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REVIEW ON LOSARTAN INDUCED HYPONATREMIA

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ABSTRACT
Hyponatremia is a frequently encountered electrolyte imbalance associated with significant morbidity and mortality. While diuretics, selective serotonin reuptake inhibitors (SSRIs), and anticonvulsants are well-recognized causes, angiotensin II receptor blockers (ARBs), particularly losartan, have also been implicated in rare cases. This review explores the potential mechanisms, clinical evidence, risk factors, diagnostic considerations, and management strategies related to losartan-induced hyponatremia. Awareness of this uncommon yet clinically significant adverse effect is essential for early recognition and prevention of complications.

Keywords: *Hyponatremia, Losartan, Angiotensin II receptor blockers (ARBs), Electrolyte imbalance, Adverse drug reaction, Syndrome of inappropriate antidiuretic hormone secretion (SIADH)*

INTRODUCTION

Losartan, an angiotensin II type I receptor (AT1R) antagonist, is widely used for managing hypertension, heart failure, and diabetic nephropathy. It is generally considered safe, with common adverse effects including dizziness, hyperkalemia, and renal impairment. However, hyponatremia secondary to losartan therapy is rarely reported in literature. Given the widespread use of ARBs, understanding this potential adverse effect is important, particularly in elderly or comorbid patients who are predisposed to electrolyte disturbances.

Losartan's potential role in hyponatremia

The exact mechanism of losartan-induced hyponatremia remains unclear, but several hypotheses exist:-

Interference with the Renin-Angiotensin - Aldosterone System [PAAS] – Losartan antagonizes the effects of angiotensin-II, including the release of Aldosterone, a hormone that promotes sodium retention. This interference could potentially lead to reduced sodium reabsorption. And lower sodium levels.

MechanismofHyponatremia: -

Aldosterone Secretion:-

Losartan blocks ATI receptors- decreased angiotensin-II effect then decreased Aldosterone – decreased sodium reabsorption -increased Sodium loss in urine.

Volume Depletion effect

Losartan causes vasodilation -decreased effective blood volume -Non-osmotic -ADH release -increased water retention – Dilutional hyponatremia.

SIADH-like effect [Rare]

Some ARBS may stimulate inappropriate ADH secretion Leads to water retention& diluted sodium.

Symptoms of Hyponatremia

- Mild-Nausea
- Fatigue
- Headache
- Moderate:-confusion, irritability.
- Severe seizures, coma, respiratory arrest.
- Monitoring:-Serum sodium, creatinine, potassium
- Management:- Discontinue or reduce losartan
- stop thiazide diuretic if used.
- Careful correction of sodium.

Potential enhancement of antidiuretic Hormone [ADH]: effects

Some evidence suggests that losartan mayPotentially enhance the effects of ADH, a hormone that regulates water reabsorption by the kidneys. This could lead to water retention and a dilutionalhyponatremia.

Altered renal sodium handling

Losartan may also directly or indirectly affect the kidney's ability to properly handle & excrete sodium, further contributing to electrolyte imbalances.

CLINICAL EVIDENCE

Clinical data regarding losartan-induced hyponatremia primarily consist of case reports and small observational studies. Several case studies have documented symptomatic hyponatremia following losartan initiation, typically within 2–6 weeks of therapy. Patients often presented with serum sodium levels below 125 mmol/L, manifesting confusion, lethargy, or seizures. Symptoms usually resolved upon drug discontinuation and sodium correction.

Pharmacovigilance data suggest that ARB-associated hyponatremia is less frequent compared to thiazide diuretics but warrants clinical awareness. Combination therapy with diuretics or other sodium-lowering drugs may amplify the risk.

OBSERVATIONAL STUDIES

Limited data exist, but small pharmacovigilance analyses suggest a possible association between ARBS hyponatremia, through less frequent than with thiazide diuretics.

RISK FACTORS

The following factors may predispose individuals to losartan-induced hyponatremia:

- Advanced age – elderly patients have reduced renal reserve and impaired water regulation.
- Concomitant use of diuretics, SSRIs, or other sodium-depleting medications.
- Underlying renal, hepatic, or cardiac dysfunction.
- Volume depletion states such as vomiting, diarrhea, or dehydration.
- Low dietary sodium intake or adrenal insufficiency.

DIAGNOSIS AND MONITORING

Diagnosis is based on laboratory findings of serum sodium levels below 135 mmol/L, supported by clinical evaluation. It is essential to exclude alternative causes of hyponatremia such as hypothyroidism, adrenal insufficiency, and SIADH. Monitoring serum electrolytes during losartan initiation and dose adjustment, particularly in high-risk populations, is strongly recommended.

CLINICAL MANAGEMENT

Discontinue losartan

Discontinue losartan as the primary step. The patient's serum sodium levels should be closely monitored to see if they normalize after the drug is stopped.

Supportive Care

Nutritional support.

- Assess severity. The clinical management strategy is based on the patient's serum sodium levels and symptoms.
- Mild hyponatremia (130–134 mEq/L) often presents with mild or no symptoms, such as nausea or headache.
- Moderate hyponatremia (125–129 mEq/L) requires careful management and monitoring.
- Severe hyponatremia (<125 mEq/L) or any symptomatic hyponatremia (e.g., confusion, seizures) is a medical emergency requiring immediate attention.
- Correct volume status. Evaluate whether the patient is hypovolemic (low fluid volume) or hypervolemic (excess fluid volume). Losartan can cause hypervolemic hyponatremia, particularly in patients with heart failure.

SUMMARY AND CLINICAL RECOMMENDATIONS

Although rare, losartan-induced hyponatremia is a clinically significant adverse reaction. Clinicians should maintain vigilance, especially among elderly patients or those with comorbidities. Early recognition, appropriate diagnostic evaluation, and timely management can prevent severe neurological complications. Routine electrolyte monitoring should be incorporated into the therapeutic plan of patients initiated on losartan, particularly when used concomitantly with diuretics or in patients with compromised renal function.

CONCLUSION

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INFORM CONSENT AND ETHICAL CONSIDERATIONS

Not applicable

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