

Metabolic Responses, Fluid and Electrolyte Status Following Badminton Matches in Junior Players: Implications for Player Recovery

Anil Ramachandran

Department of Physical Education and Sports Sciences, Kannur University, Kannur, Kerala, INDIA.

Contact: dranil@live.com

Abstract

A critical examination of the metabolic responses and fluid-electrolyte imbalances post exercise and subsequent recovery post match would represent a powerful tool to understand the demand and intensity of the game, provide valuable knowledge for preparing training schedules, and inputs regarding post match recovery. Eight competitive singles players (4 male and 4 female) (Mean \pm SD age: 15 ± 0.85 ; height 165.56 ± 7.26 ; body weight 60.35 ± 6.79) playing at the junior national level circuit in India volunteered to participate in this study. Employing a descriptive design, data on selected metabolic and fluid and electrolyte variables (plasma glucose, plasma lactate, serum sodium, serum potassium and serum ionized calcium, urine specific gravity, urine sodium and urine potassium) were taken for pre match, immediate post match and thirty minutes post match recovery. Fluid intake and sweat rate were also estimated during the badminton matches for every player. Heart rate was recorded throughout the match and during recovery period. The matches were played on wooden surface flooring with moderate mean environment temperature ($28.06 \pm 1.80^{\circ}\text{C}$) with an average humidity of $38.10 \pm 7.20\%$. Average sweat rate of 0.99 ± 0.38 in case of male badminton players and 1.23 ± 0.19 in case of female players was observed during the matches. Heart rate and plasma lactate values increased significantly from pre to post match, with post match lactate concentrations of 4.02 mmol/l in case of male players and 3.50 mmol/l in case of female badminton players. The average heart rate of $178 \text{ beats.min}^{-1}$ and $172 \text{ beats.min}^{-1}$ respectively for male and female players indicate the high intensity at which the matches were played. The heart rate and plasma lactate values decreased significantly from post match level to 30 minutes recovery period, but failed to reach pre match levels. Urine sodium showed significant decrease from pre to post match levels in case of male badminton players ($p < .05$). The evidence of higher heart rate despite moderate levels of lactate accumulation indicates that badminton is a highly demanding game in terms of cardiovascular efforts rather than metabolic responses. The lack of recovery in cardiovascular and metabolic responses following badminton singles matches to baseline after thirty minutes may negatively affect subsequent performance. The high

variability in metabolic responses and fluid and electrolyte imbalances among players after singles badminton matches suggest individualized consideration and advice on recovery and fluid replacement for players.

Keywords: metabolic responses, fluid-electrolyte status, badminton matches, player recovery

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