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The Alstrom Syndrome: A Multisystem Genetic Disorder Presenting as a Cardiac Crisis: A Case Report

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Abstract: ***Since it is an inherited ciliopathy, diagnosis is frequently difficult due to the variety of clinical symptoms it presents with. Cone-rod dystrophy, hearing loss, cardiomyopathy, obesity, and type 2 diabetes mellitus are common symptoms. We discuss the case of a 28-year-old man who had severe iron deficiency anemia and acute decompensated heart failure due to a strong family history of consanguinity. The clinical diagnosis of Alstrom syndrome was supported by many findings from the diagnostic evaluation, including retinitis pigmentosa, bilateral hearing loss, hypothyroidism, and renal impairment. Early diagnosis and thorough treatment are crucial to minimizing complications because delayed detection of this disorder can result in severe morbidity and mortality.***

Keywords: Alstrom Syndrome, Anemic Heart Failure, Retinitis Pigmentosa, Ciliopathy, Consanguinity

1. Introduction

Alstrom syndrome is a complex ciliopathy due to mutations in the ALMS1 gene, which results in an evolving multisystem disorder. Typically, this starts in infancy with photophobia and nystagmus due to cone-rod dystrophy, progressively causing blindness. Other characteristic features include progressive sensorineural hearing loss, truncal obesity, insulin resistance that may progress to T2DM, and dilated cardiomyopathy with possible development of congestive heart failure. Progressive renal and hepatic dysfunction is also commonly noted. The rarity of this syndrome combined with great clinical variability, often delays its diagnosis. A case is presented wherein the resident admitted for an acute cardiovascular event had an underlying syndromic diagnosis**.**

2. Case Presentation

A 28-year-old male, admitted to General Medicine Unit due to progressive edema of the legs and feet, general swelling, chest pain, and progressive difficulty in breathing over a period of a week. His previous illness includes type 2 diabetes mellitus for three years, hypertension of two years, retinitis pigmentosa, and bilateral mixed deafness. His parents are third-degree relatives; thus, there was a marked consanguineous family history.

On examination, his blood pressure was found to be 140/90mmHg, and he exhibited tachycardia (110/min) and tachypnea (26/min). Cardiovascular examination elicited jugular venous pressure elevation and pansystolic murmur in the mitral area. Chest examination elicited bilateral basal rales.

Initial abdominal US findings included grade I changes bilaterally in the renal parenchyma, likely indicative of early nephropathies, mild ascites, and mild pleural effusion on the right side. Extensive laboratory analyses were also undertaken, including CBC, renal and hepatic function tests, and endocrine function tests. The patient was also diagnosed to be suffering from anemic heart failure due to severe iron deficiency anemia, and a strong clinical working diagnosis of Alstrom syndrome is also made based on the constellation of clinical features. Key laboratory findings are presented below in Table 1. A 2D echocardiogram revealed fair function of the left ventricle (EF 50%), mitral valve prolapse, and moderate mitral regurgitation

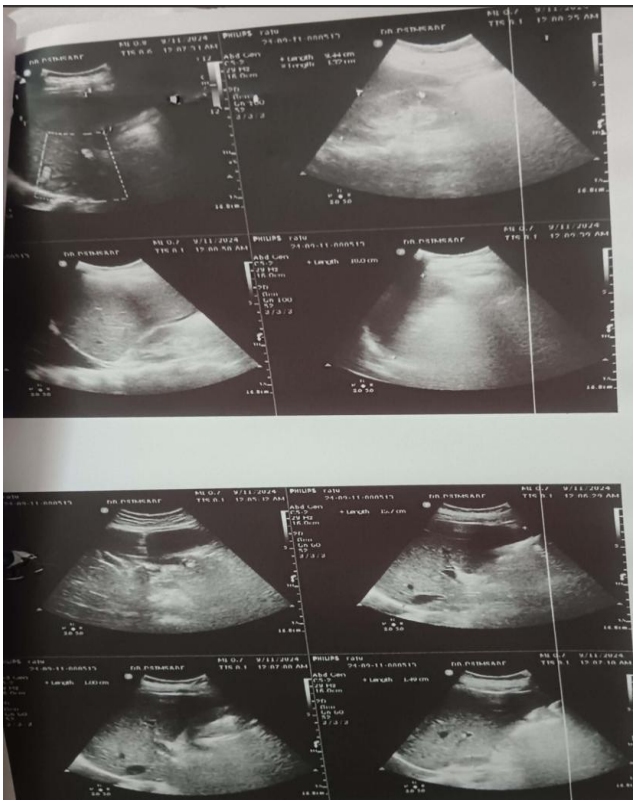

Figure 1: Ultrasound image showing renal parenchymal changes. Findings included bilateral Grade-I renal

parenchymal disease (RPC), minimal ascites, and mild right pleural effusion, consistent with the multisystem involvement seen in Alstrom syndrome

Table 1: Lab Investigations Showing Abnormal Values

Investigation	Abnormal Value	Normal Range
Complete Blood Picture		
Hemoglobin	6.2 g/dL	13 - 17 g/dL
MCV	67.1 fL	83 - 101 fL
MCH	19.8 pg	27 - 32 pg
MCHC	29.5 g/dL	31.5 - 34.5 g/dL
Renal Function Tests		
Blood Urea	99 mg/dL	18 - 45 mg/dL
Serum Creatinine	2.4 mg/dL	0.7 - 1.4 mg/dL
24-hr Urine Protein	1080 mg/day	21.3 - 119.6 mg/day
Endocrine & Metabolic Tests		
Glycated Hemoglobin (HbA1c)	9.10%	4.0 - 6.5 %
TSH	9.20 uIU/ml	0.3 - 6.02 uIU/ml
Serum Iron	14.3 ug/dL	45 - 158 ug/dL
Serum Ferritin	8.6 ng/ml	20 - 250 ng/ml
Liver Function Tests		
SGOT (AST)	56 U/L	< 35 U/L
SGPT (ALT)	86 U/L	< 45 U/L

Treatment Advised

The treatment plan for the patient was inclusive, focusing on the immediate episode and the chronic conditions. The patient received two units of packed red blood cells (PRBCs), together with ferric carboxymaltose (FCM), intravenously for the treatment of severe anemia. The patient's heart failure was treated using intravenous diuretics (Inj. Lasix). For the patient's endocrine problems, the initiation of insulin was necessary for the control of hyperglycemia, together with the administration of thyroid hormone (Tab. Thyronorm) for the treatment of hypothyroidism. Other supporting treatments for the patient include antibiotics and proton pump inhibitors and he was discharged on a well-structured oral medication regimen

3. Discussion

Alstrom Syndrome is a progressive multi-system disorder, whose early diagnosis can be challenging. The present patient was a classic case of cone-rod dystrophy (clinically diagnosed as retinitis pigmentosa), sensorineural deafness, and Type 2 DM. The concomitant presence of cardiomyopathy (MVP/MR), hypothyroidism, and nephropathy makes the clinical diagnosis even more secure. Furthermore, the fact of a third-degree consanguineous relation is an added factor giving a clue towards the autosomal recessive mode of inheritance of this clinical entity.

Acute illness due to decompensated heart failure was triggered by the presence of severe iron-deficiency anemia (hemoglobin levels of 6.2 g/dL), which increased the workload of the heart and unmasked cardiac dysfunction due to his syndromic cardiomyopathy. The condition was effectively managed by treating the underlying condition and fluid overload, and this resulted in the patient improving. Such a case demonstrates that a common condition, such a condition of anemia, may be the final push that leads to the identification of a rare condition.

4. Conclusion

Alstrom syndrome is an unusual presentation of multiple-system diseases that is only diagnosed on a higher index of suspicion. This case presentation illustrates how the typical presentation of Alstrom syndrome can be diagnosed on an acute hematological complication. Early and precise diagnosis is essential so that holistic and multidisciplinary approaches can be taken for managing the different system involvement and enhancing the quality of life of the patient.

Ethical Approval and Consent to Participate

Approval was obtained from the Institutional Ethics Committee of Dr. Pinnamaneni Siddhartha Institute of Medical Sciences & Research Foundation.

Patient Consent

Written informed consent was obtained from the patient for the publication of this case report**.**

Conflict of Interest

The authors declare that there is no conflict of interest.

Abbreviations

- IDA: Iron Deficiency Anemia
- T2DM: Type 2 Diabetes Mellitus
- MR: Mitral Regurgitation
- MVP: Mitral Valve Prolapse
- TSH: Thyroid Stimulating Hormone
- RPC: Renal Parenchymal Changes

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