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## Nepbro-protective concept and drugs described in Unani system of medicine: A review

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### Abstract

Nephrotoxicity is a poisonous effect of some substances, both toxic chemicals and medication on the kidneys. A number of therapeutic agents like certain antibiotics, anticancer drugs and other synthetic molecules adversely affect the kidney resulting in life threatening renal diseases. Nephrotoxicity is one of the major problems in the current era.

These drugs from the treasure of traditional systems of medicines can also be used to protect the renal function and delay the progression of renal damage that leads to several life threatening diseases. The Unani System of Medicine possesses a number of drugs which are effective in various renal disorders. Some of the single as well as compound formulations mentioned in Unani literature have been evaluated for their effects on renal disorders and reported to possess anti-inflammatory, diuretic, antioxidant and nepbro-protective effects against known toxicants. The researchers are keen to develop some good and cost effective drugs from the sources of traditional medicine. In the present review paper, concept of nepbro-protection and herbal drugs mentioned as nepbro-protective in classical literature of Unani system of medicine will be elaborated.

**Keywords:** *Quwwat-e-Dafeah*; Nepbro-protection; *Mudir-e-Baul*; *Quwwate mumayyizah*

### Introduction

Nepbrotoxicity is one of the most common kidney problems and occurs when body is exposed to some substances, both toxic chemicals and medication on the kidneys [1]. Infact, it is an inherent adverse effect of certain antibiotics, anticancer drugs and other synthetic molecules which are used for various ailments in the current era. A number of therapeutic agents can adversely affect the kidney resulting in acute renal failure, chronic interstitial nephritis and nephritic syndrome [2, 3]. An impairment in kidney function leads to decreased glomerular filtration rate (GFR) and subsequently to renal failure, where retention of metabolic by products occurs as a consequence of deteriorating renal functions, which requires medical intervention. Majority of patients die because of uremia in poor countries where such facilities are scarcely available [4]. In India the projected number of deaths due to chronic kidney diseases is on a rise. In 1990 it was 3.78 million and is expected to become 7.63 million in 2020. Globally more than 500 million people or roughly one in ten persons have some form of chronic kidney disease (CKD) [5]. In addition, individuals with kidney diseases are at an increasing risk of other systemic diseases which frequently prove to be fatal [6]. The cost management of nephropathies is very high, mainly due to increasing number of patients and availability of very limited facilities especially in developing and underdeveloped countries. This forced the physicians to think of some alternative measures to preserve the renal function as far as possible and slow the renal disease progression [2].

After the experimental demonstration of ACE (Angiotensin converting enzyme) inhibitors slowing the progression of loss of renal function in a number of renal diseases [7] the concept of nepbro-protection evolved which encouraged the physicians to practice it aiming at early detection and subsequent prevention of progression of kidney disease, mainly through lifestyle adjustment and with the use of new pharmacological agents [8].

A nepbro-protective agent can be a drug, which improves the kidney function or delays the degenerative changes occurring in the kidney through any of the mechanisms. Some of the related pharmacological actions of a drug like diuretic, ant-inflammatory etc. have also been shown to have complementary nepbro-protective effect [9, 10]. A few drugs have been found in the recent past which possesses significant nepbro-protective effect; though their mechanism of action is not fully understood still they qualify the criteria of nepbro-protection due to their overall renal function improving effect [1, 9, 10, 11, 12, 13].

The traditional systems of medicines can offer some novel drugs, which may be effective in different pathological conditions of the kidney. In recent past it has been shown that a number of drugs from herbal medicine possess promising nephro-protective effect [1, 9, 10, 14, 15, 16, 17].

In this direction Unani System of Medicine is also not lagging behind and is offering drugs for numerous kidney diseases. It claims to possess a number of drugs that can be used in treating renal diseases successfully [18]. Some of the drugs mentioned in Unani literature and being practiced by Unani physicians since hundreds of years, have been demonstrated to produce some important actions like diuretic, anti-inflammatory, antioxidant and nephro-protective in various experimental and clinical models [19, 20]. These reports are indicative of great potential of Unani medicines to offer promising nephro-protective drugs.

### Concept of nephro-protection in Unani system of medicine

Nephro-protection has not been described as such in Unani System of Medicine, but the principles of treatment in this system are based on the concept of organ protection, strengthening and maintenance of the faculties (*Quwa*) at its equilibrium (*Ae'tedal*). The faculties at their equilibrium are poised inherently to maintain the normal functions of that organ/system and make it strong enough to fight and remove the untoward elements that can come into contact [21, 22, 23]. This is the reason why in Unani system of medicine, for every organ/system a group of tonic drugs has been proposed, that safeguards its larger interest and brings it near to its equilibrium if some derangement in its function or structure has taken place. If the normalization does not take place then the drugs possessing specific actions are used to treat the disease or inhibit its progression [21, 22, 23, 24]. Thus, we can say that the protective approach to prevent, treat or slow the progression of disease is the hallmark of Unani System of Medicine.

According to Unani system of medicine all the organs have been endowed with four faculties viz. *Quwwat-e-Hazimah*, *Quwwat-e-Jazibah*, *Quwwat-e-Masikah* and *Quwwat-e-Dafeah*, which work in coordination to maintain the function and the structure of each organ [23, 25].

Apart from these four faculties that are responsible to maintain its normal functioning, the kidney has also been bestowed upon with a special faculty namely *Quwwate mumayyizah* (separating and distinguishing force), by virtue of which kidney separates the blood from impurities and wastes which are the sequels of the ongoing metabolic process in the body or come from the deliberately administered drugs and chemicals for therapeutic purposes or passively ingested toxicants from the environmental pollution or exposure to various hazardous toxins [23, 24, 25]. When the process of separation completes, *Quwwate Dafeah* helps the wastes to get eliminated, as early as possible. It suggests that a number of forces that complement each other operate continuously in a synchronized way not only to maintain the functioning of kidney but also to protect it by not allowing the wastes and toxins to which the kidney is continuously exposed, and that may be in contact with it for sufficient period and cause local injury. Thus, the reno-protection by view point of Unani Medicine involves the protection of the various faculties of the kidneys to maintain its functioning. These forces are competent enough to negotiate with the toxins

that frequently come in contact with it. In case of mild degree of kidney disorder the drugs categorized to be kidney tonics are sufficient enough to deal with the situation and to restore normalcy. However, when gross impairment in kidney function or matrix takes place because of the high toxic effect of a substance or because one of the natural faculties is undermined owing to some local or systemic disease of the body, then the drugs having other pharmacological actions along with the tonic are used.

Drugs ascribed to possess *Mudir-e-Baul* (diuretic), *Muhallil-e-Awram* (anti-inflammatory), *Mushil* (cathartic) actions along with *Muqqawi* (tonic) effect are frequently used with an aim to treat the pathology and invigorate the kidney to bounce back to its normal state to perform its assigned work [23, 24, 25, 26, 27, 28]. According to Ibne Sina, *Muqqawiyat* (tonics) are described as a drug which moderates the disposition and temperament of an organ to an extent so that it resists the superfluous matter and disorders moving towards it, this action is elicited either by its inherent property or by its moderate temperament, by which the kidney adapts to maintaining its functions. Further, in case of progression of kidney diseases some other drugs are included in the regimen along with the drugs mentioned above, to directly ameliorate the compromised condition by promoting the healing of injured tissue, removal of toxins and reducing the pressure of work on kidney by evolving the other system or organs of the body [26, 27, 28]. Despite having a comprehensive approach of treatment it has been described by the Unani physicians that the treatment of renal injury itself is very difficult because of several reasons such as:

- Kidney is the passage of urine and other waste product therefore the drugs intended to be effective do not stay at the site of action for sufficient period of time.
- The matrix of kidney is too hard therefore the drugs did not diffuse easily to the site of action.
- The waste material excreted by kidney is usually of harsh and corrosive in nature which delay or partially hamper the process of healing.
- Kidneys always remain busy in their work, while healing process requires a degree of rest [21, 22, 23, 24, 25, 26, 27, 28, 29].

### Plants as nephro-protective agents

Sources of herbs which have been documented for possible use as nephroprotective in nephrotoxic disorders in Unani literature are presented briefly. *Tukhm-e-Shibbat* the seeds of *Peucedanum graveolens* commonly known as Dill fruit are reported to be antidysenteric, diuretic, carminative, emmenagogue, galactagogue, and resolvent [23, 26, 28]. The seeds of *Gazar (Daucus carota)* commonly known as carrot are considered to be nervine tonic, a decoction of the seeds is said to be used by natives as a stimulant to the uterus during parturition, lithotriptic, diuretic, aphrodisiac, emmenagogue, demulcent and diaphoretic [23, 28]. The seeds of *Nankhah (Trachyspermum ammi)* commonly known as Ajwain have been reported to be carminative, digestive, appetizer, diuretic and emmenagogue [23, 26]. The seeds of *kharpazah (Cucumis melo)* are reported to be diuretic, detergent, demulcent, lithotriptic, further used in burning micturition and oliguria [23, 26]. The seeds of *khayar (Cucumis sativus)* cures strangury, thirst, and are used in painful micturition and oliguria and in renal and urinary bladder calculi, promoting the passage of calculi [23, 30]. The

plant commonly known as “Bisheri Booti.” (*Aerva lanata*) is used by the inhabitants in nephrological disorders<sup>[31]</sup>. The dried ripe fruits of Karafs (*Apium graveolens*) are reported to be stimulant, aromatic, emmenagogue and diuretic, *Beekh Karafs* (the roots of karafs) is also reported to be appetizer, carminative, lithotriptic, diuretic, emmenagogue, deobstruent, frequently used in dropsy, anuria, kidney and vesical calculi and amenorrhoea<sup>[23, 30, 31]</sup>.

From the last few decades several herbs mentioned in Unani system of medicine has been evaluated experimentally as well as clinically for the nephro-protective effects. Few studies will be mentioned briefly here. The clinical, experimental and immunological studies on Biskhapra (*Boerhavia diffusa*) reveal equivalent diuretic effect as of frusemide. *Biskhapra* increases serum protein level and decreases urinary protein excretion in patients of nephritic syndrome. Clinically *Biskhapra* was proved to be useful and safe drug in patients of nephritic syndrome<sup>[32]</sup>. Simultaneous administration of Gokhroo (*Tribulus terrestris*) 200 mg/kg/day/orally and gentamicin to female rats decreased the gentamicin induced nephrotoxicity in both structural and functional terms. The effects were comparable to that of Verapamil<sup>[33]</sup>. The leaf juice of Turb or Mooli (*Raphanus sativus*) is prescribed in dysuria as well as in the obstruction of urinary passage. Root juice of the same is used in urinary troubles and seeds are found to be effective in increasing the excretion<sup>[34]</sup>. The decoction of whole plant Satavar (*Asparagus racemosus*) is used in the ailment of kidney<sup>[34]</sup>.

Seeds of Rehan (*Ocimum sanctum*) are useful in complaints of urinary system, Sahajna (*Moringa olifera*) with a little opium (*Papaver somniferum*), Giloo (*Tinospora cordifolia*) are useful in the inflammation of kidney<sup>[34]</sup>. The protective effect of Asgandh (*Withania somnifera*) on Cadmium induced toxicity in mice kidney has been studied. Results based on lipid peroxidation indicate that Asgandh is capable of reducing toxicity caused by cadmium<sup>[35]</sup>.

Infact, from the classical literature of Unani system of medicine, few compounds Unani formulations have also been evaluated for the nephro-protective effect on recent scientific parameters. A Unani formulation “*Banadequl Buzoor*” was tested for nephro-protective activity, and was found to decrease the serum urea and serum creatinine levels significantly<sup>[19]</sup>. Further, several Unani compound formulations have been reported to possess the nephro-protective activity, among them *Jawarish Zarooni sada* is very famous<sup>[18]</sup>.

### Conclusion

The Unani System of Medicine possesses a number of drugs which are effective in various renal disorders. Some of the single as well as compound formulations mentioned in Unani literature have been evaluated for their effects on renal disorders and reported to possess anti-inflammatory diuretic, antioxidant and nephro-protective effects against known toxicants.

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