

**Atherogenic Index of Plasma Associated Cardiovascular Risk in 10,241 Paediatric Patients**

Tomader Ali, Radwa Helal, Rayan Khaled, Hani Sabbour and Nader Lessan

Imperial College London Diabetes Center, Abu Dhabi, UAE

**Background:**

Cardiovascular disease (CVD) is a leading cause of mortality. Childhood obesity is a major contributor to CVD. Atherogenic index of plasma (AIP) is an indicator of risk of atherosclerotic CVD. Associations between childhood obesity and CVD risk in the region remains under-explored. We aim to investigate this association as a predictor of CVD in this young population.

**Methods:**

Patients who attended our Centre (2009-2019), age  $\leq 19$  years and with complete lipid profiles were assessed. Extracted data was grouped per sex, age and BMI percentile: normal-weight (NrWt) 5th – 85th percentile, overweight (OvWt) 85th – 95th percentile and obese (Ob) 95th percentile. AIP was calculated using the logarithmic formula,  $\log(\text{Triglyceride(TG)}/\text{high-density lipoprotein cholesterol (HDL-C)})$  [1]; patients were divided into three risk groups (Gps): Gp1=low, Gp2= intermediate and Gp3=increased CVD risk.

**Results:**

In our study population (n=10,241), 52.9% of total patients were females. Female percentage is different in each AIP risk group: Gp1=59.6%, Gp2=46.5% and Gp3=35.4% in low, intermediate and high risk groups respectively. In the different BMI percentiles, CVD risk varied; 88.00%, 8.75% and 3.25% in Gp1 (low), Gp2 (intermediate) and Gp3 (high) respectively. In the overweight/obese (OvWt/Ob) group specifically, 41.3% of patients were in Gp1 (low risk), 72.7% of patients were in Gp2 (intermediate risk) and 81.4% were in Gp3 (high risk).

**Conclusion**

Even at a young age, all patients displayed some level of AIP associated CVD risk. There is a significant group of children and adolescents with increased risk of cardiovascular disease who do not belong to the familial hypercholesterolemia group. This is further exacerbated by obesity. The data highlights the importance of early identification of these patients at a younger age, potentially earlier than previously acknowledged to prevent long-term detrimental complications.

Table 1.

| Categories              |         | Atherogenic Index of Plasma (AIP) -Logarithmically Transformed Ratio of Molar Concentrations of Triglycerides to HDL-Cholesterol |                                   |                           |
|-------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------|
|                         |         | Gp1                                                                                                                              | Gp2                               | Gp3                       |
|                         |         | Low Risk (AIP <0.1)                                                                                                              | Intermediate Risk (AIP 0.1 - 2.1) | Increased Risk (AIP >2.1) |
| Patient Number (n)      | Total N | 9012                                                                                                                             | 896                               | 333                       |
|                         | Females | 5373 (59.6%)                                                                                                                     | 417 (46.5%)                       | 118 (35.4%)               |
|                         | Males   | 3639 (40.4%)                                                                                                                     | 479 (53.5%)                       | 215 (64.6%)               |
| Weight (BMI Percentile) | Total N | 9012 (88.00%)                                                                                                                    | 896 (8.7%)                        | 333 (3.3)                 |
|                         | NrWt    | 4546 (50.4%)                                                                                                                     | 227 (25.3%)                       | 60 (18.0%)                |
|                         | OvWt    | 3720 (41.3%)                                                                                                                     | 651 (72.7%)                       | 271 (81.4%)               |
|                         | UnWt    | 746 (8.3%)                                                                                                                       | 18 (2.0%)                         | 2 (0.6%)                  |

Table 1. Cardiovascular risk in paediatric patients.

## References

1. Fernández-Macías, J.C., et al., *Atherogenic Index of Plasma: Novel Predictive Biomarker for Cardiovascular Illnesses*. Arch Med Res, 2019. **50**(5): p. 285-294.