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Review Article

Urtica Dioica: In Used To Treat Benign Prostatic Hyperplasia

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ABSTRACT

Benign prostatic hyperplasia (BPH) is a common condition in aging men, characterized by an enlarged prostate gland that leads to urinary symptoms such as increased frequency, urgency, and nocturia. Conventional treatments for BPH often involve pharmacological interventions, including alpha-blockers and 5-alpha-reductase inhibitors, which may be associated with significant side effects. As a result, there is growing interest in alternative therapies, particularly those derived from medicinal plants. *Urtica dioica*, commonly known as stinging nettle or also known as bichu buti, has been traditionally used in herbal medicine for various ailments, including BPH. This poster presents a comprehensive review of the current literature on the efficacy and mechanism of action of *Urtica dioica* in the treatment of BPH. Studies have suggested that *Urtica dioica* exerts its therapeutic effects through several pathways, including the inhibition of 5-alpha-reductase, modulation of inflammatory processes, and interference with the binding of sex hormone-binding globulin to its receptors. Clinical trials indicate that *Urtica dioica* can significantly reduce symptoms of BPH, particularly in terms of improving urinary flow and decreasing post-void residual urine volume. Additionally, the side effect profile of *Urtica dioica* is generally mild, making it a favorable option for patients seeking a natural approach to managing BPH.

INTRODUCTION

Benign prostatic hyperplasia (BPH) is the most common disease in aging men. The lower urinary tract symptoms when caused by BPH affects the daily normal activity additionally the routine sleep cycles leading to symptoms related to storage, voiding or post-micturition which in turn reduce the health-related quality of life of the individual (1). In recent times, there has been a decline in

surgical procedures for BPH in favour of medicinal therapies. Pharmaceuticals, 5 α -reductase inhibitors, and α 1-blockers are the main medications used for LUTS. As some α 1-blockers may be associated with postural hypotension, and 5 α -reductase inhibitors may cause sexual dysfunction, there is a great interest in well-tolerated and efficacious herbal remedies. Indeed,

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drugs from the latter group are still very common all over the world (2).

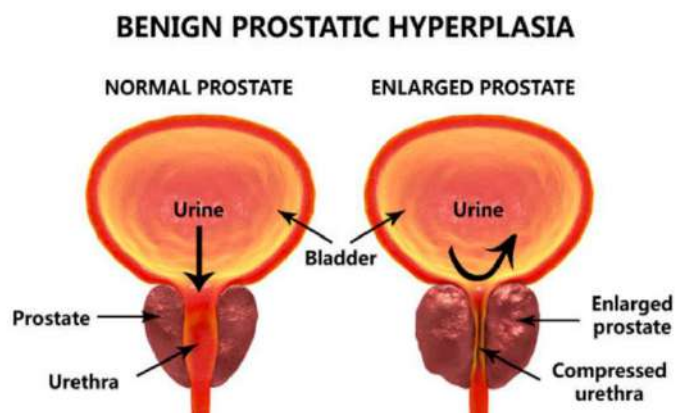


Fig. No. 1.1 (Showing the Difference Between Normal and Enlarged Prostate)

ANATOMY OF THE PROSTATE GLAND:

The real pelvis contains the prostate gland, which is responsible for supporting the male reproductive system. Its main function is to secrete an alkaline solution that shields sperm from the vagina's acidic environment (3). Sperm live longer and have more time to successfully fertilize an egg when the vaginal fluid balances the acidity of the vagina.

The fluid also contains supportive proteins and nutrients that nourish the sperm (4). The urethra can be used for straightforward mechanical propulsion due to the prostatic fluid's greater volume than that of the seminal fluid and sperm (5).

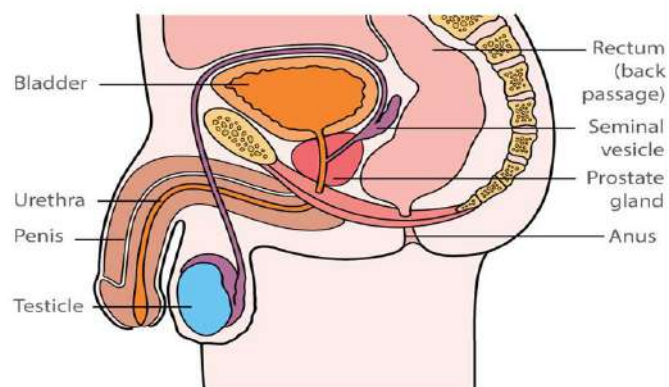


Fig. No. 1.2 (Anatomy of the Prostate Gland)

Location Of Benign Hyperplasia Anatomically:

The presence of acute anterior angulation of the entire proximal urethral segment means that the prostatic urethra, referred to as the site of clinical practice, CFA, consists of two segments that are approximately of equal length in both physical and functional terms (Fig. .3) (6). At the urethral segment's point of angulation, the verumontanum

forms at its most proximal extent as it extends from the posterior wall towards the distal urethral segment (7). Most (95%) of the main excretory duets of the prostatic glandular tissue open into the distal urethral segment at or below the level of the ejaculatory duct orifices and the base of the verumontanum (8). As such except for the distal the lower 50% of the action of the ejaculatory

near the prostatic urethra. The mass of the prostatic gland creates a flat disk structure of tissue whose ducts are directed inwards into the distal urethral segment mostly laterally from the urethra (9).

There is very little glandular tissue in the polynuclear stroma in front of both urethral segments, in broad anterior margins (10). At the urethral angulation at the base of the

verumontanum the most proximal region is cut out where the secretory glands are located and the anterior fibromuscular stroma takes up the space of the proximal urethral segment (11). The preprostatic sphincter, which surrounds the proximal bladder neck, fits within the intervening area created by the urethra and the glandular prostate and consists of a cylindrical layer of smooth muscle (12).

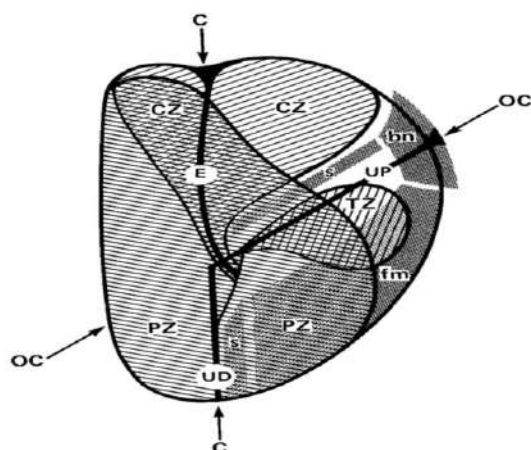


Fig. No. 1.3 (Location of Benign Hyperplasia Anatomically)

The sagittal graphic displays a sagittal portion of the anteromedial nonglandular tissues in addition to the ejaculatory ducts (E), proximal urethral segment (UP), and distal prostatic urethral segment (UD) (13). The preprostatic sphincter (s), distal striated sphincter (s), anterior fibromuscular stroma (fm), and bladder neck (bn) are some of these tissues. The glandular prostate is depicted in three dimensions, with the center zone (ez), peripheral zone (PZ), and transitional zone (TZI) arranged in relation to each other. In Fig 1.4,(14) the oblique coronal plane (OC) is displayed along the proximal urethral segment, while the coronal plane (C), which represents the plane of maximal extent of the glandular prostate, is presented along the distal urethral segment (15).

The only source of PH nodule growth is the branching of a few ducts that link the urethra at or near its point of angulation (16). These ducts make up between 5 and 10 percent of the glandular prostate (17). It is unclear if this tissue has any detectable impact on prostatic function due to its small mass (18). Similarly, unless retrograde ejaculation of semen into the bladder results

in ablation of the preprostatic sphincter, removal of this tissue during BPH surgery most likely preserves prostatic function. The main prostatic gland mass is moved anteriorly by the tiny prostatic ducts that link it at and proximal to its site of angulation (19).

Unlike the main prostatic ducts, which radiate laterally, they run more proximally and anteriorly into the bladder neck, paralleling the long axis of the proximal urethral segment (Figs. 1.3 and 1.4) (20). Because of this, they remain very close to the urethra over their entire lengths. This glandular tissue is thought to be involved in the development of BPH (21). The preprostatic sphincter divides it into two different zones. The transition zone is noticeably bigger of the two (Figs. 1.3 and 1.4) (22). It consists of two separate tissue lobules that are located just outside the sphincter, laterally and somewhat ventrally (23).

It is the most distant of the proximal urethral group, with its major ducts emerging from the lateral recesses of the urethral wall at its point of angulation between the base of the verumontanum and the distal border of the sphincter (24). The primary ducts stretch laterally

before branching proximally toward the bladder neck, carrying the most medial of the terminal branches toward the midline, where they become buried between the circular smooth-muscle fibres of the sphincter (Fig. 1.4) (25). Just the preprostatic sphincter's most proximal portion, close to the bladder neck, appears to be fully established in the prepubertal prostate (26).

Compared to the adult, the transition zone is less pronounced and farther distally along the urethra (27).

The distal elongation of the preprostatic sphincter and the proximal branching of the transition zone, along with the delayed completion of embryonic development near puberty, may ultimately result in the mixing of these two functionally separate components (28).

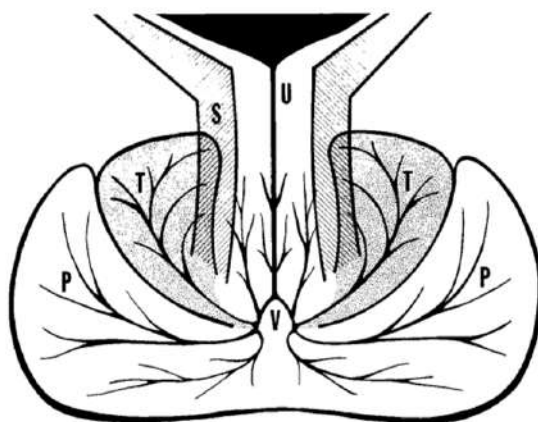


Fig. No. 1.4 (Development Of BPH)

Prostate oblique coronal plane (as seen in Figure 1.3) (29) displaying tissues that originate from BPH and are divided by the periprostatic sphincter into the periurethral area (U) and transition zone (1'). The primary transition zone ducts begin at the base of the verumontanum (V) and arborize past the sphincter's distal boundary, eventually leading to the bladder (the black area at the top) (30). P is for the perimeter of the glandular prostate.

Several tiny duct orifices can be found near the level of the transition zone ducts' origin at the site of urethral angulation, and they are distributed along the urethral wall all the way to the bladder neck (31). These give rise to the tiny, nearly microscopic, abortively formed duct branches and acini in the periurethral region (32). These run immediately proximally and are entirely contained within the preprostatic sphincter magnitude lower (33). Every BPH nodule forms in the periurethral area or the transition zone. Now that these two anatomic compartments have been identified, it is

feasible to go into more depth about how they contribute to the hyperplastic process (34).

Signs And Symptoms:

Growing prostate tissue may cause limited urine flow. The bladder and prostate's nerves may also cause the following common symptoms: (35)

- Urine frequency and urgency
- Nocturia: the numerous awakenings during the night to urinate
- Hesitancy: a weak, irregular urination that is challenging to initiate
- Incomplete bladder emptying: No matter how often you urinate, you can have trouble getting rid of all the residual urine.
- Straining: One must push or strain in order to begin and maintain urination as well as a more complete bladder emptying (Valsalva technique).
- Decreased stream force: Over time, the force of the urine stream is believed to gradually decrease.
- Dribbling: The loss of very little amounts of urine due to insufficient or weak urine flow.

Diagnosis:

Rectal digital examination the digital rectal examination (DRE) is an essential part of the assessment procedure for men who have BPH (36). The DRE allows the examiner to measure the prostate's dimensions and form, look for nodules, and pinpoint any potentially malignant regions (37).

Laboratory Studies

Urinalysis: Using centrifuged sediment analysis or dipstick methods, check the urine for the presence of leukocytes, blood, bacteria, protein, or glucose.

Urine culture: Usually carried out if the preliminary results of the urinalysis point to an anomaly, this test may help rule out infectious reasons of irritative voiding.

Prostate-specific antigen (PSA): Men who are at risk for BPH should also be examined for prostate cancer, even if prostate cancer screening is still debatable. BPH does not cause prostate cancer (38).

Electrolytes, creatinine, and blood urea nitrogen (BUN) -Creatinine, blood urea nitrogen, electrolytes, and post-void residual (PVR) urine volumes all work well as screening markers for chronic kidney disease in people with high PVR urine volumes.

However, a serum creatinine routine at the first evaluation of patients with lower urinary tract symptoms associated with Yes could be usually contraindicated (39).

Urtica Dioica:

This perennial plant, often referred to as Bichu Buti, Nettle, or Stinging Nettle, grows in tropical and temperate wasteland habitats worldwide. It belongs to the Urticaceae family and reaches a height of 2 to 4 meters. It produces pointed leaves and white to yellowish flowers (40).

1. Owing to these itchy hairs, the genus name *Urtica* is derived from the Latin verb *urere*, which means "to burn." Because the plant typically

produces either male or female blooms, the species name *dioica* means "two houses." Nettle is well recognized for its painful sting that occurs when skin meets the bristles and hairs on the stems and leaves (41). 2. Due to its significant benefits, *Urtica dioica* L. has gained recognition as a medicinal plant in recent years. Common uses for the plant's leaves and underneath roots include blood purification, emmenagogue, diuretic, congestion of the nose and menstrual flow, stiffness, skin inflammation, iron deficiency, nephritis, haematuria, jaundice, menorrhagia, and diarrhoea (42). The plant includes phyosterols, saponins, flavonoids, tannins, sterols, fatty acids, carotenoids, chlorophylls, proteins, amino acids, and vitamins among its many classes of naturally occurring mixtures with restorative value (43).

The mixes which are accounted for from the plant are beta-sitosterol, trans-ferulic corrosive, dotriacontane, erucic corrosive, ursolic corrosive, scopoletin, rutin, quercetin and p-hydroxybenzalcohol (44). The plant has been accounted for to have different pharmacological activities, for example, antioxidant, anti-inflammatory, antiulcer, anti-colitis, antiviral, anticancer, antibacterial, antimicrobial, antifungal, antiandrogenic, insecticide, immunomodulatory, hypocholesterolemic, hypoglycemic, cardiovascular effects, analgesic, natriuretic, hypotensive, hepatoprotective, and rheumatoid arthritis (45).

Taxonomy

Kingdom- Plantae – Plants

Subkingdom: Vascular Plants (Tracheobionta)

Division: Magnoliophyta - Flowering plants

Super division: Spermatophyta - Seed

plants Class- Dicotyledons - Magnoliopsida

Subclass- Hamamelidae

Order- Urticales

Family- Urticaceae - Nettle family

Genus- *Urtica* L.

Species- *Urtica dioica* L., - stinging nettle.



Plant Profile:

Urtica dioica is native to the colder regions of Northern Europe and Asia but now this herbaceous shrub can be found all over the globe. Rattail nettle is pretty much an annual and perennial herbaceous plant that can grow toward "3 feet" high and blooms between the months of June and September (46). Some dark green, some paler on the underneath side, some of the leaves are opposite, oblong, or ovate with the base cordate and quite serrated (47).

Description:

- **Type:** Herbaceous perennial

- **Height:** Typically grows 1-2 meters (3-7 feet) tall.
- **Leaves:** Leaves are opposite, heart-shaped, with serrated edges, and covered with stinging hairs that release irritating chemicals when touched.
- **Flowers:** Small, greenish, or yellowish flowers. The plant is dioecious, meaning it has separate male and female plants.

Stem: Square and slightly hairy, also covered with stinging hairs.



Fig. No. 1.5 (Grown plant of *Urtica Dioica*)

Phytochemical	Leaves	Seeds	Roots
Flavonoids	+	+	+
Kigelinol	-	-	-
Glucoquinone	+	+	+
Tannins	+	+	+
Ascorbic acid	+	+	+
Polysaccharides	+	+	+
Sterols	+	+	+
Triglycerides	+	+	+
Fatty acids	-	-	-
Lapachol	-	-	-
Ligans	+	+	+
Terpinoids	-	-	-
Silica	+	+	+

(+) Indicates Presence, (-) Indicates Absence

Historical Uses Of Nettle In Medicine:

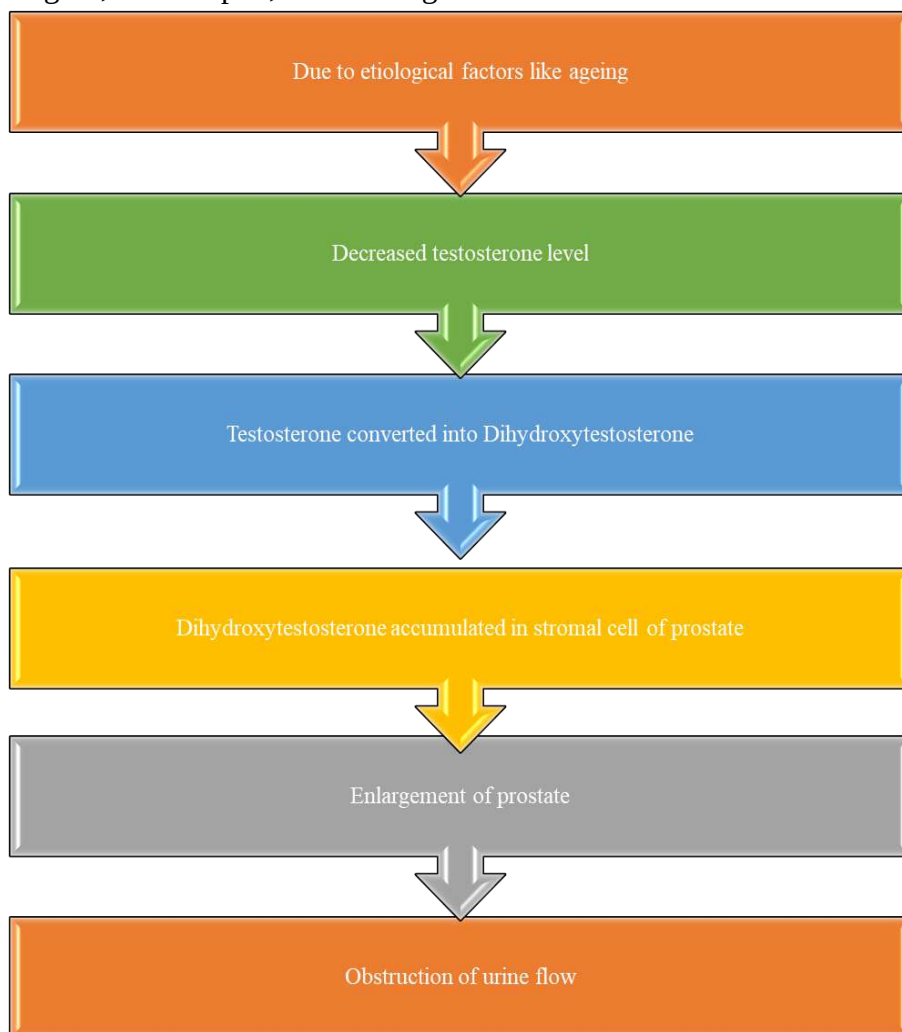
U. dioica has a long history of use in home remedies for families and a healthy diet regimen. The regulated leaf removals are used as an antihemorrhagic agent to reduce excessive

bleeding from the nose and menstruation (48). This herb was used to treat used in people's medication as diuretics, astringents, and blood makers; also used for joint discomfort, iron deficiency, and roughage fever (37). As a blood purifier and

purging tonic, *U. dioica* leaves have historically been used to make tea. Externally, this herb is used to treat gout, haemorrhoids, sciatica, neuralgia, skin complaints, and hair problems, among other conditions (49). The plant is consistently harvested around May and June for medicinal uses while it is approaching flower and preserved for use later. *Urtica dioica*, the root, has a beneficial effect on mature prostate organs (50). Its blossoms are used to treat rheumatic gout, chickenpox, and itching

rash; it is also somewhat related to bruising. Generally speaking, the plant possesses used for millennia by botanists all over the world (51). Greek physicians Pedanius Dioscorides and Galen described how *U. dioica* leaves had purgative and diuretic qualities and could be used to cure spleen ailments, pleurisy, and asthma in the main century (52).

Pathogenesis Of Benign Prostatic Hyperplasia:



Molecular Signalling Of Bph:

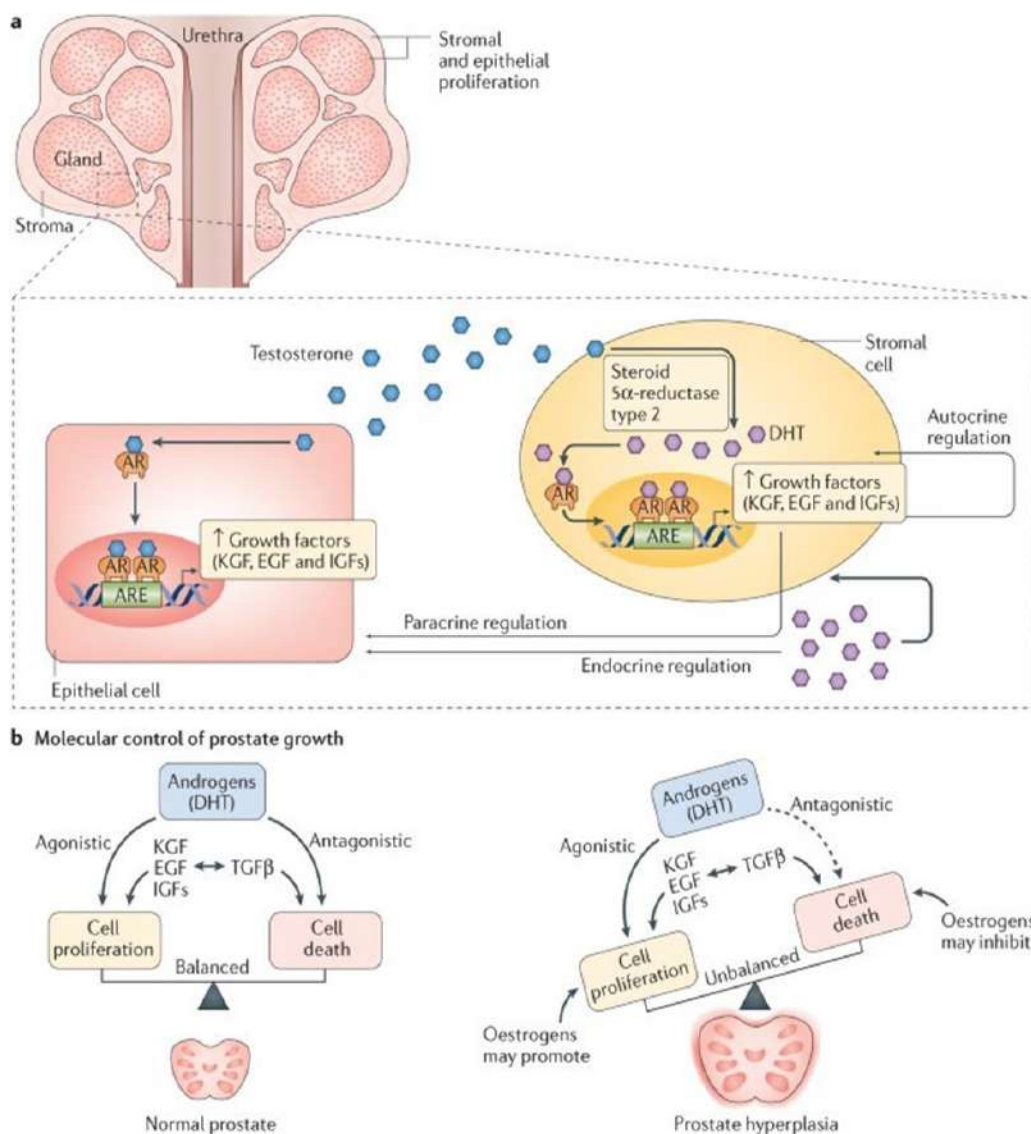


Fig. No.1.6 (Molecular Signalling)

Etiology Of Benign Prostatic Hyperplasia:

An increase in stromal and epithelial cells in the prostate's preurethral region is a hallmark of BPH (53).

- A rise in the number of cells:
 1. Proliferation of stroma and epithelium
 2. Deficit in planned cell death
- No conclusive proof of a proliferative process.

- The early stages of BPH, which are characterized by a fast rate of cell division.
- An established illness that persists despite a constant or slowed rate of cell division.
- Higher expression of genes involved in the antiapoptotic pathway, such as bcl-2
- Androgens proactively impede cellular demise (54).

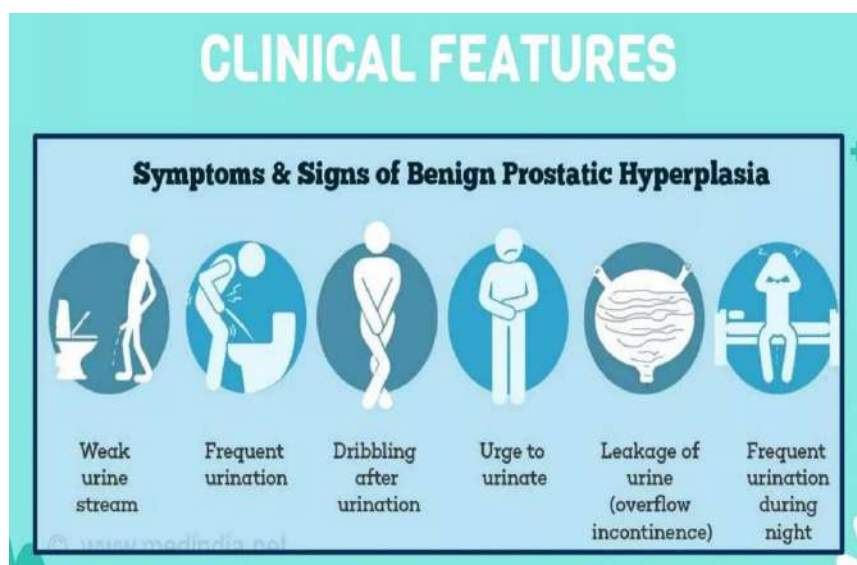


Fig.No. 1.7 (Symptoms and Sign)

Mechanism Of Action: How Nettle Affects Prostate Health:

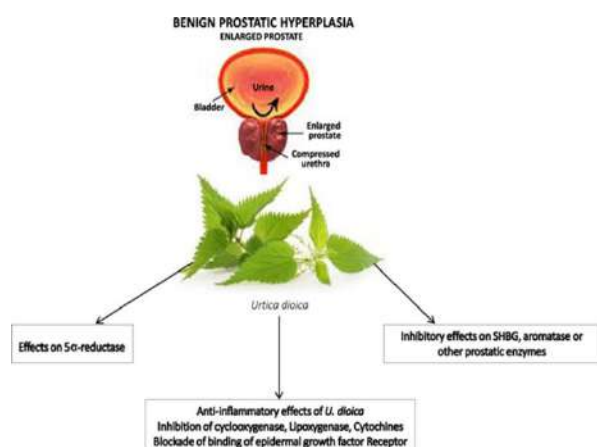


Fig. No.1.8 Mechanism of Action Nettle

Urtica dioica, or stinging nettle, may affect benign prostatic hyperplasia (BPH) in several ways, including (55):

- 5-alpha-reductase Inhibition: *Urtica dioica* may prevent testosterone from being reduced by 5-alpha-reductase.
- Prostate cell proliferation inhibition: *Urtica dioica* has the potential to prevent prostate cell proliferation (56).
- *Urtica dioica* has the potential to lessen oxidative stress.
- Kidney protection: *Urtica dioica* may offer kidney protection (57).

- The enzyme aromatase, which changes testosterone into oestrogen, may be inhibited by *Urtica dioica* (58).
- Stopping androgen binding: *Urtica dioica* may stop androgens from attaching to the globulin that binds sex hormones (59).
- Prostate contractility reduction: *Urtica dioica* leaf extract may lessen prostate contractility (60).

CONCLUSION:

Urtica Dioica (stinging nettle) presents a promising natural treatment option for BPH, benign prostatic hyperplasia prevalent illness that has a major negative influence on older men's quality of life. The plant's bioactive substances, such as lignans, sterols, and flavonoids, are important in controlling the symptoms of BPH because they have anti-inflammatory, antioxidant, and maybe 5-alpha reductase inhibitory properties. Clinical research indicates that *Urtica Dioica*, especially when combined with other phytotherapeutic drugs like saw palmetto, can significantly improve the symptoms of benign prostatic hyperplasia (BPH), including nocturia, decreased urine flow, and general discomfort. Its minimal side effects and good safety profile make it a good substitute for or addition to traditional pharmaceutical treatments.

Even though the current research is encouraging, more investigation is required to completely understand the long-term effects, ideal dosage, and potential drug interactions of *Urtica dioica*. Further research into the potential synergistic benefits of stinging nettle in combination with other herbal medicines may also improve its effectiveness and expand its use in the treatment of BPH.

Urtica dioica promises to enhance patients' quality of life by providing a natural, well-tolerated, and perhaps successful treatment for BPH. Healthcare professionals must keep up with the growing popularity of herbal medicine in order to give patients with comprehensive treatment plans that are suited to their specific needs.

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