

## ***Differential Serum Total Antioxidant Capacity in Acute Coronary Syndrome: A Comparative Analysis across Clinical Conditions and Gender***

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Oxidative stress plays a pivotal role in the pathogenesis of Acute Coronary Syndrome (ACS). Serum Total Antioxidant Capacity (TAC) reflects the body's antioxidative defense and its evaluation can provide insights into the clinical management of ACS. In a prospective cohort study from October 2016 to January 2020 at Teaching Hospital Peradeniya, 360 ACS patients and 150 matched healthy controls were enrolled. Serum TAC was assessed using the Ferric Reducing Antioxidant Power (FRAP) assay. Statistical analyses were performed using SPSS and included independent samples T-test and one-way ANOVA. The mean serum TAC levels showed no significant difference between ACS patients ( $857.6 \pm 194.4 \mu\text{mol/L}$ ) and controls ( $847.7 \pm 162.0 \mu\text{mol/L}$ ;  $p=0.558$ ). However, within the ACS group, significant variations were observed: NSTEMI patients had the highest mean TAC at  $901.8 \pm 202.5 \mu\text{mol/L}$ . STEMI patients had a mean TAC of  $843.5 \pm 182.5 \mu\text{mol/L}$ . UA patients showed the lowest mean TAC at  $835.0 \pm 192.3 \mu\text{mol/L}$ , significantly lower than NSTEMI ( $p=0.027$ ). Gender analysis within UA revealed males had significantly higher TAC ( $874.1 \pm 175.5 \mu\text{mol/L}$ ) compared to females ( $798.7 \pm 201.1 \mu\text{mol/L}$ ;  $p=0.021$ ). Correlations between TAC and BMI were not significant, contradicting findings from previous studies which suggested a positive relationship. Serum TAC varies significantly across different ACS clinical conditions and between genders but not between ACS patients and healthy controls. NSTEMI patients exhibited the highest TAC, suggesting variations in antioxidative response might be associated with the nature of myocardial injury. The lack of correlation between TAC and BMI suggests that TAC may be independently regulated by factors other than body weight. This study underscores the complexity of antioxidant responses in cardiovascular diseases and supports further investigation into the role of TAC as a potential biomarker in ACS management.

**Keywords:** Acute Coronary Syndrome, Total Antioxidant Capacity, FRAP Assay, Clinical Conditions, Gender Differences, Cardiovascular Biomarkers

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