework for understanding obstructive urinary disorders. The proposed sequence of *Sudda* → impaired urinary flow → accumulation or retention of urine → dilatation of the urinary collecting system → renal damage provides a conceptual bridge between the traditional description and modern pathophysiology.

Among the Unani concepts reviewed, *Hasat-ul-Kulya* (renal calculus) has particular relevance because a calculus may obstruct the ureter or urinary outlet and consequently impair urinary drainage. The sequence of *Hasat-ul-Kulya* → urinary obstruction → impaired urine drainage → urinary accumulation → dilatation of the renal pelvis and calyces corresponds conceptually with the modern understanding of stone-associated Hydronephrosis. Similarly, *Ihtibas al-Baul* may be considered relevant where significant urinary retention results from obstruction. However, urinary retention itself should not automatically be regarded as equivalent to Hydronephrosis because the development of upper urinary tract dilatation depends upon the site and severity of obstruction.

The concept of *Waram* (inflammation or swelling) may also have relevance when inflammatory changes narrow the urinary passage and interfere with urine flow. The manuscript further discusses *Su'i-Mizaj* of the kidney and *Zu'f al-Kulya* as broader traditional concepts relating to renal dysfunction. These concepts should, however, be interpreted within the framework of Unani pathology and should not be presented as direct anatomical equivalents of hydronephrosis. In particular, renal weakness alone does not necessarily produce Hydronephrosis unless it occurs in association with obstruction or impaired urinary drainage.

The review also identifies several additional Unani concepts that can be conceptually correlated with possible causes of urinary obstruction, including accumulation of abnormal material, *Quruh* (ulceration), *Tashannuj* (spasm), narrowing or structural alteration of the urinary passages, masses or growths, and congenital abnormalities. These correlations should be regarded as interpretative relationships between traditional terminology and modern clinical conditions rather than as evidence that classical Unani physicians described Hydronephrosis in its present anatomical and radiological form.

The epidemiological pattern of Hydronephrosis also emphasizes the importance of identifying the underlying cause. The condition can occur from fetal life to old age. In children, congenital urinary tract abnormalities such as ureteropelvic junction obstruction, vesicoureteral reflux, posterior urethral valves and ureterovesical

junction obstruction are important causes. In adults, acquired causes such as urinary calculi, benign prostatic hyperplasia, ureteric strictures, malignancies, retroperitoneal fibrosis, neurogenic bladder, blood clots, pelvic masses and iatrogenic injury become important. Pregnancy may also be associated with urinary tract dilatation because of mechanical and hormonal factors.

The pathophysiological consequences of prolonged obstruction are particularly important when considering therapeutic intervention. Increased pressure within the collecting system can affect glomerular filtration and, when obstruction persists, lead to renal scarring, tubular and glomerular dysfunction, cortical atrophy and tubulointerstitial fibrosis. The severity of renal damage is related to the duration and degree of obstruction. This emphasizes that management should not be directed merely at relieving symptoms but should also aim to identify and correct the underlying cause and preserve renal function.

Diagnosis requires assessment of both the presence of Hydronephrosis and its underlying cause. Ultrasonography is an important imaging modality for detecting Hydronephrosis, while CT may be particularly useful when nephrolithiasis or external compression is suspected. Assessment of renal function and urinalysis are also important, particularly in patients with symptoms suggestive of obstruction or infection. In pregnancy, ultrasound is particularly useful for evaluating urinary tract dilatation. Thus, modern diagnostic methods provide an anatomical and functional assessment that cannot be replaced by traditional symptom-based classification alone.

From the Unani therapeutic perspective, the principal objectives are *Izala-e-Sudda* (relief of obstruction), *Tanqiya-e-Majra-e-Baul* (clearing of the urinary passage), facilitation of urine flow, relief of pain and associated symptoms, and preservation of renal function. Where urinary calculus is implicated, the manuscript describes therapeutic categories such as *Mufattih-e-Hasat* (traditionally described as stone-fragmenting agents), *Mudirr-e-Baul* (diuretics), *Musakkin* (analgesic agents) and *Mufattih-e-Sudad* (agents traditionally described as relieving obstruction). Examples discussed include *Hajr-ul-Yahud*, *Tukhm-e-Kharbuza*, *Tukhm-e-Kahu*, *Kasni* and *Zarawand*. However, the manuscript appropriately cautions that these traditional agents should not be assumed to reliably dissolve or remove an obstructing calculus, particularly when hydronephrosis is significant.

Several Unani formulations are traditionally associated with renal and urinary disorders, including *Sharbat-e-Bazoori Motadil*, *Majun Najah*, *Habb-e-Quruth*, *Jawarish Zarooni Sada*, *Dawa-ul-Misk Mutadil*, *Arq-e-Mako*, *Arq-e-Kasni* and *Habb-e-Hasat*. Their relevance in the present context should be understood as supportive or related to the underlying urinary disorder rather than as established specific treatments for hydronephrosis. In

particular, *Habb-e-Hasat* is discussed in relation to urinary calculi, making it conceptually relevant when calculus is the underlying cause of obstruction.

An important point emerging from the review is the need for a cause-based approach rather than treating hydronephrosis as a single disease. In modern medicine, management may range from observation in selected mild cases to analgesia and stone-directed procedures, ureteroscopic intervention, extracorporeal shock-wave lithotripsy, percutaneous nephrolithotomy, ureteral stenting, nephrostomy or surgery, depending on the cause and severity. Ureteral stenting and percutaneous nephrostomy can restore drainage when significant obstruction requires decompression, while procedures such as pyeloplasty may be necessary in selected cases of ureteropelvic junction obstruction.

Therefore, the Unani contribution to the understanding of hydronephrosis is best presented as a conceptual and therapeutic correlation with disorders of urinary obstruction, calculus, retention and inflammation. The traditional concepts of *Sudda*, *Hasat-ul-Kulya*, *Ihtibas al-Baul* and *Waram* provide useful frameworks for discussing the underlying urinary disturbances. Nevertheless, the absence of an exact classical equivalent and the potential for progressive and irreversible renal damage necessitate careful modern diagnostic evaluation. In significant obstruction, preservation of renal function depends on timely restoration of urinary drainage, and traditional medicines should not delay appropriate urological intervention.

CONCLUSION

Hydronephrosis is primarily a consequence of impaired urinary drainage or urinary tract obstruction rather than an independent disease entity. Persistent or severe obstruction can result in progressive dilatation of the renal collecting system, renal parenchymal damage and deterioration of renal function. Therefore, early identification of the underlying cause and timely restoration of urinary drainage are essential for preventing irreversible renal injury.

From the Unani perspective, there is no exact one-to-one classical equivalent of the modern anatomical and radiological diagnosis of Hydronephrosis. However, important conceptual correlations can be established with *Sudda* (obstruction), *Hasat-ul-Kulya* (renal calculus), *Ihtibas al-Baul* (urinary retention), *Waram* (inflammation/swelling) and other disorders of the kidneys and urinary passages. Among these, *Sudda* and *Hasat-ul-Kulya* provide particularly relevant conceptual frameworks for understanding impaired urinary flow and obstruction. The Unani therapeutic principles of *Izala-e-Sudda* and *Tanqiya-e-Majra-e-Baul*, along with measures directed toward facilitating urine flow, relieving associated symptoms and preserving renal function, may be considered supportive approaches to the underlying urinary disorder. Traditional Unani formulations used in

renal and urinary disorders may have a supportive role when appropriately indicated; however, they should not be considered specific or established treatments for Hydronephrosis itself. In particular, significant obstruction, acute urinary retention, infection, or deterioration of renal function requires appropriate modern urological assessment and, when necessary, timely decompression or definitive intervention. Overall, an appropriate integrative approach should recognize the valuable traditional concepts of Unani medicine while clearly distinguishing them from the modern anatomical diagnosis of hydronephrosis. Modern diagnostic imaging and renal-function assessment provide essential evaluation of the severity and cause of obstruction, whereas Unani concepts offer a traditional framework for understanding urinary obstruction, calculus, retention and associated renal dysfunction.

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