



## INTERNATIONAL PROSTATE SYMPTOM SCORE (IPSS) STUDY OF THE RELATIONSHIP BETWEEN PROSTATIC VOLUME ON ULTRASONOGRAPHY AND CLINICAL SYMPTOMS IN CASES OF PROSTATOMEGALY

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Conflicts of Interest: Nil

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### ABSTRACT

**Background:** The International prostate symptom score (IPSS), which is frequently used as a prognostic indicator, is used to assess the severity of lower urinary tract symptoms (LUTS) in men with bladder outlet obstruction and to gauge the effectiveness of medical or surgical treatment for benign prostatic obstruction.

**Aims & objectives:** In the current investigation, the International Prostate Symptom Score was used to determine the relationship between prostatic volume on ultrasonography and clinical symptoms in cases of prostatomegaly.

**Material and Methods:** The current investigation was a single-center, cross-sectional study that included patients who were over 50 years old, had lower urinary tract symptoms that were not alleviated by medicine, were willing to participate in DRE, and underwent USG.

**Results:** 42 percent of patients were above 70 years old, followed by 61–70 years old (41 percent) and 51–60 years old (17 percent). On a digital rectal examination, grade 3 was the most common result (43%), followed by grade 2 (35%), and grade 1 (22%). Most prostate volume patients had a grade 2 (39%) or grade 3 (38%), while only 23% had a grade 1 (prostate volume). The majority of patients (50%) had a residual urine volume of 50–100 ml, followed by those with >100 ml (34%) and 50 ml (16%). Most patients (64%) have an IPSS score of 20 to 35, followed by (8 to 19%) and (0 to 26%). The majority of patients experienced a significant reduction in IPSS score after treatment. The association between prostate volume and DRE, prostate volume and IPSS, IPSS and DRE, and prostate volume and Age was statistically extremely significant ( $p=0.0001$ ).

**Conclusion:** The International Prostate Symptom Score (IPSS), which is directly proportional to the size of the prostate gland as seen on clinical rectal examination and validated by ultrasound, is a very helpful diagnostic and prognostic tool in situations with prostatomegaly.

**Keyword:** The International prostate symptom score (IPSS), prostatomegaly, per rectal examination, ultrasonography, clinical symptoms.

### Introduction

Diabetes mellitus is a group of metabolic diseases marked by chronic hyperglycemia caused by insulin release, insulin action, or both. The importance of insulin as an anabolic hormone causes metabolic abnormalities in carbohydrates, lipids, and proteins<sup>1,2</sup>. It's one of the chronic non-communicable diseases (CNCDs) that's become a major global health issue. It's also related to blindness, vascular brain disorders, renal failure and amputations of

limbs. T2DM is the most common endocrine condition, characterized by abnormal metabolism and long-term complications affecting the kidneys, skin, nerves, and gastrointestinal tract, resulting in morbidity and mortality<sup>3,4</sup>. T2DM is the most common form of diabetes worldwide, accounting for about 90% of all cases, and is more common in men than in women. Diabetes mellitus affected 2.8 percent of the world's population in 2000, which is projected to raise to 4.4 percent by 2030<sup>5</sup>. By

2035, the overall number of people with diabetes is anticipated to grow from 382 million in 2013 to 592 million. Diabetic keto-acidosis, hyperglycemia, hypoglycemia, thrombosis, and electrolyte imbalance are all acute complications of diabetes mellitus<sup>6</sup>. As a result, diabetes's premature morbidity, mortality, and financial burden are a public health concern, accounting for 10.7% of global all-cause mortality among people aged 20 to 70 years. A few studies have looked at the prevalence of gall-bladder disease in people with type 2 diabetes<sup>7-9</sup>. Cholecystomegaly and impaired gall-bladder contraction have been blamed for this. Age, female sex, family background and genetic factors, obesity, rapid weight loss, and physical inactivity are all risk factors<sup>10</sup>. Ultrasound is a straightforward technique with a high degree of precision in detecting gall-bladder diseases. Since it is safe, inexpensive, and reliable, ultrasonography is a useful imaging modality for assessing gall-bladder volume in T2DM patients and controls<sup>11</sup>.

**Aims & objectives:** To determine the gall-bladder volume in T2DM patients and healthy controls using Ultrasonography.

#### Materials and methods:

This three-year research included 200 cases and 200 normal controls in the Department of Radio-diagnosis at a tertiary healthcare center in Central India. USG screened all of the research participants to determine gall-bladder volume. All of the research participants were given a thorough physical and clinical review. Gray

scale real-time ultrasound examinations were performed using 3.5 to 10 MHz curvilinear and linear array transducers on the GE VOLUSON P8 and Samsung U50 Ultrasound scan machines in this research. Patients with T2DM who were taking antihypertensive medications, those with cardiovascular disease, pregnant women, and those with cancer were all removed from the research. 3 ml of fasting blood samples were obtained from all research participants under aseptic conditions, allowed to stand for 30 minutes, and then centrifuged to obtain serum. Fasting blood glucose, post-prandial blood glucose, total cholesterol, triglycerides, high-density lipoprotein, and low-density lipoprotein were all measured using the serum research. Demographic information was gathered.

#### Results:

The gall-bladder volume was measured using ultrasonography in 200 people with type 2 diabetes and 200 healthy controls in this research. In this analysis, systolic ( $139.6 \pm 10.6$  mmHg) and diastolic ( $91.2 \pm 8.4$  mmHg) blood pressure, fasting blood glucose ( $142.32 \pm 13.4$  mg/dl), post-prandial blood glucose ( $168.6 \pm 14.3$  mg/dl), total cholesterol ( $198.3 \pm 20.2$  mg/dl), triglycerides ( $176.4 \pm 15.6$  mg/dl), LDL ( $132.3 \pm 4.4$  mg/dl) and gall-bladder volume ( $24.4 \pm 10.4$  ml) were significantly raised in type 2 diabetes mellitus patients as compared with healthy controls. However Age, BMI, and HDL on the other hand, were not statistically important. (Table 1).

**Table 1: Comparison of Demographic, biochemical parameters and gall-bladder volume in type 2 diabetes mellitus patients and healthy controls**

Parameters	T2DM (Mean $\pm$ SD) (n=200)	Controls (Mean $\pm$ SD) (n=200)	P value
<b>Demographic characteristics</b>			
Age (years)	45.4 $\pm$ 8.4	44.4 $\pm$ 3.4	0.07
BMI (kg/m <sup>2</sup> )	24.6 $\pm$ 1.4	22.6 $\pm$ 1.2	0.07
Systolic BP (mmHg)	139.6 $\pm$ 10.6	113.7 $\pm$ 9.2	0.001
Diastolic BP (mmHg)	91.2 $\pm$ 8.4	77.4 $\pm$ 7.4	0.001
<b>Biochemical parameters and Gall-bladder volume</b>			
FBS (mg/dl)	142.32 $\pm$ 13.4	92.23 $\pm$ 10.4	0.001
PPBS (mg/dl)	168.6 $\pm$ 14.3	131.3 $\pm$ 9.2	0.001
Total cholesterol (mg/dl)	198.3 $\pm$ 20.2	148.6 $\pm$ 15.3	0.001
Triglycerides (mg/dl)	176.4 $\pm$ 15.6	99.4 $\pm$ 8.3	0.001
HDL (mg/dl)	43.6 $\pm$ 3.3	44.2 $\pm$ 5.8	0.07
LDL (mg/dl)	132.3 $\pm$ 4.4	90.3 $\pm$ 4.6	0.001
Gall-bladder volume (ml)	24.4 $\pm$ 10.4	17.4 $\pm$ 4.1	0.001

## Discussion

Patients with chronic diabetes mellitus who have autonomic neuropathy have a higher fasting gall-bladder volume and a lower percentage of contraction. Bile stasis causes complications such as cholelithiasis, cholecystitis, and sludge accumulation as a late result. When a chronic diabetic presents in an emergency and requires surgery, hepatobiliary ultrasonography may be used as a screening technique to detect complications early and prevent severe consequences. Diabetes complications that occur later in life are a significant cause of morbidity and mortality. Gallstones are more common in diabetics, particularly those with type 2 diabetes. The prevalence of cholesterol gall stones is estimated to be two to three times higher in diabetics. Gall-bladder diseases are very common and have a wide range of symptoms as well as morbidity and mortality. Gallstones account for 95 percent of all gall-bladder disorders, while non-calculus disease accounts for around 5%. Gall-bladder inflammation, whether acute or chronic, was also observed. Reduced gall-bladder motility, reduced post-prandial cholecystokinin (CCK) release, reduced sensitivity of gall-bladder smooth muscle to CCK, reduced number of CCK receptors in the gall-bladder wall, supersaturation of bile, and the occurrence of gall stones themselves are the key reasons for the high prevalence of gall stone disease in diabetes mellitus. Gall-bladder volume was found to be significantly higher in T2DM patients than in safe controls in this research. These results were backed up by a research by AK Agarwal et al<sup>2</sup>, who found that T2DM patients had substantially raised gall-bladder volume as compared to healthy controls. In a research conducted by Bruce A. Chapman et al<sup>11</sup>, they found that T2DM patients had a larger gall-bladder volume than healthy controls. R Harikiran Reddy et al<sup>12</sup> reported in another research that gall-bladder functional defects are most common in diabetic neuropathy. T2DM patients with neuropathy had a substantially higher fasting gall-bladder volume than the control group<sup>13,14</sup>. Although hyper-triglyceridaemia is a recognized risk factor for gallstones, there is no proof that hyper-cholesterolaemia causes gall-bladder hypomotility<sup>15</sup>. As a result, the current research

emphasizes the importance of diabetic cholecystopathy, which can contribute to gallstone formation in T2DM patients. As a result, there's a greater chance of complications from gallstone disease and its care, both surgical and medical.

## Conclusion

Raised gall-bladder volume and dyslipidemia in patients with type 2 diabetes mellitus, according to the findings of this research. As a result, all T2DM patients should be tested for elevated fasting gall-bladder volumes to determine the likelihood of gallstone disease progression. As a result, using USG to calculate gall-bladder volume changes will help us anticipate gall-bladder function abnormalities. Incomplete gall-bladder emptying can lead to gallstone formation and complications in T2DM patients, so gall-bladder function should be tested on a regular basis. More research with a large sample size is recommended.

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