

# A Case of DIDMOAD Syndrome

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## ABSTRACT

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A rare case of Wolfram's Syndrome (also known as DIDMOAD Syndrome- Diabetes Insipidus, Diabetes Mellitus, Optic atrophy and Deafness) in a 24 year old adult associated with bilateral hydronephrosis, hydroureter and atonia of the bladder is reported here.

**Keywords:** Wolfram's syndrome, Ureteric dilatation, Atonia of the urinary bladder

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## INTRODUCTION

Wolfram's syndrome comprises Type 1 DM, Diabetes Insipidus (DI), Optic Atrophy (OA) and associated with many other neurological and urological abnormalities. Ureteric dilatation and atonia of the urinary bladder are associated with this syndrome and both of them were present in this patient. Because of the rarity of this syndrome, we are reporting this.

**Case Note:** A 24yr. old male, a known case of IDDM on Insulin therapy was presented to the Medical OP with complaints of uncontrolled blood glucose, increased urine output and gradual loss of vision.

He was gradually losing his vision in both eyes since the last 3 years making it difficult for him to continue his studies.

The subject, eldest of 3 children was born at 8 months gestation. He was diagnosed to have IDDM at the age of 4yrs. For the last 6yrs. he had polyuria and polydipsia which was attributed to his diabetes status which was poorly controlled. He also had difficulty in voiding urine and from the age of 14 he had resorted to self catheterization 3-4 times a day.

His developmental milestones were normal. He studied upto pre-degree class. There was no family history of diabetes mellitus or insipidus. His siblings are all perfectly healthy. During the history taking session it was discovered that he was hard of hearing.

### On Examination:

Ht. 173cms, Wt. 63Kg, BMI 21Kg/m<sup>2</sup>

No skeletal abnormalities. No significant positive findings on general examination.

Pulse: 82/mt. BP:120/80mmHg.

Secondary sexual characteristics were normal.

CNS: Nystagmus on looking to the right side.

Fundus: Primary optic atrophy both eyes.

Vision: 6/36 in both eyes. Early posterior cataract both eyes.

Perimetry: Central vision only.

### Investigations:

Blood sugar: PBS: 178mg%, PPBS: 315mg% on admission.

HbA1C: 8.3%, Renal parameters:WNL.

Plasma FSH: 17.1miu/L (1.5 -12.4)

Plasma LH: 10.7miu/ml (1.5-14.9)

Plasma Osmolality: 281 m.osm/Kg.

Plasma testosterone: 5.1 ng/mL (2.8 - 8.0 normal range)

Urine Osmolality: 200 mosm/Kg.

Urine RE : NAD

Volume of Urine: 6.5 L/day, Sp. Gravity: 1.005

An audiogram showed mild sensorineural deafness in the right ear and high frequency hearing loss in the left ear.

Ultrasound abdomen done-9yrs. back and repeated now showed bilateral hydronephroureterosis with significant vesical residue (200ml).

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MCU (micturition cystourethrogram) was done which showed a dilated bladder but no reflux and normal urethral valve. The dye could be seen in the urethra during micturition. IVP done the next day showed bilateral Hydronephrosis and bilateral hydroureter extending up to the bladder.

MRI showed normal sized brain, normal pituitary gland with no abnormalities.

The patient was subjected to water deprivation test from 8.15am till 4.15pm 2 days later. Base line values: Blood glucose at the time of deprivation was FBS :126mg% and PPBS 180mg % with Insulin. Urine was collected through a catheter.

	Wt. in Kg.	U. Osmolality Mosm/ kg.	Pl. Osmolality Mosm / kg.	Volume
08.15 am	63.0	196	285	
09.15 am	62.0	227	296	400 ml.
12.15 pm	61.5	288	299	640 ml.
04.15 pm	61.0	298	306	800 ml.

At 4.15pm Desmopressin was given 20mcg/ intranasally, patient was allowed to drink water, urine and plasma osmolality was measured after one hour and 2 hours.

05.15 pm	61.5	375	28.5	Urine not collected
06.15 pm	62	649	283	Urine not collected

He was discharged with combination insulin (24 U-0-14&) twice daily dose and Desmopressin -20mcg/day-intranasally. His urine volume reduced to 3.3 L/day on next day itself.

He came for review after 2 weeks with decreased urine vol. and normal blood sugar values.

## DISCUSSION

Many syndromes are associated with Diabetes Mellitus (DM) and Diabetes Insipidus (DI) the commonest are Wolfram's Syndrome, Refsum Syndrome, Frederich's Ataxia and Alstrom Syndrome.

This patient had polyuria, low sp. gravity urine, urine Osmolality lower than plasma Osmolality, urine osmolality without significant change (less than 400ml.osm/kg) after water deprivation and dramatic rise (about 3 fold) after desmopressin. These findings conclusively prove the diagnosis of D.I. Rise of urine

osmolality from 196 to 298 mosm/ kg. During water deprivation test suggests the presence of partial function of the post pituitary.

The features of OA and DM which Wolfram described in 4 siblings in 1938 have been taken as essential features of Wolfram Syndrome. The term DIDMOAD syndrome is at present used to describe patients with more wide spread abnormalities such as DM,DI, bilateral OA with various combinations of deafness, dilatation of the genitourinary tract, hypogonadism and a variety of neurological abnormalities including ataxia, insomnia and psychiatric disturbances.<sup>1</sup> Family studies of DIDMOAD patients have indicated autosomal recessive inheritance.<sup>2</sup>

In DIDMOAD syndrome, mitochondrial DNA deletions have been described and a defective gene (Wolfram gene) is located in chromosome 4 P 16.<sup>2</sup> IDDM appears first in early childhood as in this case, where as OA, DI, sensory neural deafness and neurologic abnormalities follow sequentially later in childhood or early adulthood. The median age at death is 30 years.<sup>3</sup>

Total blindness may occur in the I<sup>st</sup> or II<sup>nd</sup> decade itself. Atrophy of the lateral geniculate nucleus of the thalamus, optic nerve and optic tract, posterior pituitary and olivopontocerebellar tract and Purkinje cells may be seen<sup>4</sup> in this condition.

Several urologic alterations, mainly bladder dilatation of urinary collecting systems and decrease in detrusor muscle contractility and emptying problems are also observed in Wolfram's Syndrome probably due to neuronal degeneration in these organs also.<sup>5</sup> Absence of retinitis pigmentosa, ichthyosis, ataxia and nerve thickening excluded Refsum Syndrome in this patient, so also the presence of urinary and other neurological abnormalities exclude Frederich's ataxia and Alstrom Syndrome.

## END NOTE

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