



## Determination of PSA, DHT, IL-8, TNF- $\alpha$ and serum Testosterone in patients with benign prostate hyperplasia in Samarra city

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### Abstract

The study's goals were to find out how inflammation affects the start and progression of benign prostatic hyperplasia (BPH) and to measure the amounts of PSA, dehydrotestosterone, IL-8, TNF- $\alpha$ , and testosterone in the blood of patients with BPH. How to Do It and Patients: The study took place in Samarra City from July to December 2024. A skilled doctor at Samarra Medical Hospital looked at blood samples from people who had benign prostate hyperplasia (BPH). There were sixty BPH samples and sixty healthy, normal subjects.

**Results:** People with benign prostatic hyperplasia had much higher levels of TNF- $\alpha$ , IL-8, PSA, and dehydrotestosterone (DHT) in their blood than healthy comparison subjects. Nonetheless, the current investigation discovered that BPH patients' blood testosterone levels were significantly lower than those of healthy control participants ( $P \leq 0.01$ ). **Key words:** prostate, hyperplasia, PSA, IL-8, androgen.

### Introduction

Benign prostatic hypertrophy, or BPH, is a condition that mostly affects elderly men. This phrase is not synonymous with benign prostatic enlargement (BPE), which is characterized by symptoms in the lower urinary tract and an enlarged prostate (1,2). Benign prostatic hyperplasia (BPH), a disorder affecting the lower urinary stream, is more common in men over 50. One of the primary indicators is an enlarged prostate gland. Despite their effectiveness, common medications such as 5-alpha-reductase inhibitors and alpha-blockers often have negative side effects (3,4). The development of BPH is significantly influenced by the enzyme 5- $\alpha$ -reductase. It's crucial to understand that 5 $\alpha$ -reductase produces [DHT], a more potent androgen. PSA is typically produced by the prostate and is not limited to cancer patients. As a result, it may decrease if you have elevated androgen levels, prostatitis, benign prostatic hyperplasia (BPH), a high body mass index (BMI), a damaged prostate (biopsy), ejaculation or urine leakage within 24 hours, and so forth (6,7). PSA readings in the "gray zone," which ranges from 4 to 10 ng/mL, indicate some degree of uncertainty. On the other hand, any value more than 4 ng/mL indicates the possibility of prostate cancer [PCa] and requires careful treatment (8,9,10). Androgens also have a significant impact on the biology of the prostate and how a man's desire develops. Two primary androgens are produced by various body parts: 5-reductase in peripheral tissues converts testosterone to DHT, whereas Leydig cells in the testicles produce testosterone (11,12).

### Patients and methods

The study's goals were to find out how inflammation affects the start and progression of benign prostatic hyperplasia (BPH) and to measure the amounts of PSA, dehydrotestosterone, IL-8, TNF- $\alpha$ , and testosterone in the blood of patients with BPH. How to Do It and Patients: The study took place in Samarra City from July to December 2024. A skilled doctor at Samarra Medical Hospital looked at blood samples from people who had benign prostate hyperplasia (BPH). There were sixty BPH samples and sixty healthy, normal subjects.

**Results:** People with benign prostatic hyperplasia had much higher levels of TNF- $\alpha$ , IL-8, PSA, and dehydrotestosterone (DHT) in their blood than healthy comparison subjects. Still, this study found that the blood testosterone levels of men with BPH were significantly lower than those of healthy control participants ( $P \leq 0.01$ ).

**Result and discussion**

**Table 1** shows the concentration of serum PSA, Testosterone, and dihydroxytestosterone, [DHT].

It was checked how much prostate-specific antigen (PSA) was in the blood of the study groups (control group and BPH patient groups). The PSA level in the blood of people with benign prostate hyperplasia was  $8.225 \pm 1.1$  ng/ml, which was higher than the level found in the blood of healthy people ( $1.61 \pm 0.82$  ng/ml). One of the most important ways to tell the difference between prostate cancer and benign prostatic hyperplasia (BPH) is to use prostate-specific antigen (PSA). PSA is still an important diagnostic sign, even though there are many others available (8,9). A marker called prostate-specific antigen (PSA) is used to find people with prostate enlargement (10,11). Like androgens (Testosterone and dihydrotestosterone), they are very important for the growth and survival of prostate cells (12,13). In the present study, there is significant reduction in serum testosterone of BPH patients, ( $5.1 \pm 1.5$  pg/ml) as compare with healthy control subjects, ( $24.7 \pm 4.2$  pg/ml); ( $P \leq 0.01$ ). This result agrees with previous finding, (12). However, there is significant elevation in serum DHT (pg/ml) of BPH patients, ( $862.6 \pm 99.7$  pg/ml) as compare with healthy control subjects, ( $183.5 \pm 59.4$  pg/ml); ( $P \leq 0.01$ ). Previous studies have found that most people with BPH have lower levels of testosterone and higher levels of DHT (13,14). This study backs up those results.

**Table 1** shows the concentration of PSA, Testosterone and DHT in normal control and benign prostate hyperplasia, [BPH]

| Parameters                  | Controls<br>(n=60) | BPH Patients<br>(n=60) | P value |
|-----------------------------|--------------------|------------------------|---------|
| PSA (ng/ml)<br>M±SD         | $1.61 \pm 0.82$    | $8.22 \pm 1.1$         | 0.01    |
| Testosterone(pg/ml)<br>M±SD | $24.7 \pm 4.2$     | $5.1 \pm 1.5$          | 0.01    |
| DHT (pg/ml)<br>M±SD         | $183.5 \pm 59.4$   | $862.6 \pm 99.7$       | 0.01    |

**Table 2** shows the concentration of serum IL-8 and TNF- $\alpha$  in the serum of BPH patients and normal healthy control subjects. **Table 2** show the concentration of IL-8 and TNF-  $\alpha$  in normal control and benign prostate hyperplasia, (BPH)

| Parameters                    | Controls<br>(n=60) | Patients<br>(n=60) | P value |
|-------------------------------|--------------------|--------------------|---------|
| IL-8 (pg/ml)<br>M±SD          | $53.4 \pm 13.9$    | $190.4 \pm 43.6$   | 0.01    |
| TNF- $\alpha$ (pg/ml)<br>M±SD | $71.5 \pm 15.5$    | $486.2 \pm 76.5$   | 0.01    |

IL-8 levels in the blood of people with BPH were much higher than those of healthy people who were not in the study. Long-term inflammation may be a big reason why BPH happens, according to studies done on people. The most important thing that leads to BPH is interleukin IL-8, which changes the growth of epithelial and stromal cells directly. When a person with BPH has a high amount of IL-8, their stroma is very different from a normal prostate stroma. This reactive stroma pattern in BPH was linked to higher levels of IL-8 in the epithelium next to it (15). In BPH, the immune system may not be working properly because of high levels of the pro-inflammatory cytokine IL-17. This causes too much production of IL-6 and IL-8, which are important for stromal growth in BPH (14). Also, higher amounts of IL-8 in BPH tissues make a strong stromal growth factor more likely to be produced. (16) TNF- $\alpha$  and IL-6 are two cytokines that promote inflammation. They are highly expressed in prostate tissue and cause histology inflammation. The prostate volume and PSA levels of people with BPH and prostatitis are much higher than those with simple BPH. But there aren't any big differences between people of different ages in the rate of pee flow. It's possible that these two cytokines play a big role in increasing BPH and PSA production. (17) IL-6 and IL-8 are made by prostate tissues in either autocrine or paracrine ways. These chemicals then cause T cells to gather and cause an inflammatory reaction. (18) The present study also found a strong link between the size of BPH and amounts of IL-8 and PSA. So,

inflammation may make the effects of BPH more likely. This study backs up what other studies have found.<sup>(١٨)</sup> In this study, the level of TNF- $\alpha$  in the blood was significantly higher in men with BPH ( $486.2 \pm 76.5$  pg/ml) compared to healthy people ( $71.5 \pm 15.5$  pg/ml;  $P \leq 0.01$ ). This finding about TNF- $\alpha$  and BPH is the same as earlier ones.<sup>(١٧,١٩)</sup> It was most clear in BPH tissues where TNF- $\alpha$  was present, and the difference was statistically significant ( $p < 0.01$ ). They thought that the high level of TNF- $\alpha$  in the prostate tissue of people with BPH might be because of the inflammatory response brought on by the tissue's growth and breakdown.

<sup>(٢٠)</sup> The results of this study show that there was a significant rise in PSA, DHT, IL-8, and TNF- $\alpha$ , and a significant drop in blood testosterone. Also, this study suggests that IL-6 and CRP should be looked at in people with BPH.

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