Clinical Profile of Adrenal Insufficiency: A Study in a Tertiary Care Centre

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Abstract: *Adrenal insufficiency (AI) is an uncommon but potentially fatal endocrine disorder caused by inadequate secretion of adrenal hormones. Because the presenting symptoms are often vague, diagnosis may be delayed, especially in developing countries. This study aimed to analyze the clinical characteristics, etiological factors, and laboratory findings of patients diagnosed with adrenal insufficiency at a tertiary care center. A retrospective review of 22 confirmed cases was conducted over a period of two years. Diagnosis was established based on early morning serum cortisol levels below 3 mcg/dL or levels between 3-15 mcg/dL with an inadequate response to the cosyntropin stimulation test. The gender distribution was equal among the study participants. Primary adrenal insufficiency accounted for approximately 41% of cases and was observed predominantly among female patients. Autoimmune disease represented the most common cause of primary adrenal insufficiency, whereas tuberculosis contributed significantly to both primary and secondary adrenal insufficiency. The most frequent presenting manifestations included fatigue, dizziness, vomiting, and postural hypotension. Early identification through clinical suspicion and electrolyte screening may improve outcomes and prevent adrenal crisis.*

Keywords: Adrenal insufficiency, Cortisol deficiency, Hyponatremia, Tuberculosis, Autoimmune disorders

1. Introduction

Adrenal insufficiency is a clinical condition resulting from inadequate production of glucocorticoids and, in some cases, mineralocorticoids by the adrenal glands. The disorder may arise due to pathology involving the adrenal glands themselves (primary adrenal insufficiency) or from abnormalities affecting the hypothalamic-pituitary axis (secondary or tertiary adrenal insufficiency).

The prevalence of primary adrenal insufficiency is estimated to be between 82 and 144 cases per million population, while secondary adrenal insufficiency is somewhat more common. In developed countries, autoimmune adrenalitis represents the leading cause of primary adrenal insufficiency. However, in developing nations such as India, tuberculosis continues to be a major etiological factor.

Patients with adrenal insufficiency frequently present with nonspecific symptoms including fatigue, weight loss, dizziness, nausea, vomiting, and generalized weakness. These symptoms can easily be overlooked or attributed to other medical conditions. In severe cases, untreated adrenal insufficiency may lead to adrenal crisis, characterized by severe hypotension, electrolyte disturbances, and shock.

Due to the nonspecific nature of the disease presentation, understanding the clinical profile and associated laboratory findings is essential for early recognition and timely management.

2. Materials and Methods

Study Design
This study was conducted as a retrospective observational analysis at a tertiary care teaching hospital.

Study Duration
The study included cases diagnosed over a two-year period.

Study Population
A total of 22 patients with confirmed adrenal insufficiency were included.

Inclusion Criteria
Patients were included if they satisfied one of the following criteria:
- 8 AM serum cortisol level <3 mcg/dL, or
- 8 AM cortisol between 3-15 mcg/dL with inadequate response to cosyntropin stimulation test (peak cortisol <18 mcg/dL).

Exclusion Criteria
Patients below 14 years of age were excluded.

Data Collection
Clinical presentation, demographic information, laboratory parameters, and associated comorbidities were collected from hospital records.

Statistical Analysis
Data were summarized using descriptive statistics, and findings were expressed as percentages.

3. Results

Table 1: Demographic Distribution

Parameter	Number	Percentage
Total patients	22	100%
Male	11	50%
Female	11	50%

Table 2: Type of Adrenal Insufficiency

Type	Number of Patients	Percentage
Primary Adrenal Insufficiency	9	41%
Secondary Adrenal Insufficiency	13	59%

Table 3: Etiological Distribution

Etiology	Percentage
Autoimmune disease	80% of primary AI
Tuberculosis	25.2%
Pituitary disorders	16.7%
Exogenous steroid therapy	16.7%

Table 4: Clinical Presentation

Clinical Feature	Number of Patients	Percentage
Fatigue / Myalgia	17	75%
Dizziness / Reeling sensation	15	66.6%
Weight loss	11	50%
Vomiting	11	50%
Postural hypotension	20	91.6%

Figure 1: Distribution of Clinical Symptoms

Table 5: Associated Comorbidities

Comorbidity	Number of Patients	Percentage
Thyroid dysfunction	13	58.3%
Diabetes mellitus	4	16%
Anemia	17	75%

Figure 2: Distribution of Associated Comorbidities

Table 6: Laboratory Findings

Laboratory Parameter	Percentage of Patients
Urinary sodium >20 mEq/L	66.6%
Hyponatremia (<136 mEq/L)	41.6%
Elevated ESR	83%
Preserved creatinine clearance	100%

Flow Diagram (PRISMA Style)
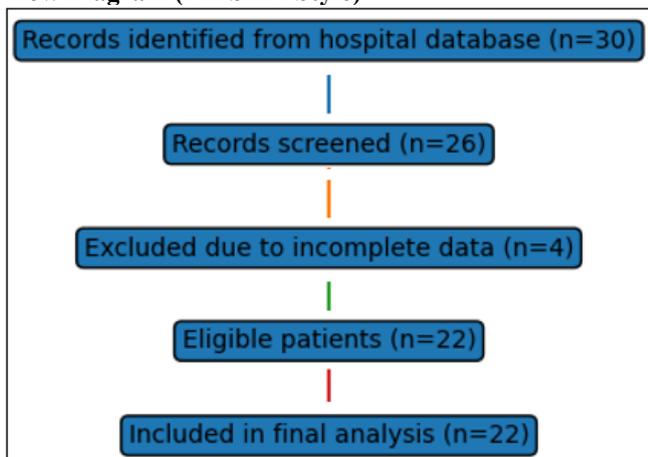
4. Discussion

The present study evaluated the clinical profile of adrenal insufficiency in patients treated at a tertiary care hospital.

The findings demonstrate that primary adrenal insufficiency was more frequently observed in female patients, which may reflect the higher prevalence of autoimmune disorders in women. Autoimmune adrenalitis accounted for the majority of primary adrenal insufficiency cases in this study.

Tuberculosis remains an important etiological factor in India and was identified as a contributing cause in both primary and secondary adrenal insufficiency. This highlights the continued importance of infectious diseases in the pathogenesis of endocrine disorders in developing regions.

Clinical manifestations were often nonspecific, with fatigue, dizziness, and gastrointestinal symptoms being common complaints. Postural hypotension was the most consistent clinical sign and may represent an important diagnostic clue.

Anemia was also frequently identified among patients. While iron deficiency anemia is common in the general population, the presence of normocytic normochromic anemia may suggest an underlying endocrine disorder such as adrenal insufficiency.

Hyponatremia occurred through different mechanisms depending on the type of adrenal insufficiency. In primary adrenal insufficiency, sodium loss occurs due to mineralocorticoid deficiency. In secondary adrenal insufficiency, hyponatremia results from increased vasopressin activity leading to dilutional sodium levels.

5. Conclusion

Adrenal insufficiency remains an underdiagnosed endocrine condition due to its nonspecific clinical manifestations. The findings of this study emphasize the importance of maintaining a high level of clinical suspicion in patients presenting with fatigue, dizziness, unexplained weight loss, and postural hypotension.

Autoimmune disease and tuberculosis were identified as major etiological factors. Routine screening using serum electrolytes and urinary sodium estimation may facilitate early diagnosis and help prevent adrenal crisis.

Further large-scale prospective studies are necessary to better understand the epidemiology and clinical spectrum of adrenal insufficiency in the Indian population.

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