



How early is the rise in Leptin levels in Small for Gestational Age children with catch up growth?



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INTRODUCTION

- Incidence of Low Birth Weight (LBW) world wide is **15.5%**(range 6 to 18%)¹
 - 70% of LBW infants are SGA(Birth Weight < 10th percentile)¹
 - By 2 years age, most SGA achieve catch up growth(CUG)²
 - Being born SGA and postnatal CUG strongly associated with metabolic derangements:-
 - Hyperinsulinemia and Insulin resistance³
 - Adipokines imbalance -High Leptin and low Adiponectin levels⁴
- Leading to central adiposity, metabolic syndrome and CVD in later life⁵

INDIAN SCENARIO

- India is **world's capital of LBW babies**, contributing 40%
- LBW incidence -**30% (UNICEF) and 21.5%(NFHS-3)**
- More than two-thirds of LBW are SGA
- Our institute data -**30-45%** newborns are SGA
- Onset of Insulin resistance **as early as 4 years** of age(Pune Study)
- ✓Tempo of postnatal CUG had highest level of risk factors for Type 2 DM and CVD⁶
- Higher Leptin and Insulin in cord blood of Indian SGA newborns **support intrauterine origin of central adiposity and hyperinsulinemia in Indians**⁷

OBJECTIVES

- **Primary Objective:** To evaluate serum Leptin and Insulin levels in term SGA at 15-18 months age
- **Secondary Objective:** To evaluate their association with catch up growth

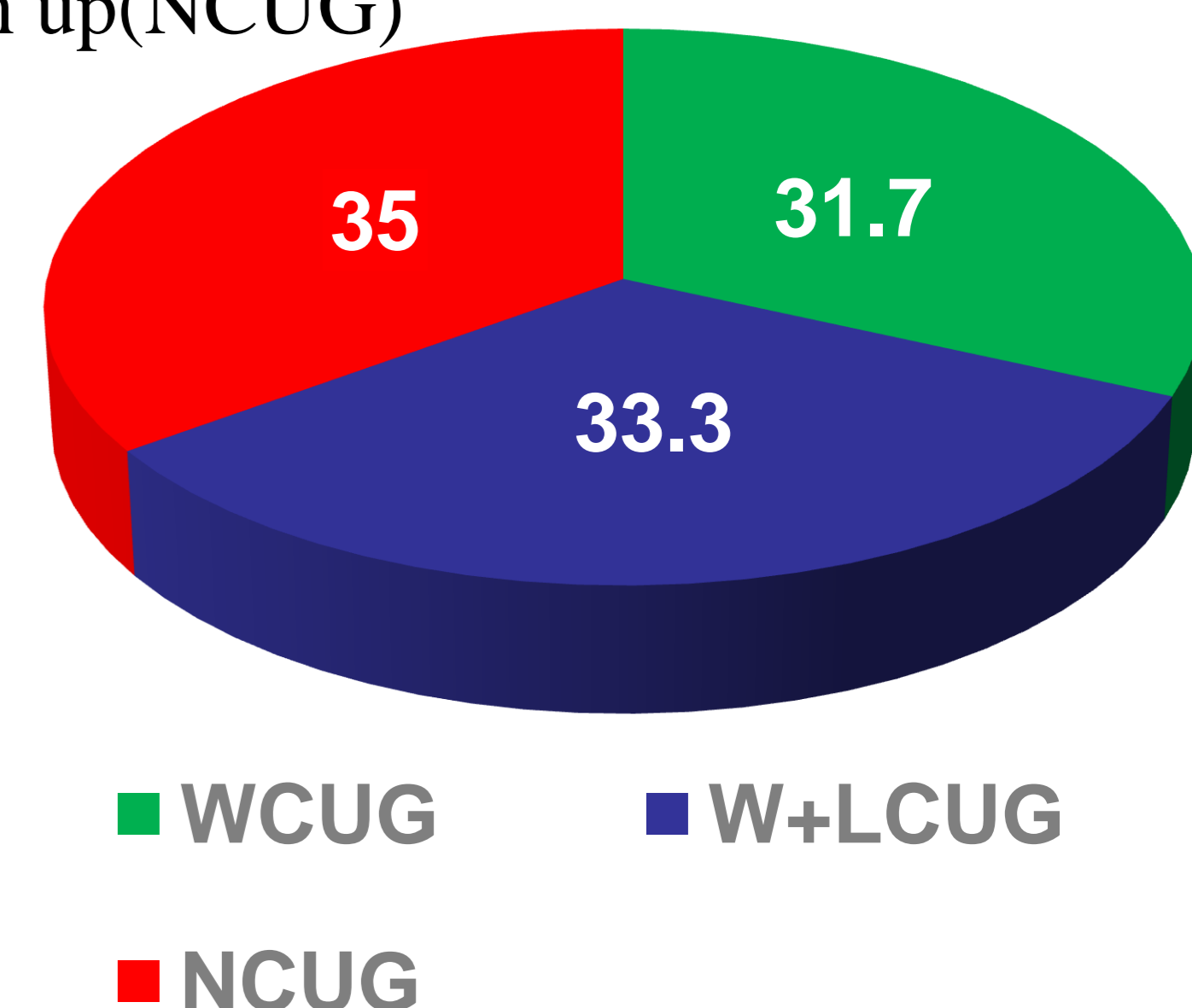
MATERIALS AND METHODS

- Study approved by institutional ethical committee
- Study Design-Cross-sectional observational
- 60 term SGA children consented and enrolled
- Gross anomaly, IEM and chronic illness excluded
- Current anthropometry measured at inclusion.
- Birth data recorded from discharge document
- Reference standards used - WHO growth charts
- Data analyzed for CUG as gain in weight or length SDS or both >0.67 SDS (percentile band)
- Fasting blood samples analysed for **Leptin and Insulin using Electro-chemiluminescence and ELISA kit** respectively
- **Insulin sensitivity** evaluated using **homeostatic model assessment index (HOMA-IR)**

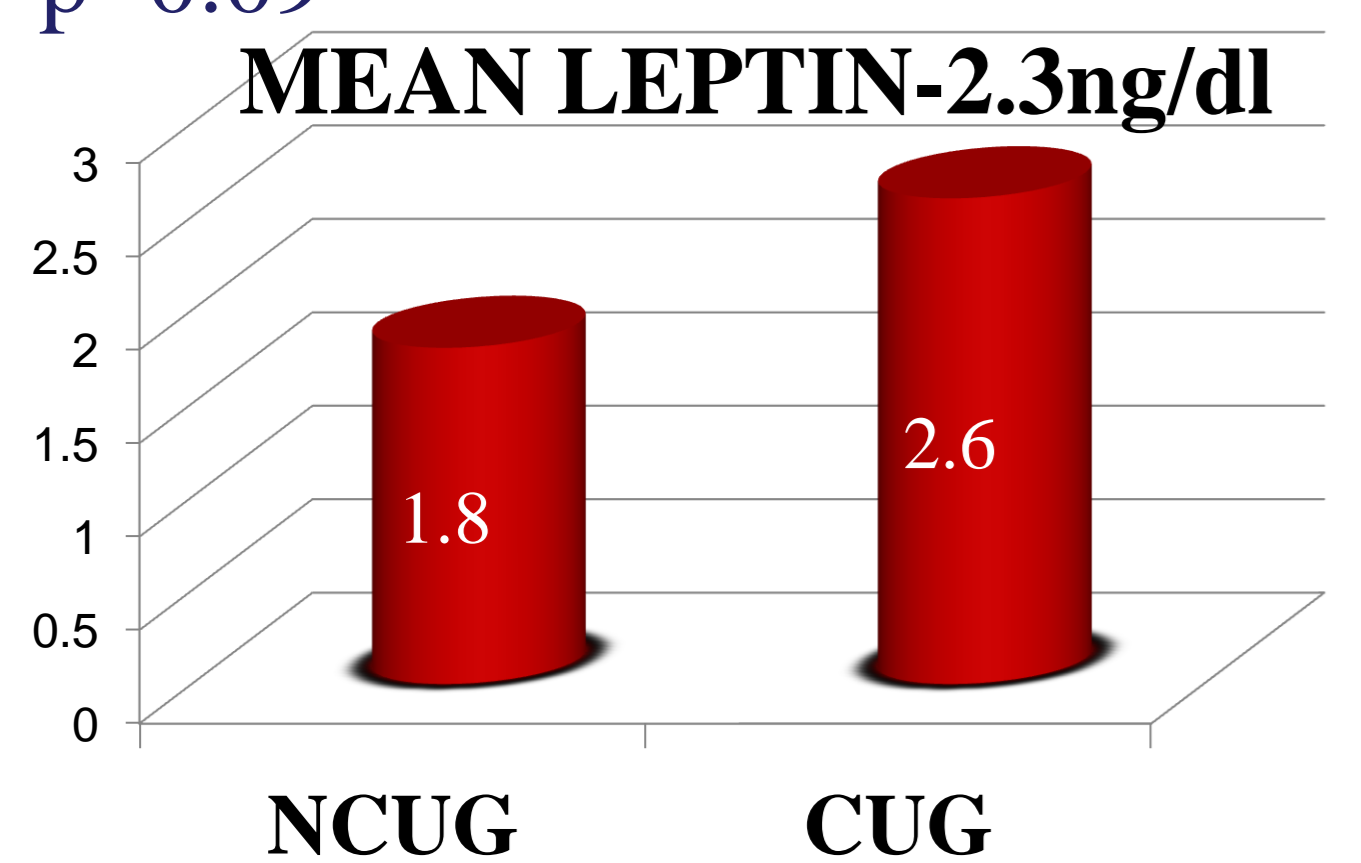
RESULTS

	BIRTH	ENROLLMENT
AGE	38.4± 1.2 weeks (gestational age)	16.9 ±1.2 months
WEIGHT (kg)	2.08± 0.2	8.2 ± 0.8
WEIGHT SDS	-2.89±0.59	-2.00±0.98
LENGTH (cm)	45.1 ± 2.5	73.0 ± 3.0
LENGTH SDS	-2.37±1.36	-2.36± 1.11

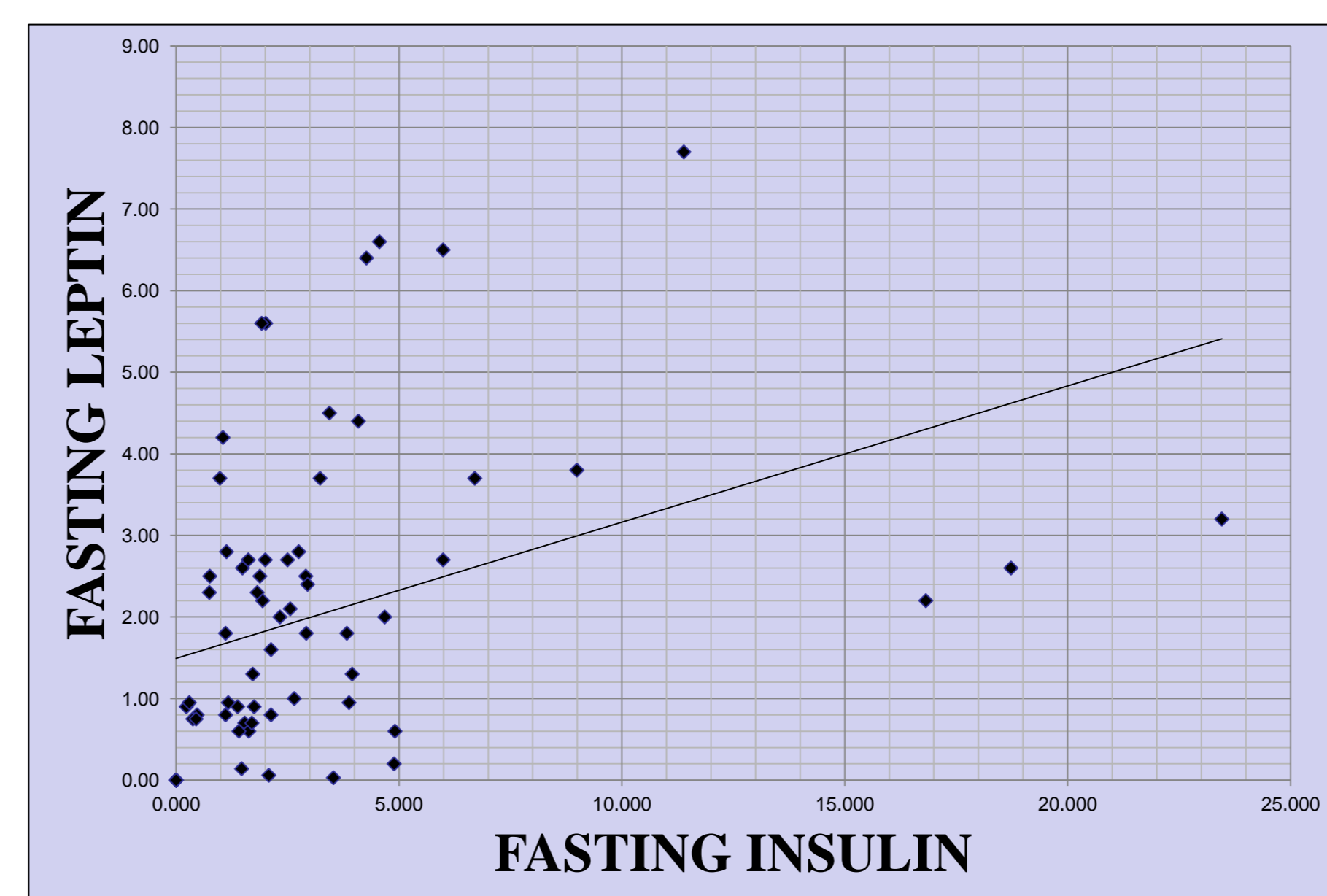
- 65% (39/60)** showed CUG
- 35% (21) had no catch up(NCUG)
- 33.3% (20) in both weight and length (W+LCUG)**
- 31.7% (19) displayed only weight catch up (WCUG)



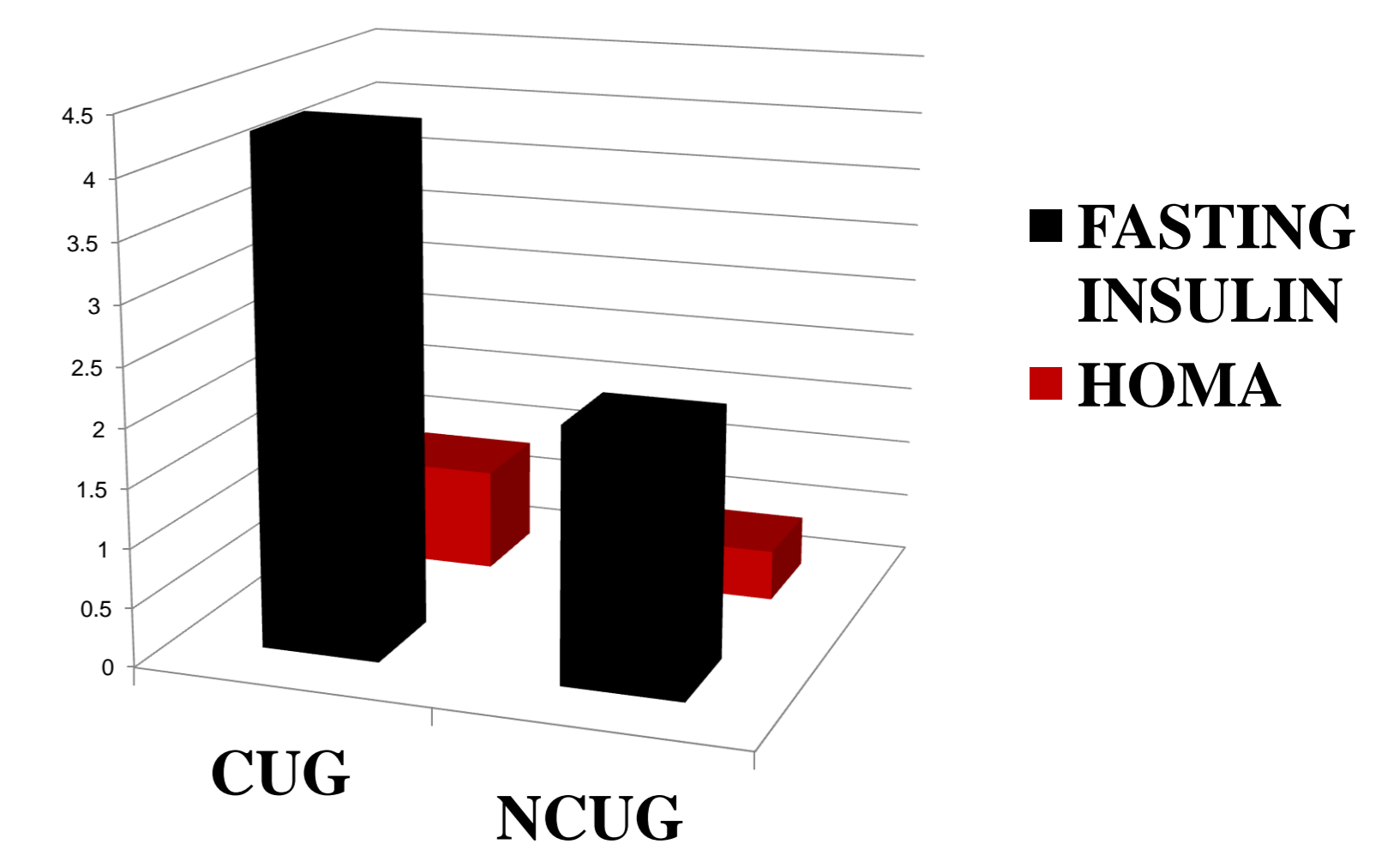
Leptin levels **higher in CUG** (2.6±1.98 ng/dl) than NCUG(1.8±1.20 ng/dl), difference being **insignificant**, p=0.09



Leptin levels positively correlated significantly with Insulin levels, p=0.004 and HOMA-IR value, p**=0.002**



Insulin and HOMA-IR value significantly higher in CUG vs NCUG; 4.29±5.0µIU/ml vs 2.15 ±1.9µIU/ml, p*=0.031 and 0.87 vs 0.43, p*=0.039 respectively.

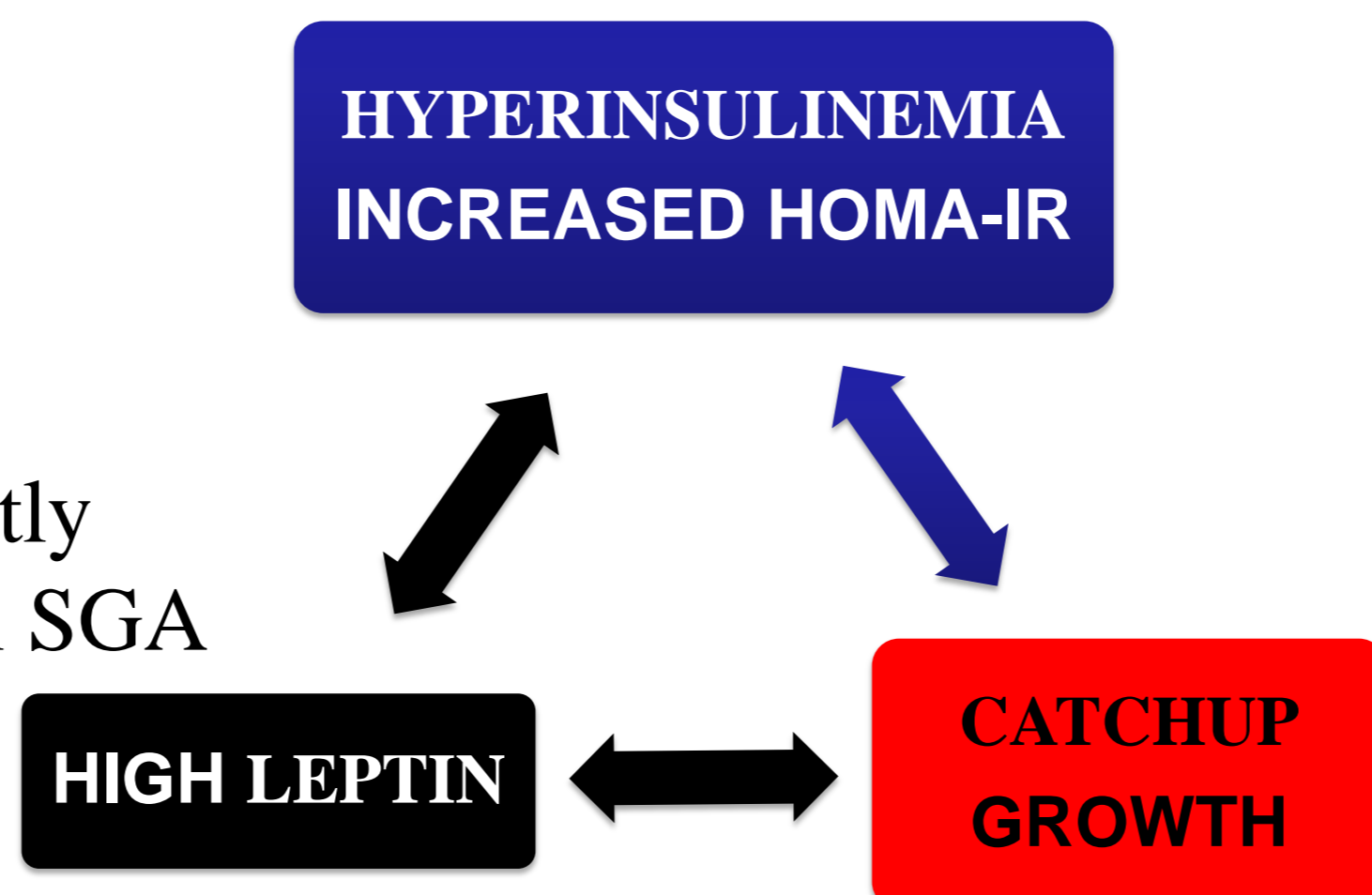


CONCLUSIONS AND RECOMMENDATIONS

- Leptin levels **higher** in SGA with CUG(2.6)vs NCUG(1.8), p=0.09
- This rise in Leptin levels evident **as early as 15 months**
- CUG positively relate with hyperinsulinemia, p*=0.05 and increased HOMA-IR value, p*=0.039
- Leptin levels strongly correlated with Insulin, p**=0.004 and HOMA-IR, p**=0.002
- Therefore, **High Leptin at early age indicates early onset of Insulin resistance**

RECOMMENDATIONS

- Regular follow up of SGA for anthropometric parameters
- Those showing CUG especially in weight monitored more frequently
- Insulin levels, Leptin levels and HOMA should be monitored in all SGA
- SGA children with high Leptin levels kept in close follow up
- Excessive weight gain avoided to prevent metabolic syndrome in later life



❖**4 children in CUG had HOMA-IR in Insulin resistance range (HOMA-IR> 2.0), with average Leptin and Insulin levels of 3.9 ng/ml and 17.6 µIU/ml respectively**

References

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