

Review Article

A REVIEW ON COMPREHENSIVE OVERVIEW IN THE MANAGEMENT OF NEPHROTIC DISORDERS

HARIKESH MAURYA*, TIRATH KUMAR

Department of Pharmaceutical Sciences, Kumaun University, Bhimtal Campus, Bhimtal, Nainital, Uttarakhand, India
Email: mauryaharikesh2@gmail.com

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ABSTRACT

The nephrotic disorder are the medical condition characterized by a cluster of indication that includes protein in the urine, low blood protein levels, high cholesterol levels, high triglyceride levels, and swelling of the limbs. Oxidative stress, chronic inflammation, psychological stress, diabetes, hypertension, and glomerulonephritis are known to be the most common causes of kidney failure. Treatment modalities which control these factors and improve lifestyle for survival to the patients are "AYUSH" medication system, considerably accepted by health-care professional. In this Ayurvedic medications and Yoga therapies are really introduced for the management as well as regain of altered kidney function. From the ancient time, herbal medicine has been widely used and found the significant effects for relieving the sign and symptoms of nephrotic disorders, while Yoga plays a significant role for the management of non-communicable diseases. Regular yoga practice can help control sugar levels, blood pressure and reduce the risk of cardiac complications in patients with heart diseases as well as impaired kidney function. Thus, yoga has been promising a role in the primary and secondary management of chronic kidney disorder as an adjuvant along with necessary precautions to be taken while doing yoga. Now we compile every treatment medication system to relieve the symptoms and management of all complications in the patients with kidney disorders.

Keywords: Nephrotic disorders, Pathogenesis of proteinuria, Albuminuria, Oedema, AYUSH medication system

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INTRODUCTION

Nephrotic disorders (ND) are an indication of the intention of something wrong amongst kidney function, which is usually caused by damage to the clusters of small blood vessels (glomeruli) that filters wastage and maintains the equilibrium of water into the blood [1,2]. In this condition, the human body excretes excess protein (Massive proteinuria>3g in 24 h) in urine, resulted in low blood protein levels. Other common factors like; high-cholesterol levels (Hypercholesterolaemia>7 mmol/l), hypercoagulability and high triglyceride levels in blood but low levels of albumin (Hypoalbuminaemia<3g/dL) in the blood causes swelling of feet, ankles, stomach, and eyes sometimes the face (oedema due to sodium and water retention) [3, 4]. The effect gradually increases in all age groups of population, but it is more common in children between the ages of eighteen months to eight years. The occurrences of nephrotic disorders in pretentious patients are slightly higher in males than females and also differentiated by geographic location and ethnic origin [5, 6].

The comprehensive descriptions of abnormalities related to ND are as follows;

Proteinuria

It is commonly observed that twenty times more protein leaks out in urine due to damage of glomeruli in comparison to a healthy human.

Edema

Usually seen in patients with ND, either in a localized form or in a generalized form. The leakage of albumin in urine subsequently decreases oncotic pressure, which leads to edema basically, begins with a face, legs, stomach and eyes [7].

Hypoalbuminemia

Generally, the protein deficiency occurs due to massive loss of albumin in urine leads to alteration of hepatic albumin production.

Hyperlipidemia

The increased lipid and cholesterol levels in blood occurred due to abnormal lipoprotein homeostasis, which leads to increase in

synthesis and decrease in the catabolism of lipids. In hyperlipidemic patients, the major risk of cardiac diseases like atherosclerosis, coronary artery disease may observe [8].

Hypercoagulability

There is the loss of antithrombin III in urine, which leads to altered activity of protein C and S. Increased fibrinogen synthesis by the liver and increased platelet aggregation, collectively leads to myocardial infarction in patients with ND.

Decreased immunity

In patients with ND the complimentary cascade and massive loss of IgG lead to a decrease in immunity.

Anemia

Due to the loss of functional proteins in urine may it may lead to microcytic anemia. It also occurs due to decreased renal erythropoietin synthesis [9, 10].

Sign and symptoms

In patients with nephrotic disorders, adults do not show any symptom principally, while children are showing consequently. The most prominent symptoms of nephrotic disorders in all age groups are comprised; proteinuria, hypoproteinemia, hypoalbuminemia, hyperlipidemia, facial swelling, puffiness around the eyes, pitting edema over arms and legs, gastric swelling, pulmonary edema, foamy appearance to the urine, poor appetite, weight gain, myocardial infarction, general fatigue and lethargy, episodic ventral pain, leukonychia, dyslipidemia. Further, when the condition progresses towards it may probably; recurrent infection, thrombosis, muscle wasting, malnourishment, weakening of the bones, abnormality in blood pressure, high blood cholesterol levels, acute kidney failure occurs [11-14].

Etiology

Disorders that damage the kidney, promote the release of surplus protein into the urine. The following common causes of nephrotic disorder are as follows;

A. Primary causes

1. **Minimal change disease:** Characterized by diffuse effacement of the foot processes of the podocytes. It occurs due to high concentrations of the small heat shock protein 27 within podocytes as well as increased glomerular accumulation and also commonly observed in children ages between 2-6 y.
2. **Focal segmental sclerosis:** Characterized by scattered scarring of some glomeruli, this condition may result from a genetic defect or unknown reason of another disease.
3. **Membranous nephritis:** Characterized by diffuse thickening of the glomerular capillary wall due to the accumulation of Ag-Ab reaction and deposition of subepithelial cells at the site of the basement membrane. Sometimes associated with hepatitis B, malaria, lupus, and cancer.
4. **Focal segmental nephritis:** Characterized by inflammation of some glomeruli and affects only a portion of glomerular capillary.
5. **Membrano-proliferative nephritis:** Characterized by alterations in the glomerular basement membrane, proliferation of glomerular cells, mesangial endothelial cells and leukocyte infiltration [15, 16].

B. Secondary causes

1. **Diseases:** Diabetes, Systemic lupus erythematosus, Amyloidosis
2. **Cancer:** Lymphoma, Multiple myeloma
3. **Drugs:** Antimicrobial agents, NSAID, Penicillamine, Captopril, Tamoxifen, Gold, Lithium, etc.
4. **Infection:** HIV, Mycoplasma, Syphilis, Filariasis, Schistosomiasis, Toxoplasmosis, Malaria, Hepatitis B and C
5. **Congenital causes:** Genetic disorders, Immune disorders, Alpert's syndrome, Pierson's syndrome, Nail-patella syndrome, Denys-drash syndrome [17, 18].

C. Others

1. **Thromboembolism:** Renal vein thrombosis, which occurs when a blood clot blocks a vein connected with the kidney.
2. **Infection:** Bacterial infections like cellulitis and pneumonia, bacterial peritonitis, viral infection in immuno-compromised patients.
3. **Heart failure:** Some forms of heart failure, such as constrictive pericarditis and severe right heart failure, can cause nephrotic disorder [19, 20].

Epidemiology

Nephrotic disorders are relatively extraordinary but an important manifestation of kidney disease. The incidence of the nephrotic disorder is about three new cases per 100,000 people each year in the adult population [21]. In which focal segmental glomerulosclerosis and membranous nephropathy are the most common primary causes while diabetes mellitus is the most common secondary cause [22]. Minimal change disease accounts for about 28% of cases of the nephrotic disorder in adults [23]. The incidence of minimal change disease is higher in children with a reported incidence of 2 per 100,000 per annum in Caucasian children and higher rates in Arabian and Asian children [24-26].

Prognosis

Congenital nephrotic disorders usually carry an extremely poor prognosis and highly variable depending on the underlying causes. Corticosteroids have reduced the mortality rate in children about 3% in children [27]. Outlook for the vast majority of children with minimal change nephrotic syndrome is excellent with the good response to steroids, although there may be relapses and need to use alternative immunomodulators. Since the introduction of corticosteroids, the overall mortality of primary nephrotic syndrome has decreased dramatically from over 50% to approximately 05%. The majority of children who present with their first episode of nephrotic syndrome achieve remission with corticosteroid therapy

but over 70% experience a relapsing path [28, 29]. Adult prognosis is variable and largely related to the underlying cause, its severity, progression and response to any treatment used to modify it. For adults with idiopathic, focal and segmental glomerulosclerosis, treatment may achieve complete or partial remission of proteinuria about 63% of patients and protect them from end-stage renal disease, but the remaining patients are resistant to currently available drugs [30, 31].

Laboratory analysis

- Urine dipstick analysis: Proteinuria and also check microscopic hematuria.
- Midstream urine for microscopy, culture and sensitivities to exclude urinary tract infection.
- Quantify proteinuria of early-morning urinary protein or albumin in respect to creatinine.
- FBC and coagulation screen.
- Renal function tests.
- LFTs and bone profile (calcium, phosphate, alkaline phosphatase).
- Test for other systemic diseases and causes of nephrotic disorder:
 - ESR and CRP
 - Fasting glucose
 - Immunoglobulins, serum and urine electrophoresis
 - Autoantibodies and complement levels autoimmune screening.
 - Hepatitis B & C with HIV test.
- CXR and abdominal or renal ultrasound scan.
- Consider complications:
 - Lipids-hyperlipidemia
 - Doppler ultrasound of renal vein and leg veins in suspected deep-vein thrombosis
 - CT and MRI scanning of the abdomen if renal vein thrombosis is suspected.
 - Abdominal ultrasound and venography of the inferior vena cava
 - Ventilation-perfusion scan and pulmonary angiography
 - Renal biopsy under ultrasound [32-35].

Pathogenesis

Common manifestations of the syndrome are proteinuria, edema, hypoalbuminemia, hyperlipidemia, and hypercoagulability. Recent research has presented findings that contradict some of the accepted theories regarding the pathophysiology of some symptoms of the syndrome given in fig. 1.

1. Pathogenesis of proteinuria

A defect in tubular transport due to either from chemicals like Gold, Anti-microbial agents, Antineoplastic, Allopurinol, NSAID, Tenofovir or defect in the foot process [36]. Due to a defect in tubular transportation protein excretion increases, causes increased GFR. Further due to Glomerular structure changes the endothelial cell surface of GBM or podocytes get damaged, and a large amount of protein leaks out in urine [37, 38].

2. Pathogenesis of hypoproteinemia

Hypoproteinemia favours peripheral filtration; the loss of plasma water into the interstitial space leads to hypovolemia, which triggers thirst, the release of ADH and rennin-angiotensin-aldosterone system [39]. Increased water intake and increased reabsorption of sodium chloride

and water offer to sustain the edemas, while aldosterone promotes renal excretion of K^+ and H^+ leads to develop hypokalemia and alkalosis [40].

3. Pathogenesis of albuminuria

It occurs due to excess loss of albumin demonstrated by serum electrophoresis. The concentration of larger proteins actually tends to increase because of the decreased oncotic pressure in the vascular system leads to increased filtration of plasma water

around the periphery and thus to a concentration of the other blood constituents [41]. Peripheral filtration capillaries are facilitated not only by the decreased oncotic pressure but also by damage to the capillary wall that may furthermore be subject to inflammatory changes [42].

As a result of protein filtration in the periphery, protein concentration and oncotic pressure rise in the interstitial spaces, so that the filtration balance shifts in favour of the interstitial space [43].

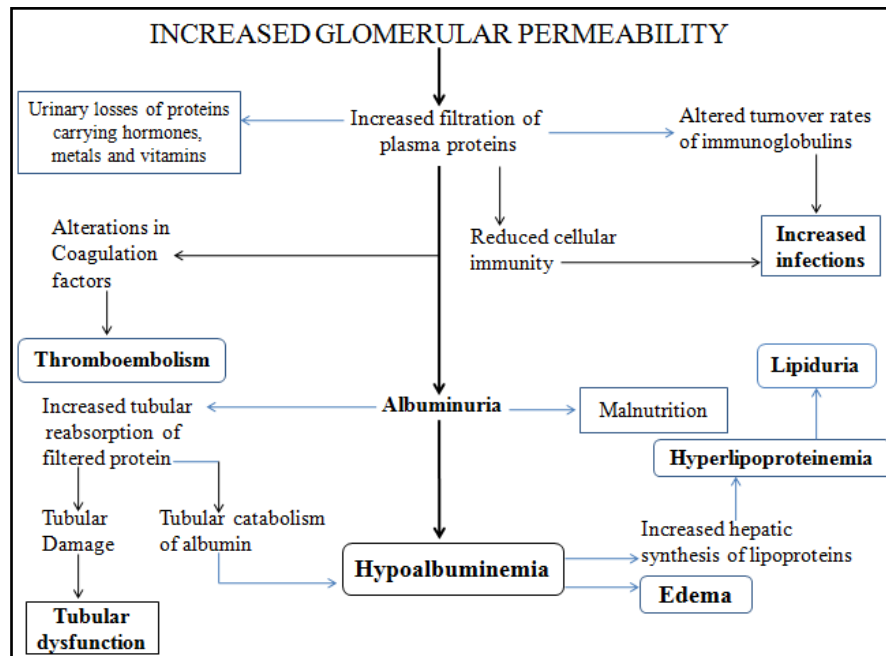


Fig. 1: Pathophysiology of nephrotic disorder-Increased glomerular permeability causing leakage of plasma protein in urine, Hypoalbuminemia is the cause of main clinical features
Source-<https://o.quizlet.com/CuSlSFUezYGs4IFS1kdL7w.png>

4. Pathogenesis of edema

The classical explanation for edema formation is a decrease in plasma oncotic pressure, as a consequence of low serum albumin levels, causing extravasations of plasma water into the interstitial space [44]. The resulting contraction in plasma volume leads to stimulation of the renin-angiotensin-aldosterone axis and antidiuretic hormone. The resultant retention of sodium and water by the renal tubules contributes to the extension and maintenance of edema [45, 46].

5. Pathogenesis of thrombosis

Patients with nephrotic syndrome are at increased risk for thrombosis due to urine losses of antithrombotic proteins such as antithrombin III and proteins C and S, increased prothrombotic factors such as increased platelet number, platelet activation and aggregation and increased levels of factor V, VIII, Von Willebrand factor, α 2-plasmin inhibitor, plasminogen activator inhibitor 1, fibrinogen, potential central hypovolemia, immobility and increased incidence of infection [47-49].

Renal vein thrombosis, deep-vein thrombosis, and pulmonary embolism (PE) are the most frequently encountered thromboembolic complications (TECs) in children [50]. Other venous sites of thrombosis include the superior sagittal sinus, other cerebral venous sites, and the inferior vena cava. Arterial thrombosis, although less common than venous TEC, can occur and has been reported at the axillary, subclavian, femoral, coronary, and mesenteric arteries [51, 52].

Diagnosis

Typical clinical, subclinical and laboratory features of the nephrotic syndrome are sufficient to focus on identification of an underlying

cause while a renal biopsy confirms the presence of nephrotic disorders [53]. In addition to a physical examination and the assessment of past history, the foremost three tests are required to diagnose the nephrotic syndrome:

A. Blood analysis shows high-cholesterol levels and low albumin; an elevated level of BUN and creatinine may confirm the patient has renal failure, and the prognosis is worse [54].

B. Urine analysis determines the actual amount of protein in the urine; a 24-hour quantitative test must be done, which indicates levels of protein and creatinine in the urine [55].

C. A kidney biopsy may be used to determine the underlying cause and extent of disease except for the following cases;

- Children with ND most often have minimal change disease and respond well to a short course of steroids. A biopsy should only be considered if they do not show a favorable response to the steroids within 6-8 w.

- Adult patients with the history of diabetes who have tested negative to other disorders such as myeloma, infections, and collagen vascular diseases. It is presumed the cause of the proteinuria is diabetic nephropathy, and a kidney biopsy is not necessary. If the duration of diabetes has been short or the severity of the ND is profound, a kidney biopsy is considered.

- Elderly patients, those for whom immunosuppressive drug therapy is not advisable are typically not candidates for a biopsy [56-58].

The particular diagnostic studies for some common secondary causes of nephrotic syndrome [59], as well as baseline evaluations that should be obtained from all persons with nephrotic disorders are discussed in table 1.

Table 1: Diagnostic evaluation in peoples with nephrotic disorders

Diagnostic studies	Disorder suggested
Baseline	
Patient history	Identify medication or toxin exposure; risk factors for HIV or viral hepatitis; and symptoms suggesting other causes of edema
Urine dipstick	Obtain history of diabetes, systemic lupus erythematosus, or other systemic illness
Random urine protein/creatinine ratio	Confirm proteinuria
Serum creatinine	Quantify a degree of proteinuria (ratio greater than 3 to 3.5)
Serum albumin	Rule out acute renal failure, assess glomerular filtration rate.
Lipid panel	Assess degree of hypoalbuminemia
	Assess degree of hyperlipidemia
Additional studies suggested by patient factors	
HIV screening test	Identify HIV
Hepatitis serology panel	Identify hepatitis B or C
Serum or urine protein electrophoresis	Suggests amyloidosis or multiple myelomas
Rapid plasma regain	Identify syphilis
Antinuclear antibodies or complement (C3 and C4) levels	Identify systemic lupus erythematosus; complement levels may also be reduced in membranoproliferative disease

Complications

Complications in kidney and alterations of its function include:

- Decreased resistance to infections, due to loss of immunoglobulin in urine.
- Increased risk of arterial and venous thrombosis, due to loss of antithrombin III and plasminogen in the urine, combined with an increase in hepatic synthesis of clotting factors. Membranous nephropathy is the particular risk for adults [60].
- Acute kidney injury rarely occurs as a spontaneous complication of nephrotic disorders. It also caused by excessive diuresis, interstitial nephritis due to the use of diuretics or NSAID, sepsis or renal vein thrombosis [61].
- Chronic kidney disease may occur as a result of an underlying cause like; amyloidosis and diabetes [62].
- Increased risk of osteitis fibrosa cystica and osteomalacia due to loss of vitamin D-binding protein and its complexes in the urine, through a combination of calcium malabsorption and secondary hyperparathyroidism [63].

Indigenous treatment through “AYUSH” medication system

The goals of nephrotic management are to relieve symptoms, prevent complications, and delay kidney destruction. To control nephrotic syndrome, must treat the symptoms that disturbing the kidney functions. A novelistic medication system such as Allopath, Yoga (naturopathy), Unani, Siddha and Herbals (AYUSH) is considered cumulative therapies in today's world [64]. The AYUSH

department is expected to lay emphasis on up gradation of 'educational standards, quality control and standardization of drugs, improving the availability of medicinal plant material, R&D and awareness of new generations about the efficacy of the systems domestically and internationally (Dept. of AYUSH, 2013 and Planning Commission, 2013) [65, 66].

Allopathic medication system

It is the modern medicine and the most advanced system of medical practice, which takes care of a disease using chemicals, produces different effects during treatment. Some common and appropriate medicines or chemical agents who exploit to resolve these complications are given in table 2.

Yoga system of management

Yoga is an ancient traditional science which encompasses yogistic physical postures (asanas), yogistic breathing practices (pranayama), meditations and relaxation techniques. Currently, Yoga is accepted as science rather than religion or philosophy [72]. Yoga considers individual existence in five dimensions and not merely physical. These five dimensions are annamaya kosha (physical body), pranamaya kosha (vital body), manomaya kosha (Psychic body), vijanamaya kosha (intellectual body) and Ananda Maya kosha (causal body) [73]. According to Yoga philosophy, non-communicable diseases are the result of an imbalance that starts at manomaya kosha level and percolates down to the annamaya kosha level via pranamaya kosha, over a short period of time. Therefore, yoga therapy focuses on bringing balance at all these levels of existence through various techniques [74]. Its components such as asanas work at the physical level; pranayama works at a vital energy level, and meditation works at psychological and intellectual levels [75].

Table 2: List of Allopathic medicines used for the treatment of ND

S. No.	Drug name	Mode of action	Dose	R. O. A.	Reference
1	Steroids Prednisolone Dexamethasone	Interaction of steroid/receptor complex with cellular DNA	2 mg/kg	i. m.	Cameron, J S., et al., 1990 [64]
2	Loop diuretics Furosemide	inhibits reabsorption of sodium and water	40 mg	oral	Cameron, J S., et al., 1990 [67]
3	Alkylating agents Cyclophosphamide, Nitrogen mustard	From DNA cross-link b/w DNA strands leads to cell apoptosis	3 mg/kg	oral	Grases, F., et al., 1998 [68]
4	Calcineurine inhibitors Cyclosporine, Tacrolimus	Inhibit macrolide calcineurine, reducing T-cell differentiation.	0.2 mg/kg	i. v.	Savin, V., 2012 [69]
5	Antibiotics Penicillin-V, Cephalosporins	Cell wall synthesis inhibitor (inhibit cross-linking of peptidoglycan)	250 mg	i. v.	Savin, V., 2012 [69]
6	Levamisole	Blocks signal transduction	2.5 mg/kg	i. m.	Takeda, T., et al., 2001 [70]
7	Mycophenolate Mofetil	Inosine monophosphate dehydrogenase inhibitors	1 gm	oral	Shih, N Y., et al., 1999 [71]

Recent evidence showed that yoga reduces heart rate, blood pressure, and basal metabolic rate by reducing sympathetic activity [76]. It has the beneficial effect in many non-communicable diseases such as hypertension, diabetes, and cancer. Yoga brings balance in the autonomic nervous system by reducing the sympathetic tone and increasing parasympathetic tone [77]. Yoga has also been proven to produce various psychological benefits by reducing stress, anxiety and depression and improving the quality of life [78]. Hence, yoga is a comprehensive approach to the complex problem of non-communicable diseases like CKD.

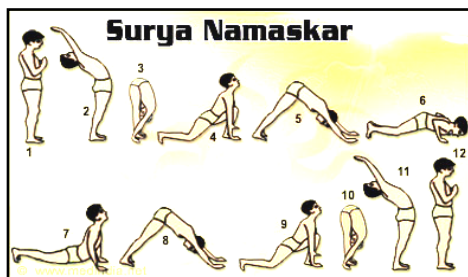
Yoga can help patients with ND in the regulation of kidney disorders and increasing the functioning of kidneys. There is some yoga, which has the power over relief in ND:

Surya namaskar

Surya Namaskara is a common 12 sequence of asanas. Its origins lie in India where its large Hindu population worships Surya, the Hindu solar divinity. Surya namaskara is composed of three elements i.e. shape, energy, and rhythm.

Benefits

1. It helps in regulating the functioning of the kidneys.
2. Surya Namaskar is a yoga exercise that improves the digestive system, heart, and lungs. It is good for kidneys and should be done twice a day.
3. It helps increasing strength of the kidneys and prevents urinary tract disorders [79].



Source: symbogym.com/surya-namaskar

Supta vajrasana

Vajrasana "Vajra Pose" is a sitting asana in yoga. It is a kneeling position sitting on the heels. This is mainly useful in improving the digestive system and boosting our stamina.



Source: astrogle.com/Supta-Vajrasana

Benefits

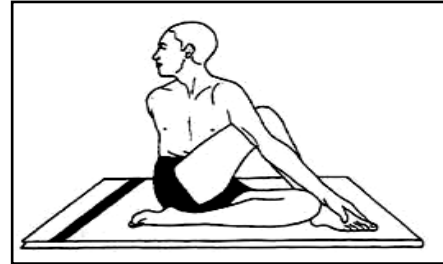
1. It is helpful for regulating blood pressure and makes people calm down.
2. It regulates the functioning of the adrenal glands.
3. It helps to eliminate anger, aggression and relax the mind.
4. This asana helps in digestive issues like constipation and strengthens the muscles of the legs and back [80].

Ardha matsyendrasana

The name comes from the Sanskrit words' ardha meaning half, matsya meaning fish, eendra meaning king, and asana meaning posture.

Benefits

1. This asana stimulates the kidneys and liver. It also improves the body's immunity level.
2. It removes the wastes and improves digestion.
3. Increases purification of the blood as well as the internal organs.
4. Releases excess toxins and heat from tissues and clean the internal organs [81].



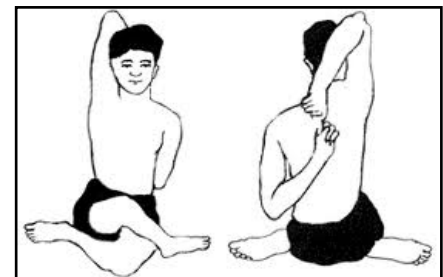
Source: astrogle.com/ardha_matsyendrasana

Gomukhasana (cow face posture)

When this Asana is demonstrated, placing both the feet on the ground by the side of the buttocks and keeping the body steady is look like the face of a cow.

Benefits

1. It strengthens the liver, kidney and breasts.
2. It provides relief in joint pain and rheumatism.
3. It helps to restore kidney functions.
4. It is also beneficial for kidney issues like an acute renal failure [82].



Source: a2zyoga.com/Gomukhasana

Makarasana (crocodile pose)

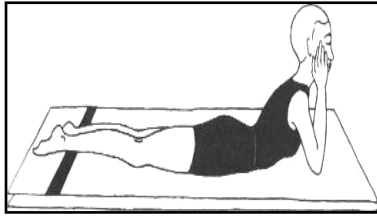
This posture resembles a crocodile resting in the ocean. It is a yogic pose useful for people with back and shoulder problems. In yoga is also a great pose to reduce stress and improve posture.

Benefits

1. It is particularly beneficial for asthma.
2. It helps increasing strength of the kidneys and prevents urinary tract disorders.
3. This posture is helpful to increase the efficiency of kidney [82].

Ustrasana

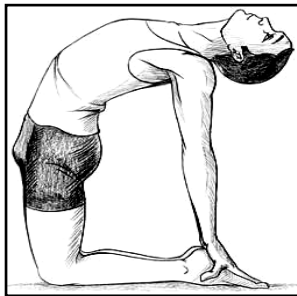
Ustrasana is an intermediate level back-bending yoga posture known to open Anahata (Heart chakra). This yoga posture adds flexibility and strength to the body and also helps in improving digestion.



Source: alarmelyoga.com/makarasana

Benefits

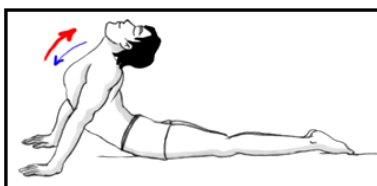
1. Ustrasana is a reasonably simple asana which gives a wonderful stretch to the thighs, abdomen, ribcage and throat.
2. People suffering from a backache, neck ache, the general stiffness of the spine will gain relief through regular practice of this posture.
3. Very useful to normalize the production of thyroids, by regular practice of this posture also can prevent aging process some extent.
4. This asana is helpful for people suffering from respiratory disorders like asthma [79].



Source: yogazonline.blogspot.in/ustrasana

Bhujangasana

The final position of this posture emulates the action of cobra raising itself just prior to striking at its prey, so it's called cobra posture or Bhujangasan. It is a Hatha Yoga pose, which helps to open the chest and to strengthen the spine.



Source: yogazonline.blogspot.in/bhujangasana

Benefits

1. It is very good to increase the flexibility to the spine.
2. This posture helpful to increase the efficiency of the kidney.
3. The people suffering from slipped disc, sciatica will get benefited from this posture.
4. It is a very good posture to overcome from asthma, and respiratory disorders [83].

Kapalbhati

The word kapalbhati is made up of two words. Kapal meaning forehead and bhati mean shining, illuminating.

Benefits

1. It can help to increase blood flow and boost immunity.
2. Kidneys can get more oxygen, which helps their recovery.
3. *Balances three dosas of the human body:* These are vata (wind/spirit/air), pitta (bile) and kapha (phlegm). Disorder of these three is the root cause for the unhealthy body [82].



Source: yogazonline.blogspot.in/kapalbhati

Pranayam

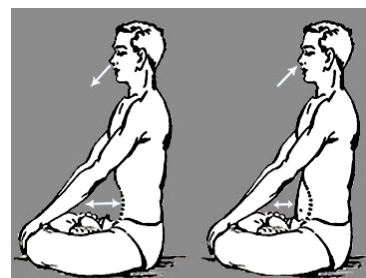
The pranayama is derived from two Sanskrit words 'Prana' and 'ayama'. Where 'prana' means energy 'ayama' means elongation. So the word meaning of pranayama is an elongation of pranic energy [84].

Benefits

1. Enhance the function of kidneys.
2. Pranayama can help the body get rid of excessive fat and weight, which helps to restore kidney functions.
3. It can also reduce wear and tear of internal organs.
4. It lowers high blood pressure in patients with Nephrotic disorder, which help to restore the cardiac irregularity [85].



Source: yogazonline.blogspot.in/pranayam



Kapalbhati pranayama

This technique helps improve blood circulation, especially to the lower half of the body and help improve the overall functioning of

the entire body. The technique also helps increase the lung capacity and improve respiratory efficiency, making more oxygen available to the body. As more oxygen flows throughout the body, it becomes more efficient. Patients can feel themselves infused with energy every time when they perform this technique. In addition to that, people may also feel increased mental acuity, improved concentration and heightened senses (Restoring kidney function through yoga therapy).

Unani medication system

In Unani system of medicine, the uses of natural sources are continued at an approved quantity for maintaining the potency of medicine (table 3). The differences of this system among another medication system are named of drugs, doses, prescription pattern and their uses in comparison to Ayurveda and Siddha medication systems [86].

Table 3: List of appropriate Unani medicines used for the treatment of ND

S. No.	Medicine	Unani name	Dose	Reference
1	Anacyclus pyrethrum	Aqirqarha	0.6 mg	Afzal, M., et al., 2004 [87]
2	Coriandrum sativum	Kashneez	0.21 mg	Afzal, M., et al., 2004 [87]
3	Smilax chinensi	Chobchini	300 mg	Afzal, M., et al., 2004 [87]
4	Vitex negundo	Nigand Babri	200 mg	Afzal, M., et al., 2004 [87]
5	Berberis aristata	Rasoot	160 mg	Siddiqui, M S A., et al., 2014 [88]
6	Rauwolfia serpens	Hab-e-Fishar	1.20 mg	Siddiqui, M S A., et al., 2014 [88]
7	Foeniculum vulgare	Badyan	2.0 mg	Siddiqui, M S A., et al., 2014 [88]
8	Apiumgra veolence	Post Beikh Karafs	1.50 mg	Siddiqui, M S A., et al., 2014 [88]
9	Cassia senna	Sana makki	200 mg	Siddiqui, M S A., et al., 2014 [88]
10	Myristica fragrans	Bisbasa	0.6 mg	Sevak, N., et al., 2008 [89]
11	Terminalia chebula	Haleela Zard	160 mg	Sevak, N., et al., 2008 [89]
12	Ipomeatur pentum	Turbud	50 mg	Sevak, N., et al., 2008 [89]

Table 4: List of appropriate Siddha medicines used for the treatment of ND

S. No.	Medicine	Siddha name	Dose	Reference
1	Aervalanata	Sirupeelai	200 mg	Antony, S J., et al., 2011 [90]
2	Raphanus sativus	Mullangi	40 mg	Antony, S J., et al., 2011 [90]
3	Hemidesmus indicus	Nannari	60 mg	Antony, S J., et al., 2011 [90]
4	Asteracantha longifera	Neermulli	200 mg	Yang, H C, et al., 2010 [91]
5	Tribulus terrestris	Neerunjil	200 mg	Yang, H C, et al., 2010 [91]
6	Moringa olifera	Murungai	200 mg	Yang, H C, et al., 2010 [91]
7	Santalum album	Santhanam	300 mg	Yang, H C, et al., 2010 [91]
8	Ocimum sanctum	Elumichamthulasi	2.10 mg	Yang, H C, et al., 2010 [91]
9	Boerhaavia diffusa	Mookirttai	300 mg	Naushabayev, A., et al., 2013 [92]
10	Cratevea nuruvula	Maavilangam	20 mg	Naushabayev, A., et al., 2013 [92]

Table 5: List of selected Ayurvedic (herbal) medicines used for the treatment of ND

S. No.	Botanical name	Family	Part used	Dose	Reference
1	<i>Costus speciosus</i>	Costaceae	Root Extract	100-300 mg/kg	Srivastava, S, et al., (2008) [95]
2	<i>Fumaria indica</i>	Ranunculaceae	Root Extract	100 mg/kg	Gupta, PC, et al., 2012 [96]
3	<i>Cichorium intybus</i>	Asteraceae	Root Extract	500 mg/kg	Zaman, R, et al., (2013) [97]
4	<i>Boerhaavia diffusa</i>	Nyctaginaceae	Root Extract	200-400 mg/kg	Sasikumar, S., et al.,(2012) [98]
5	<i>Solidago virgaurea</i>	Asteraceae	Root Extract	350-400 mg/kg	Madhav N, et al., (2013) [99]
6	<i>Crataeva nurvala</i>	Capparidaceae	Root Extract	400 mg/kg	Madhav N, et al., (2013) [99]
7	<i>Astragalus membranaceus</i>	Fabaceae	Root Extract	400 mg/kg	Madhav N, et al., (2013) [99]
8	<i>Kalanchoe pinnata</i>	Crassulaceae	Root Extract	100-300 mg/kg	Madhav N, et al., (2013) [99]
9	<i>Angelica officinalis</i>	Apiaceae	Root Extract	200-400 mg/kg	Sarvankumar G., et al., (2011) [100]
10	<i>Vitex negundo</i>	Verbenaceae	Root Extract	250-1000 mg/kg	Sarvankumar G., et al., (2011) [100]

Siddha medication system

Siddha system is one of the oldest systems of medicine of south India region, and the use of herbal medicines is prepared for the alleviation of any type of ailments in human being (table 4). At present this system of medication proving a rapid improvement over meticulous disease with having very slightest side effects.

Herbal medication system

Ayurveda says that every root, leaf, bark, and fruit found on any planet has some medicinal value. India is the largest producer of medicinal plants especially in Himalayan region [93]. Alternative medicines are being used by those people who do not use or cannot be helped by conventional medicinal system [94]. Some common medicinal plants having nutraceuticals potential and their primary use in traditional medicine are being given in table 5.

DISCUSSION

ND is a characteristic disorder of kidney, leading to varying renal problems. It is caused by either internal abnormalities like a defect

in the foot process of podocytes, diseases like diabetes mellitus, SLE, cancer, and infections or via some chemicals like-Gold, Pamidronate, Anti-microbial agents, Antineoplastics, Allopurinol, NSAID, Tenofovir, etc. After diagnosis, the prevention, and treatment of ND can be done by using varying Steroids, Antibiotics, Immunosuppressant, Calcineurine inhibitors, Alkylating agents and Loop diuretics. In Ayurveda there are various plants, which possess protective effect for treating ND, such as plants are Punarnava, Keokand, Fumariaindica, Vitexnegundo, Golden rod and Aeglemarmelos, etc. are widely used either individual or in the combination form for the treatment of ND. In future, a variety of therapy will provide sufficient treatment of ND [101, 102].

Yoga being non-invasive, cost-effective therapeutic intervention works at physical and psychological levels. It is effective intervention to reduce the blood pressure, heart rate and inflammatory markers both in healthy individuals and in patients with chronic diseases. Hypertension and diabetes are well-known risk factors for ND. Yoga helped in maintaining the blood sugars, blood pressure and lipid levels under these conditions. Yoga has

been proven to reduce oxidative stress, sympathetic tone, psychological stress and inflammatory markers in chronic diseases [103]. Yoga reduces general symptoms like fatigue, pain associated with chronic kidney disease and as well improves the hematocrit levels. Hence, yoga has the potential role as an adjunct in prevention and management of nephrotic disorders [104]. Yoga should be administered with caution under the guidance from an expert as there are some practices, which may worsen the condition. Further Unani, Sidha, Homeopathic and Ayurvedic treatment plays an imperative role for the management under these conditions [105].

A case study revealed that, the Unani herbal formulations have resolved acute kidney injury within 20 d, when analyzed by the BUN, serum creatinine, and 24-hour serum creatinine clearance levels. Serum creatinine does not rise to abnormal levels until a large proportion of the renal mass is damaged, because the relationship between the glomerular filtration rate (GFR) and the serum creatinine level is not linear, mostly prompt in disease. The preliminary treatment can help to optimize management and avoid the preventable complications of acute kidney injury suggested by Muhammad Shakil Ahmad Siddiqui (2014).

CONCLUSION

There are various underlying primary causes of nephrotic disorders, which are reliable for alteration in kidney function and other biological activity. The secondary causes of systemic disease, cancer, drugs, microbial infection and congenital defects are accountable for direct injury to the kidney. A critical diagnostic evaluation is essential for best possible care and management of nephrotic patients. The current review converses the most excellent treatment systems through "AYUSH" for the management of these worsen condition as the basis of enormous reviews published studies. With the help throughout this study, further experiment on the animal will be prepared as basic studies for the observation of the potential effect of herbal formulations on kidney disorders. Still investigation and prevention of ND are more challenging due to lack of guiding evidence bases.

CONFLICT OF INTERESTS

The authors declared no conflict of interests with respect to the authorship and/or publication of this paper.

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ABBREVIATION

ND-Nephrotic disorder, CKD-Chronic kidney disease, IgG-Immunoglobulin G, Ag-Ab-Antigen and antibodies, NSAID-Nonsteroidal anti-inflammatory drug, HIV-Human immunodeficiency virus, FBC-Full blood count, LFTs-Liver function tests, ESR-Erythrocyte sedimentation rate, CRP-C-reactive protein, CXR-Chest X-ray, CT-Computed tomography, MRI-Magnetic resonance imaging, GFR-Glomerular filtration rate, GBM-Glomerular basement membrane, ADH-Anti-diuretic hormone, PE-Pulmonary embolism, TECs-Thromboembolic complications, BUN-Blood urea nitrogen, DNA-Deoxyribonucleic acid, SLE-Systemic lupus erythematosus.

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