

ORIGINAL ARTICLE

Assessment of serum electrolytes in patients with inflammatory bowel disease

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ABSTRACT:

Background: Inflammatory bowel disease (IBD) represents a chronic inflammatory disorder of the intestine. The present study was conducted to assess serum electrolytes in patients with inflammatory bowel disease. **Materials & Methods:** The present study was conducted in the department of Biochemistry. It comprised of 48 patients of IBD of both genders. 5 ml of blood was taken from all subjects for estimation of serum electrolytes in using ion selective electrolyte technique. **Results:** The mean serum sodium level in group I was 131.4 mEq/l and in group II was 138.1 mEq/l, serum potassium level was 3.94 mEq/l and in group II was 4.18 mEq/l, serum chloride level was 104.5 mEq/l and in group II was 101.2 mEq/l. The difference was significant ($p < 0.05$). **Conclusion:** Authors found significant decrease in serum sodium potassium and increase in serum chloride level in patients of IBD.

Key words: Sodium, Potassium, chloride.

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INTRODUCTION

Inflammatory bowel disease (IBD) represents a chronic inflammatory disorder of the intestine, generally classified by histopathological and clinical features into two major entities: Crohn's disease (CD) and ulcerative colitis (UC). UC is characterized by diffuse mucosal inflammation limited to the colon. It involves the rectum in about 95% of cases and may extend proximally in a symmetrical, circumferential, and uninterrupted pattern to involve parts or the whole of the large intestine.¹ On the other hand, CD is characterized by asymmetric, transmural and occasionally granulomatous inflammation affecting the gastrointestinal (GI) tract, most commonly the terminal ileum and colon, with the potential for systemic and extraintestinal complications. CD-associated transmural inflammation often leads to fibrosis, obstructive complications, sinus tracts and fistulae, not typically seen in UC.²

Despite the substantial cost of IBD to both patients and society, curative, medical interventions have yet to be discovered. The development and persistence of IBS symptoms have been acknowledged as multifactorial in nature, making treatment of the disorder a complicated, clinical endeavor. Approaches are based on the reduction of patient symptomatology, and current

pharmacological management often provides suboptimal relief.³ IBD is recognized as a multifactorial disorder, with the following among the proposed mechanisms contributing to symptomatology: gastrointestinal dysmotility, inflammation, visceral hypersensitivity, and altered intestinal microbiota. Diet and stress exposure (including early life events) have been proposed as contributing factors to this heterogeneous disorder.⁴

The present study was conducted to assess serum electrolytes in patients with inflammatory bowel disease.

MATERIALS & METHODS

The present study was conducted in the department of Biochemistry. It comprised of 48 patients of IBD of both genders. Equal number of control was also taken. The study was approved from institutional ethical committee. All subjects were informed regarding the study and written consent was obtained.

Data such as name, age, gender etc. was recorded. 5 ml of blood was taken from all subjects for estimation of serum electrolytes in using ion selective electrolyte technique. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of subjects

Total- 96		
Groups	Group I (Cases)	Group II (Control)
Number	48	48

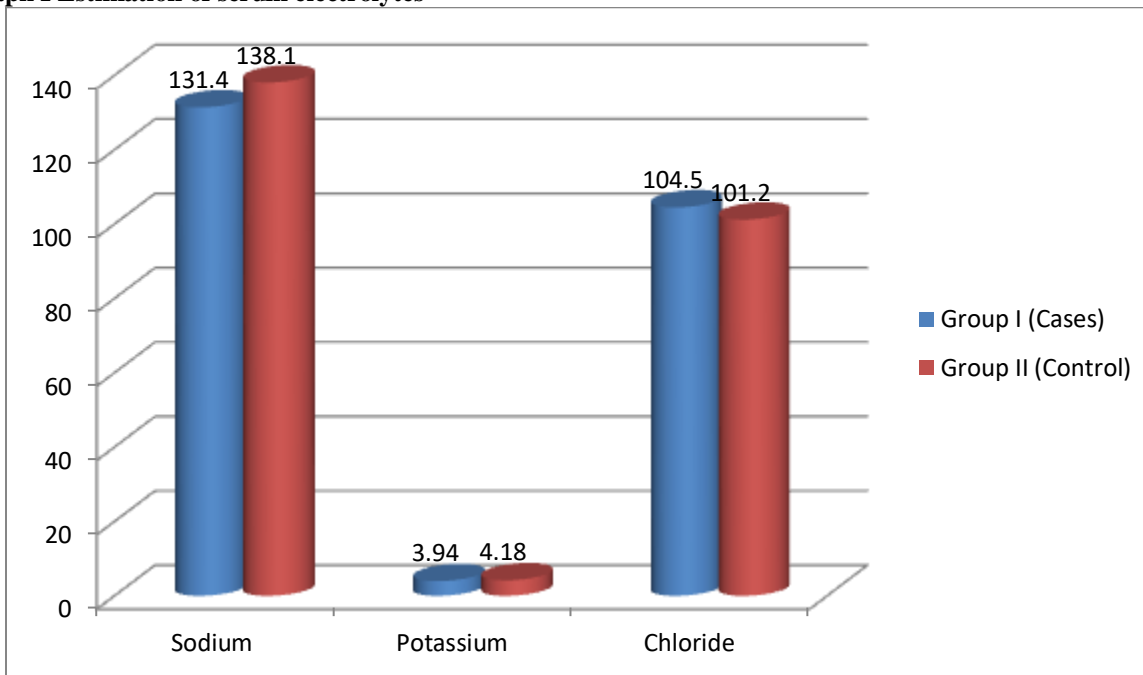
Table I shows that both groups had 48 subjects each. Group I had cases and group II had controls.

Table II Estimation of serum electrolytes

Serum electrolytes (mEq/l)	Group I (Cases)	Group II (Control)	P value
Sodium	131.4	138.1	0.05
Potassium	3.94	4.18	0.02
Chloride	104.5	101.2	0.12

Table II, graph I shows that mean serum sodium level in group I was 131.4 mEq/l and in group II was 138.1 mEq/l, serum potassium level was 3.94 mEq/l and in group II was 4.18 mEq/l, serum chloride level was 104.5 mEq/l and in group II was 101.2 mEq/l. The difference was significant (p< 0.05).

Graph I Estimation of serum electrolytes



DISCUSSION

IBD-associated mucosal inflammation and the consequent impaired secretion and absorption of electrolytes often result in electrolytic and acid-base imbalance in IBD patients. The main transport abnormality is the decrease in net sodium and chloride absorption, resulting in impaired water absorption or secretion. Diet and stress exposure (including early life events) have been proposed as contributing factors to this heterogeneous disorder.⁵ Because stress has been identified as a mechanism in the development of IBS, the major components of the stress response system, the autonomic nervous system (ANS) and the

hypothalamic-pituitary-adrenal (HPA) axis, have been the subject of numerous investigations of IBD. Lastly, genetic predisposition and environmental interactions, such as familial susceptibility and psychosocial stressors, have been implicated in the multifactorial pathogenesis of IBD.⁶ The present study was conducted to assess serum electrolytes in patients with inflammatory bowel disease.

In present study, both groups had 48 subjects each. Group I had cases and group II had controls. The key determinant of colonic water absorption is the rate of Na⁺ absorption. This can be either electrogenic via the epithelial sodium channel (ENaC) or electroneutral via

parallel Na^+/H^+ and $\text{Cl}^-/\text{HCO}_3^-$ exchange.⁷ Specifically, in electrogenic absorption of Na^+ , apical Na^+ entry is passive, channel-mediated and inhibited by amiloride, while basolateral Na^+ extrusion is mediated by $\text{Na}^+-\text{K}^+-\text{ATPase}$ (the electrogenic ' Na^+ pump'). On the other hand, in electroneutral NaCl absorption, apical Na^+ uptake is mediated by Na^+-H^+ exchange, most likely linked with intracellular pH to apical $\text{Cl}^-/\text{HCO}_3^-$ exchange. As for the place in which these absorptive processes are located, the electrogenic absorption is confined to the surface epithelium and upper crypts of the distal colon, while the electroneutral one takes place in both crypts and surface epithelium of the proximal and distal colon.⁸

We found that mean serum sodium level in group I was 131.4 mEq/l and in group II was 138.1 mEq/l, serum potassium level was 3.94 mEq/l and in group II was 4.18 mEq/l, serum chloride level was 104.5 mEq/l and in group II was 101.2 mEq/l. Lucas *et al*⁹ studied the net electrolyte and water transport in the rectum and the rectal PD in 3 groups before and 5 h after a simple i.v dose of steroids. The first group consisted of 9 patients with active UC, the second of 6 patients with inactive UC and the third of 17 control subjects. A strong reduction in PD and net sodium absorption was noticed in patients with active UC, while in those with inactive UC these transport parameters were normal. Similarly, bilateral sodium isotope flux studies in distal colonic mucosa demonstrated decreased net sodium absorption in untreated UC patients due to a reduced mucosa to serosa unidirectional flux. *In vitro* measurements of the net transport and simultaneous bidirectional flux rates of water and electrolytes across the human colonic epithelium demonstrated that in UC the colon becomes less absorptive and more secretory. Specifically, in the active phase of UC colon absorbs less water and sodium and secretes more potassium.¹⁰

CONCLUSION

Authors found significant decrease in serum sodium potassium and increase in serum chloride level in patients of IBD.

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