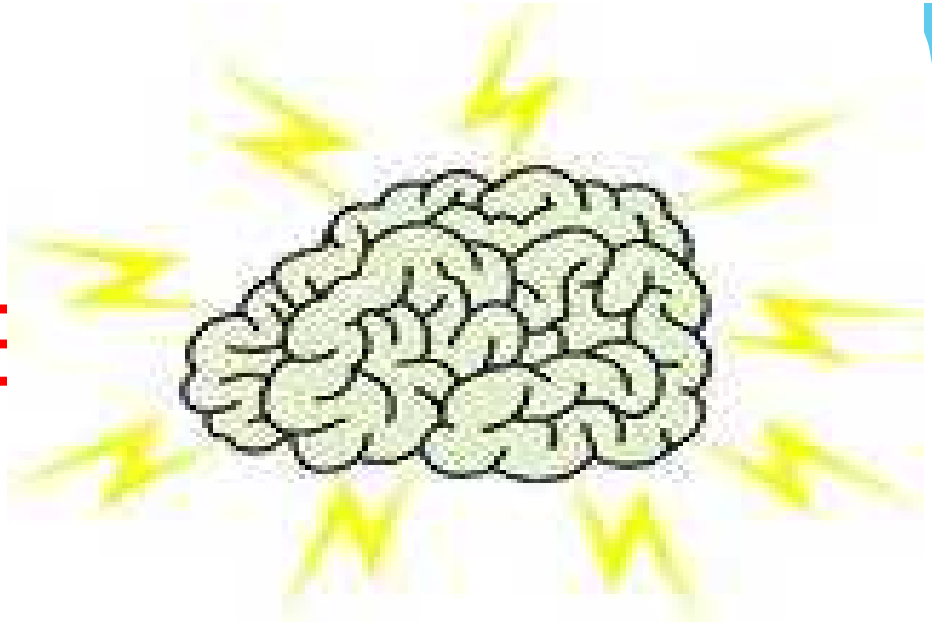
EAM IN THE
OOD,JERK IN THE
AD!!!!



Presented by: DR VENKATESWARAN V S MD III YR,
M6 UNIT
NSTITUTE OF CHILD HEALTH AND HOSPITAL FOR CHILDREN

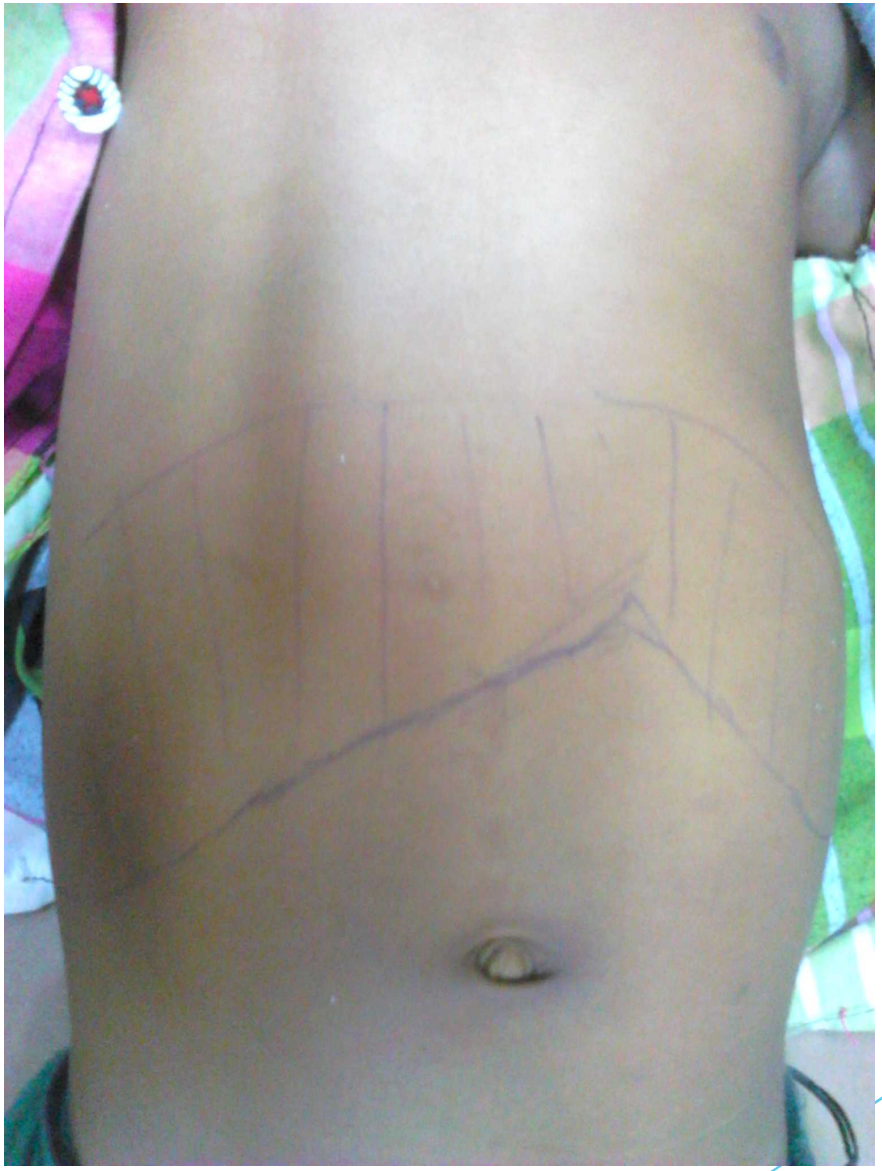
GUIDANCE: PROF.C.SUBBULAKSHMI MD DCH,
PROF.C.LEEMA PAULINE MD DM(Neuro)

- Ebinesh
- 3 years /male
- II born
- Non consanguineous parents
- Developmentally normal child
- Admitted for: convulsions,generalised tonic clonic movements,multiple episodes associated with fever one week back.

- Child was taken to a private hospital treated with AED,child was brought to our hospital for further management.
- O/E: Child irritable, afebrile, polydactyly in left hand
- CVS: S1 & S2 heard normally,continuous murmur heard in left upper sec intercostal space
- RS: NVBS
- P/A: Soft, Liver palpable 3 cm below RCM
- Spleen palpable 3 cm below LCM
- CNS: Left eye squint +,no focal deficits
- Provisional diagnosis: Atypical febrile seizure/ seizure disorder to r/o storage disorder.

Liver palpable 3 cm below rt costal margin

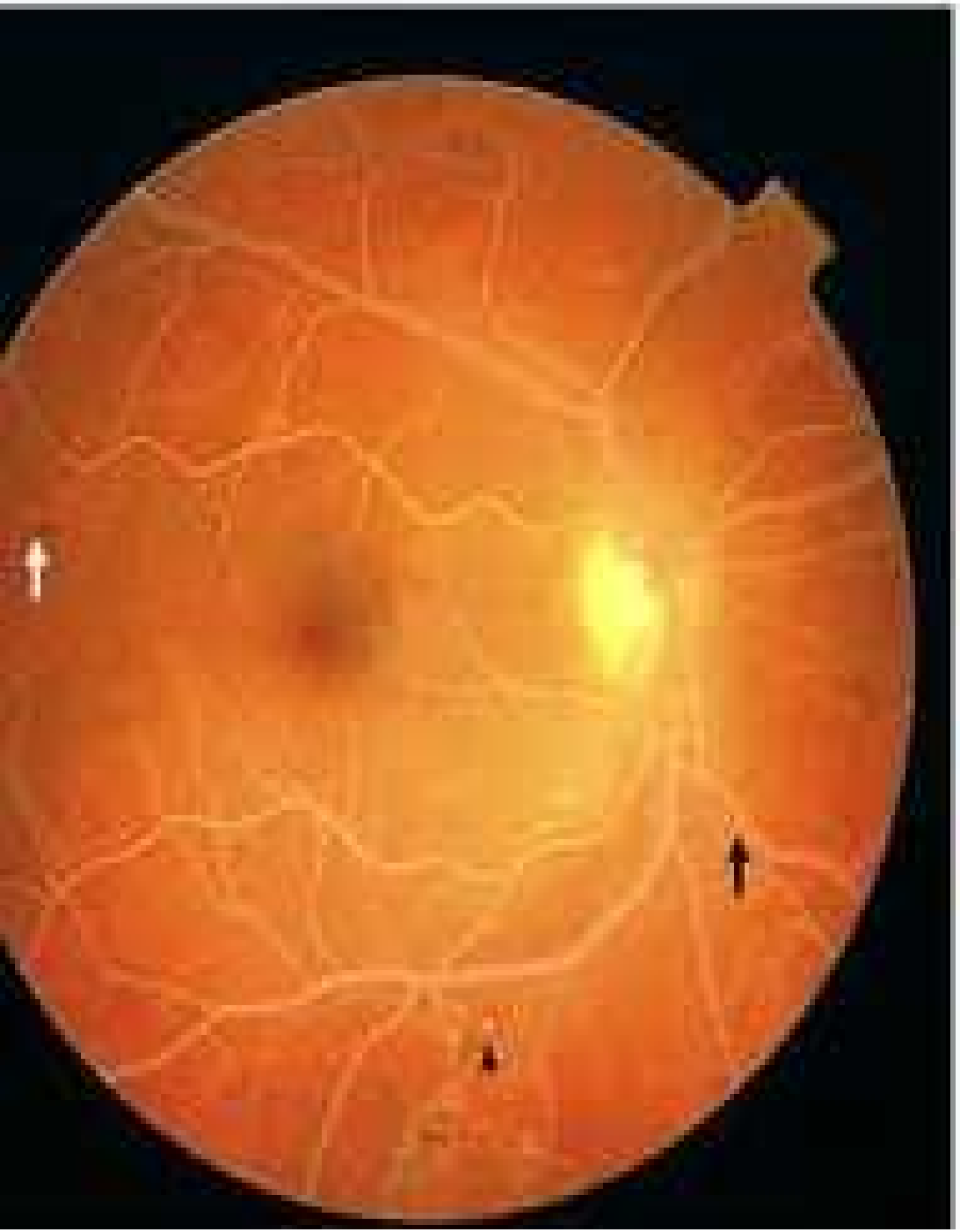
Spleen palpable 3 cm below left costal margin

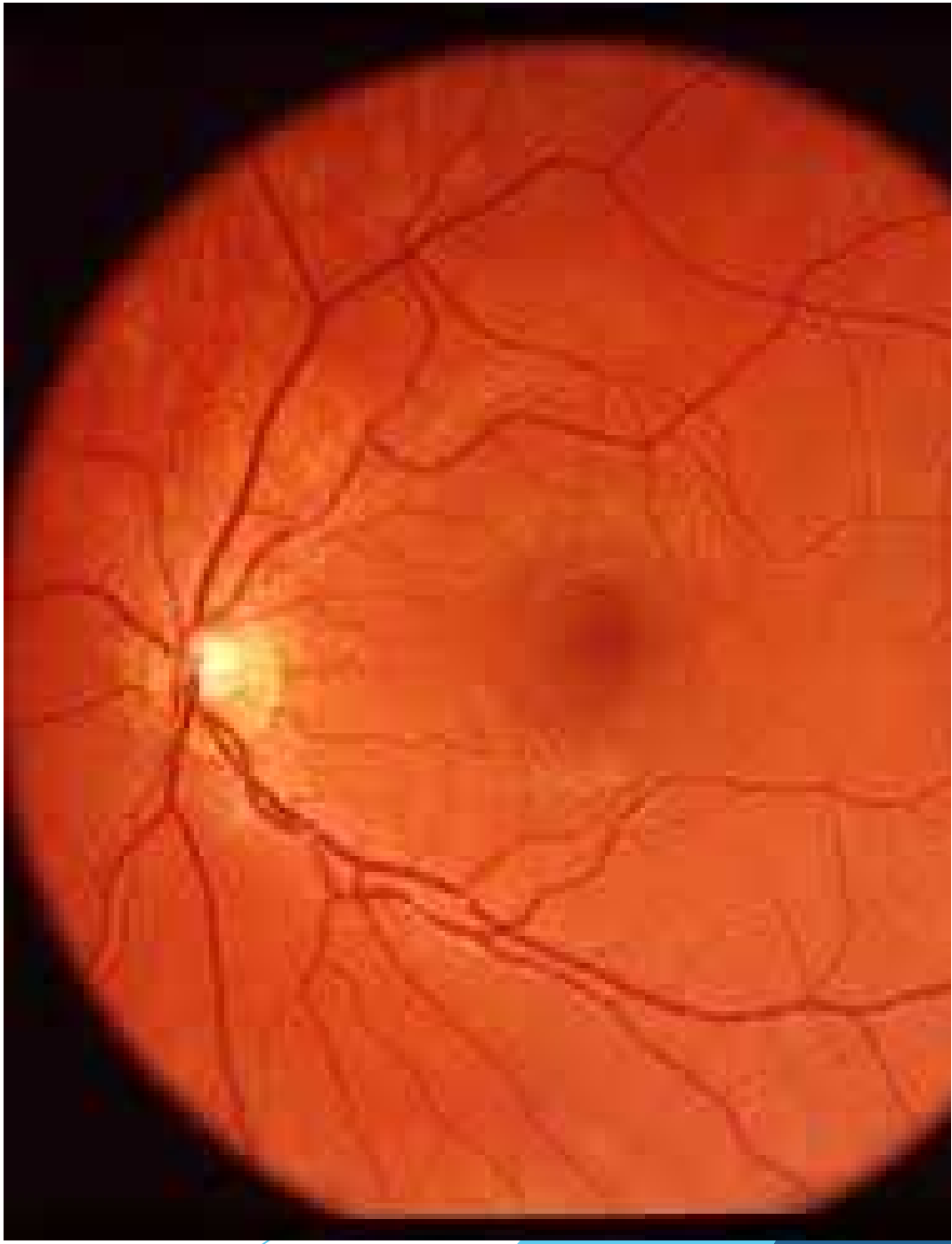


- Child's seizure was controlled with phenytoin , phenobarbitone and levitaracetam.
- From 5th day of admission child had myoclonic seizures.
- Sodium valproate and clonazepam was added,phenobarbitone tapered and stopped.
- Seizure was controlled ,cardiologist opinion was obtained ,echo shows PDA.

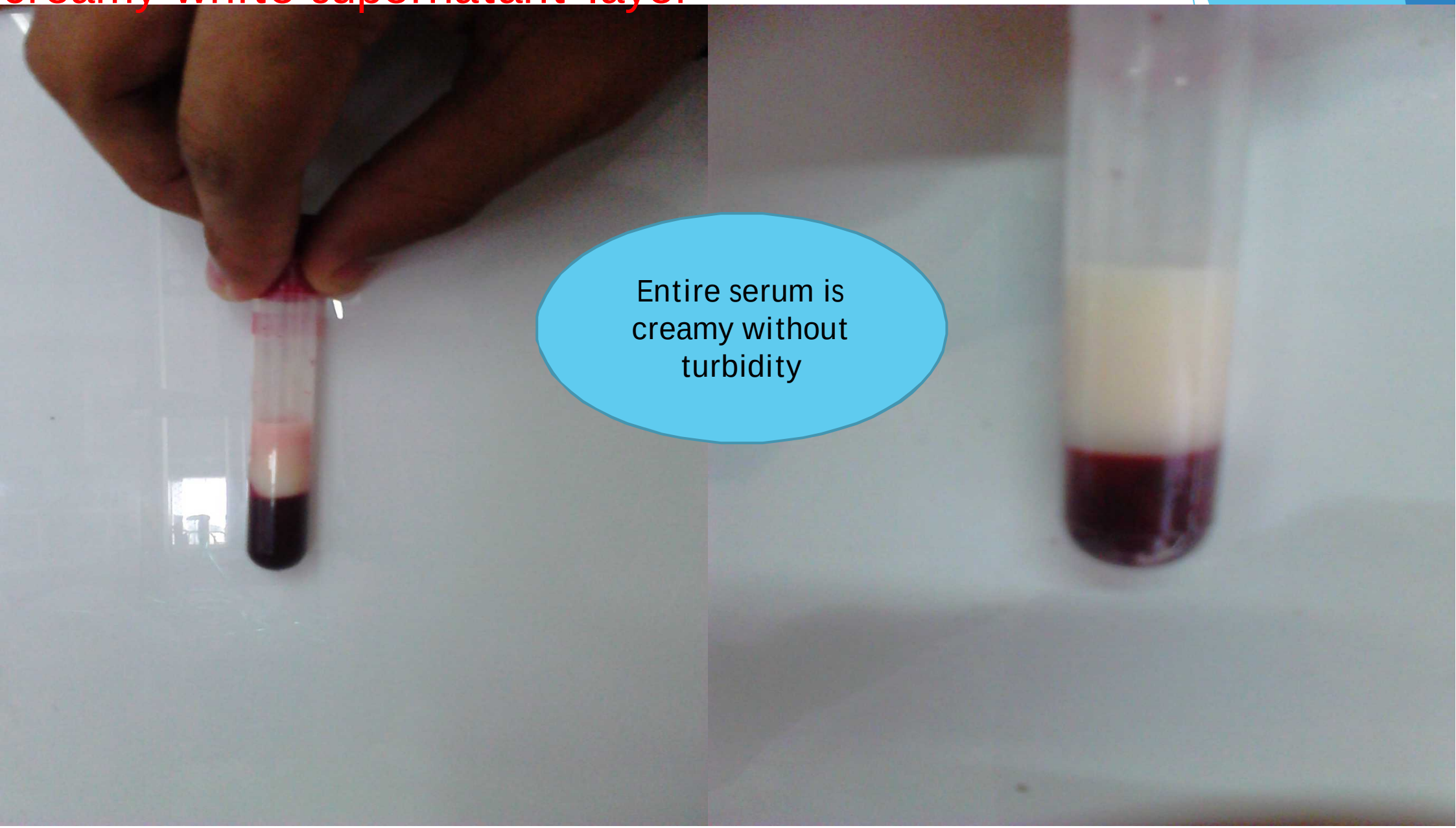
- Complete hemogram including peripheral smear normal
- RFT normal except for Na 130 meq/l
- LFT normal
- Sr amylase normal.
- Sr.lactate/pyruvate/ammonia/uric acid normal.
- Thyroid function test normal.
- Urine analysis normal.
- UMS/TMS normal.

- Retro viral screening: normal
- Cxr,skeletal survey normal
- Csf analysis: normal
- Csf for IgM Anti Measles Antibody:negative.
- USG abdomen: hepatosplenomegaly.
- CT Brain normal
- MRI Brain normal
- EEG normal.
- Ophthal opinion was suggested by neurologist to r/o cherry red spot
- Ophthal opinion : lipemia retinalis,no e/o cherry red spot.





Venous sample taken and kept for few hrs shows creamy white supernatant layer



- ICH:

  Triglycerides: 823 mgs/dl

  Cholesterol : 140 mgs/dl

- Apollo:

  Tgl : 843 mgs/dl

  Cholesterol : 134 mgs/dl

  HDL: 22 mgs/dl

  LDL: 33 mgs/dl

  VLDL: not done

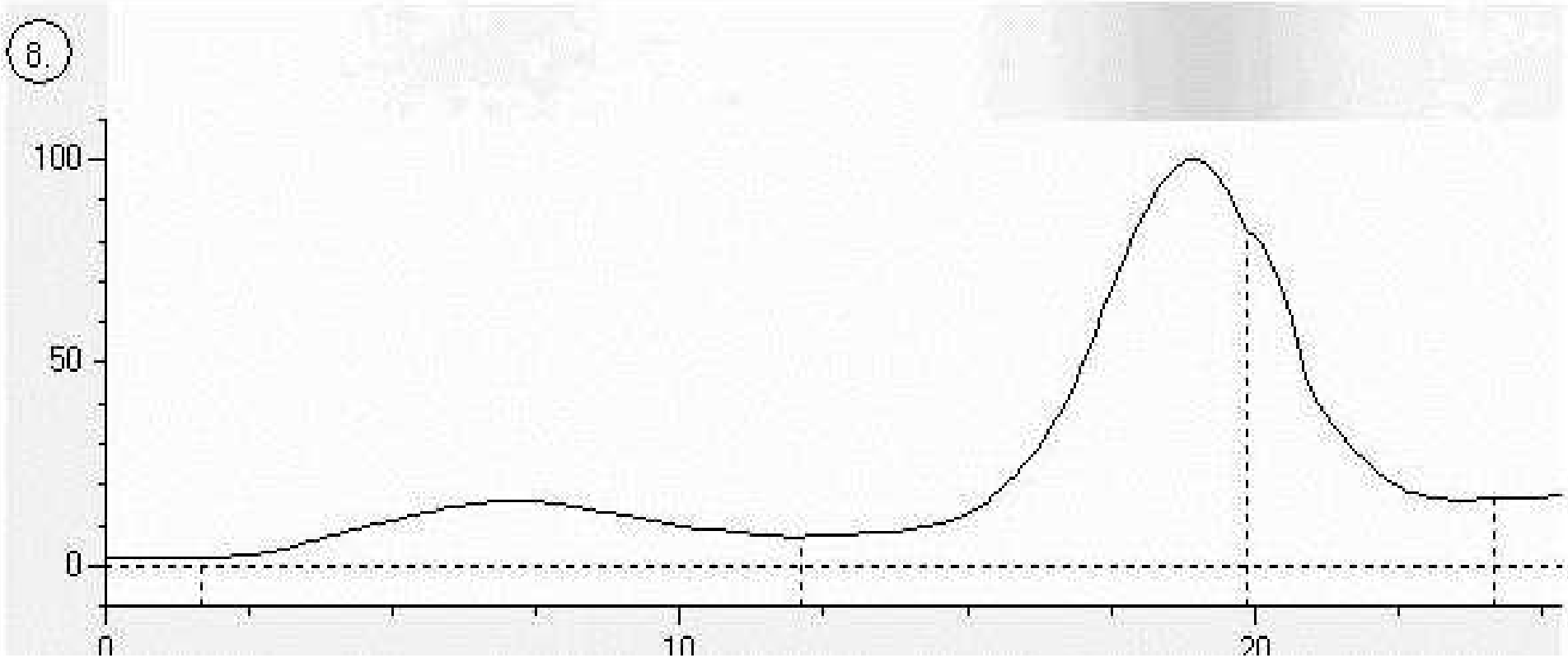
- Triglycerides alone elevated, cholesterol normal
- Lipemic serum
- All these denotes hypertriglyceridemia.

HOW TO PROCEED

- Child presents with seizures,hepatosplenomegaly,hyperlipidemia,fever 3 days
- STORAGE DISORDER????
- *GSD TYPE 1
- no hyperuricemia,lactate normal,sugar normal.
- *WOLMAN
- no adrenal calcifications.
- GAUCHER,*NIEMANN PICK-
- Platelet normal,no bony deformity,no dev delay,LFT N

- GM1,*GM2,MPS-
- No coarse facies,no cherry red spots,no skeletal deformity
- HLH-
- not sick,no pancytopenia, no prolonged fever.
- *FAMILIAL HYPERLIPIDEMIA:
- lipemia retinalis,hypertriglycerides,HSM

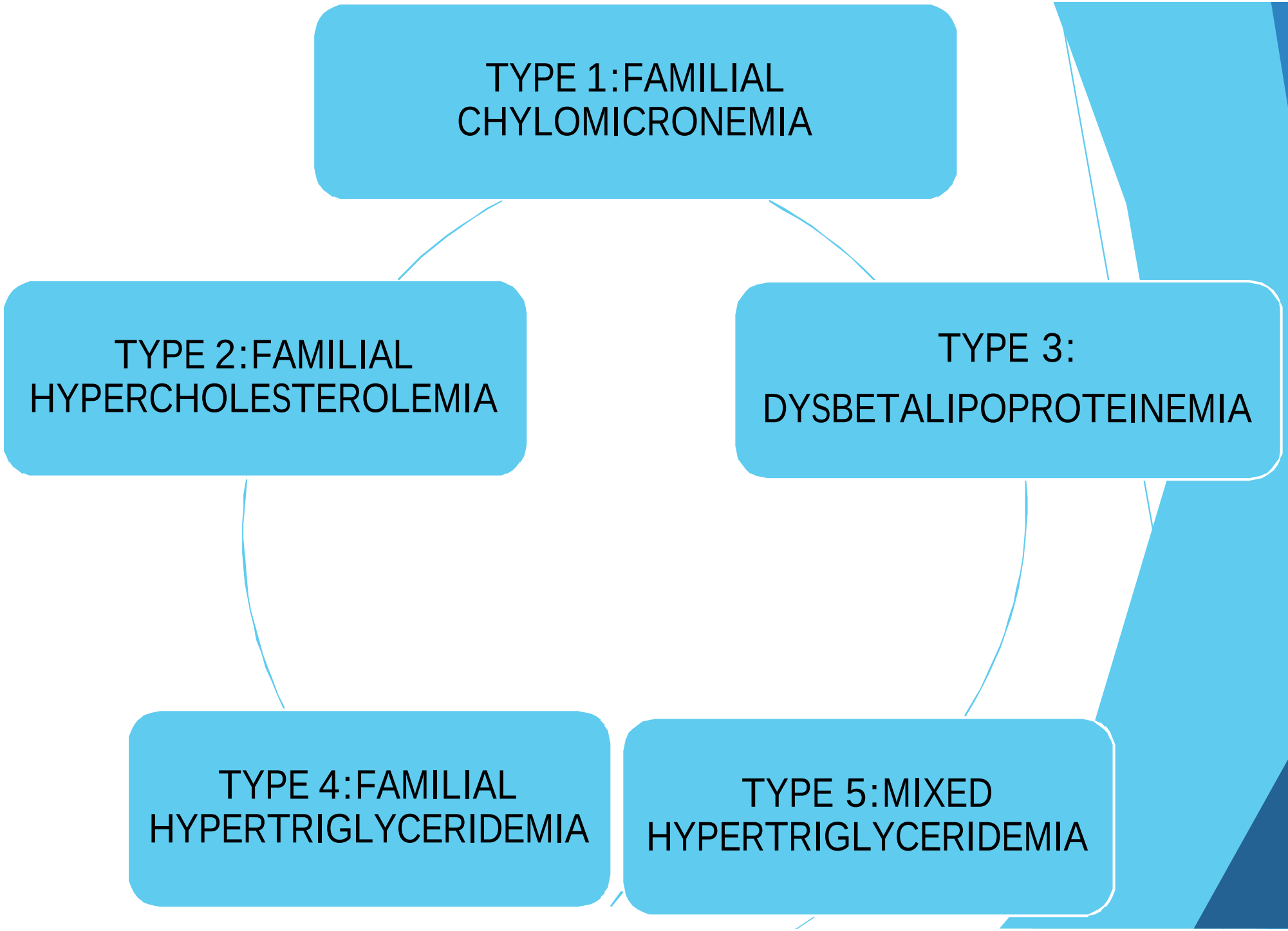
ame	Results	Units	Ref. Range
PROFILE, COMPLETE, SERUM			
rophotometry,Electrophoresis)			
terol Total @	114.00	mg/dL	<170.00
erides @	**828.00**	mg/dL	<150.00
holesterol	**20.92**	mg/dL	40.00 - 60.00
holesterol	29.21	mg/dL	<110.00
Cholesterol	**63.87**	mg/dL	<30.00
nicrons	Present		Nil
terol:HDL Ratio	**5.45**		3.30 - 4.40

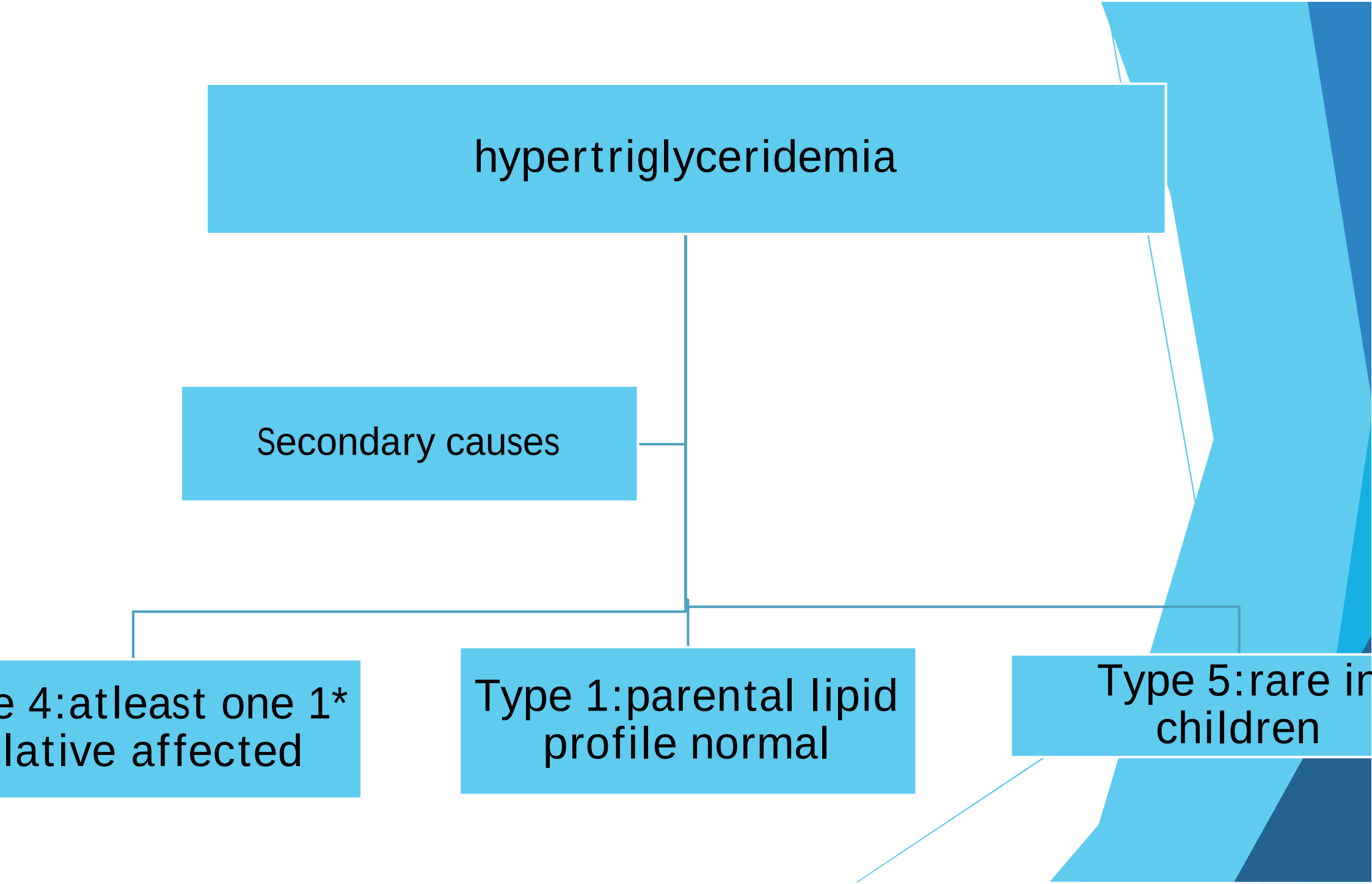


eters	Father	Mother
terol	148 mgs/dl	151 mgs/dl
erides	136mgs/dl	47mgs/dl
	50mgs/dl	63 mgs/dl
	76mgs/dl	82mgs/dl
HDL ratio	3.0	2.4

Features favouring type 1 chylomicronemia:

- Lipemia retinalis
- Lipemic (creamy supernatant layer) serum.
- Parents lipid profile normal
- Hepatosplenomegaly
- Triglycerides elevated.
- Chylomicrons increased,mild increase in VLDL, HDL decreased.

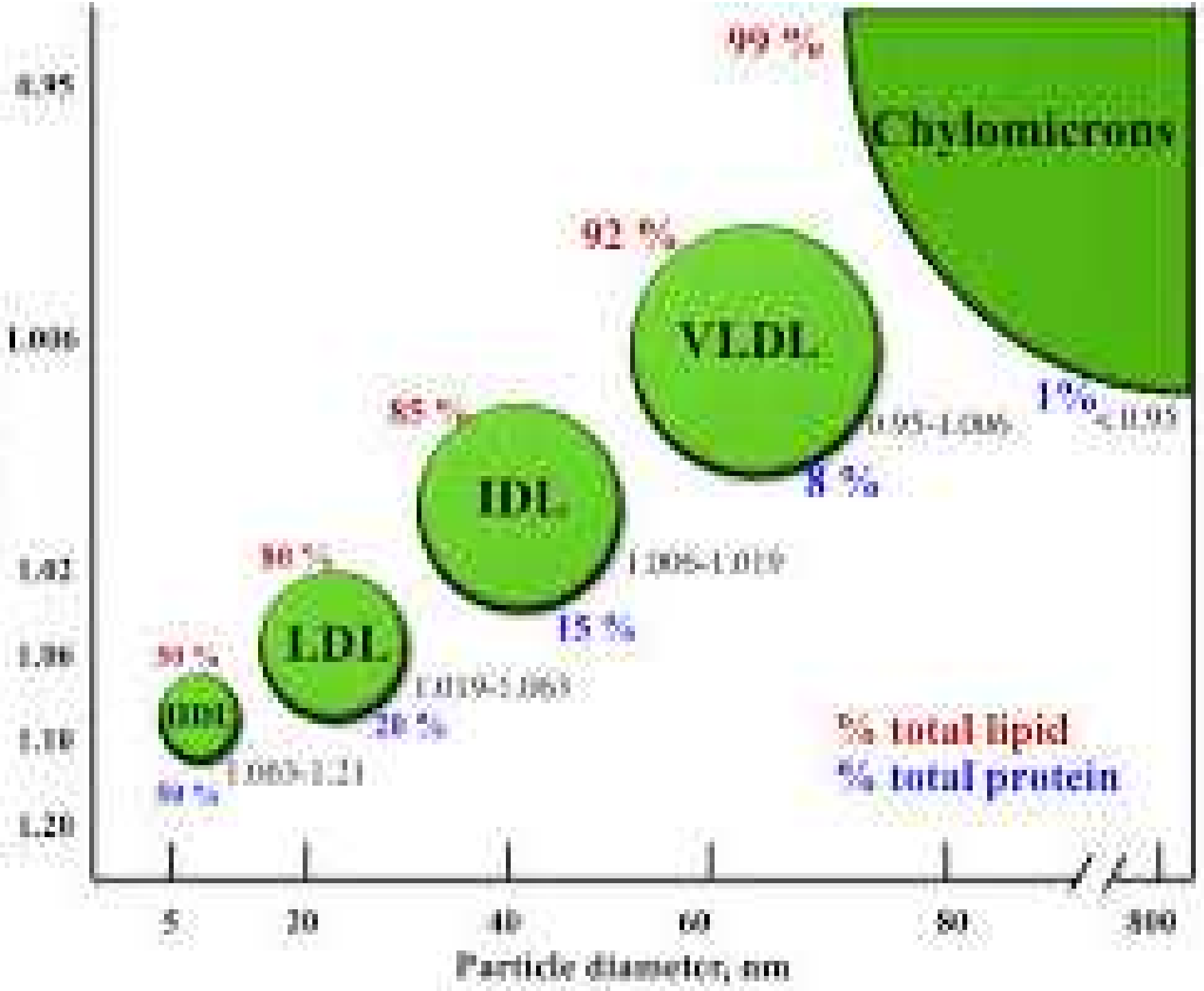

TYPE 1:FAMILIAL CHYLOMICRONEMIA
TYPE 2:FAMILIAL HYPERCHOLESTEROLEMIA
TYPE 3: DYSBETALIPOPROTEINEMIA
TYPE 4:FAMILIAL HYPERTRIGLYCERIDEMIA
TYPE 5:MIXED HYPERTRIGLYCERIDEMIA

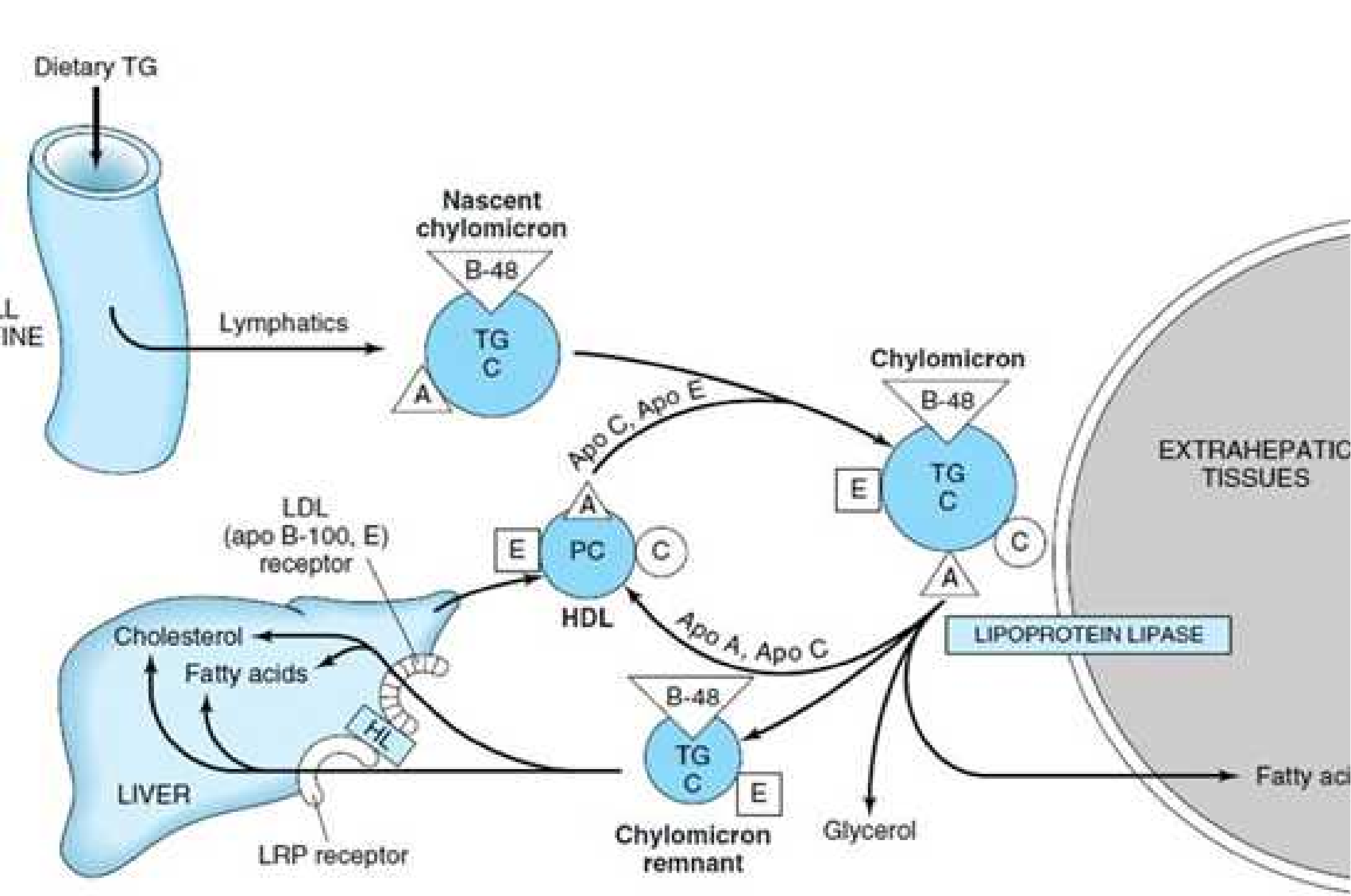

hypertriglyceridemia
Secondary causes
e 4:atleast one 1*
lative affected
Type 1:parental lipid
profile normal
Type 5:rare in
children

DISCUSSION

LIPOPROTEINS

- Lipoproteins are spherical particles
- core of mostly hydrophobic lipids (triglycerides and cholesteryl esters)
- a surface layer of more hydrophilic constituents, namely protein, free cholesterol, and phospholipids
- Lipoproteins function as vehicles to transport lipids in the blood in the form of soluble complexes of lipids and proteins.
- The lipids include triglycerides, cholesteryl esters, free cholesterol, and phospholipids.
- Twelve different protein moieties, called apolipoproteins are associated with these lipids to form lipoproteins.


0.95
1.006
1.02
1.06
1.10
1.20
99 %
Chylomicrons
92 %
VLDL
1%
8 %
IDL
15 %
LDL
20 %
IDL
5
20
40
60
80
300
% total lipid
% total protein
Particle diameter, nm


Dietary TG
Lymphatics
Nascent chylomicron
B-48
TG
C
A
Apo C, Apo E
Chylomicron
B-48
E
TG
C
C
A
EXTRAHEPATIC TISSUES
LDL (apo B-100, E) receptor
A
E
PC
C
HDL
Apo A, Apo C
LIPOPROTEIN LIPASE
Cholesterol
Fatty acids
HL
LIVER
LRP receptor
B-48
TG
C
E
Chylomicron remnant
Glycerol
Fatty aci

FREDRICKSON CLASSIFICATION

	DEFICIENCY	SERUM	ELEVATED FRACTION	SERUM TGL	SERUM CHOL	PANCREATITIS	ATHEROSIS
LIAL OMICRONEMIA	LPL / APO C2	Creamy	Chylomic	Elevated	normal	+++	—
LIAL CHOLESTEROLEMIA /	LDL rec	Clear	LDL	Normal	Elevated	—	++
TALIPOPROTEINEMIA	APO E2	Clear	IDL	Increased	Increase	—	++
MILIAL TRIGLYCERIDEMIA	VLDL met / inc syn	Turbid	VLDL	Elevated	Normal	+	+
ED TRIGLYCERIDEMIA	unknown	Turbid	VLDL ,chylo	Elevated	Normal	+	+

FAMILIAL CHYLOMICRONEMIA SYNDROME

- FCS is a rare single gene defect disease which is inherited in an autosomal recessive manner.
- severe fasting hypertriglyceridemia and chylomicron plasma,
- arises from apolipoprotein C-II or LPL deficiency
- HDL cholesterol levels are decreased.
- Plasma appears milky even after prolonged fasting.
- presents during childhood with acute pancreatitis,lipemia retinalis.
- Eruptive xanthomas on the arms, knees, and buttocks may be present, and there may be hepatosplenomegaly.

DIAGNOSIS

- extremely high level triglycerides.
- Lipid profile to detect chylomicrons,presence of it leads to the diagnosis.
- LPL activity is measured: low or absent activity is expected in the condition.
- LPL deficiency can be diagnosed by increase in triglyceride level and plasma chylomicron, while Very Low Density Lipoprotein (VLDL) level is low normal.
- Increased level of VLDL is seen in familial apo-c deficiency along with other findings which maybe observed in LPL deficiency.
- Apolipoprotein C-II level is usually assessed by gel electrophoresis.

Secondary causes……

HYPERTRIGLYCERIDEMIA

Obesity

Type II diabetes

Alcohol

Renal failure

Sepsis

Stress

Cushing syndrome

Pregnancy

Hepatitis

AIDS, protease inhibitions

Drugs: anabolic steroids, ß blockers, estrogen, thiazides

Treatment

- vigorous dietary fat restriction supplemented by fat-soluble vitamins.
- Medium-chain triglycerides that are adsorbed into the portal venous system may augment total fat intake.
- administration of fish oils may also be beneficial.

Nelson paediatrics 19th edition

- Treatment of hypertriglyceridemia in children rarely requires medication unless levels >1,000 mg/dL persist after dietary restriction of fats, sugars, and carbohydrates, accompanied by increased physical activity.
- In such cases, the aim is to prevent episodes of pancreatitis. The common use of fibrates (fenofibric acid) and niacin in adults with hypertriglyceridemia is not recommended in children.
- HMG CoA reductase inhibitors are reasonably effective in lowering triglyceride levels, and there is considerably more experience documenting the safety and efficacy of this class of lipid lowering medications in children.
- Ezetimibe has proven to be especially useful in the pediatric population because of its efficacy and low side-effect profile. Ezetimibe reduces plasma LDL cholesterol by blocking sterol absorption in enterocytes.
- NELSON PEDIATRICS 19th EDITION

Hyperlipidemia in Childhood
Normal Values

Category	Total Cholesterol, mg/dL*	LDL-Cholesterol, mg/dL*
Acceptable	<170	<110
Borderline	170–199	110–129
High	≥200	≥130

National Cholesterol Education Program (NCEP): Expert Panel on Blood Cholesterol Levels in Children and Adolescents

Diet Therapy

NUTRIENT	STEP-ONE DIET	STEP-TWO DIET
Calories	to promote normal growth and development	same
Total fat	no more than 30% of total calories	same
Saturated fatty acids	< 10% total calories	< 7% total calories
Polyunsaturated fatty acids	up to 10% total calories	same
Monounsaturated fatty acids	remaining total fat calories	same
Cholesterol	< 300 mg/day	< 200 mg/day
Carbohydrates	~55% of total calories	same
Protein	~15-20% total calories	same

National Cholesterol Education Program (NCEP): Expert Panel on Blood Cholesterol Levels in Children and Adolescents

- Drug therapy should be considered when:
  - LDL cholesterol remains >190 mg/dL;
  - LDL cholesterol remains >160 mg/dL, and other risk factors are present, including obesity, hypertension, or cigarette smoking or positive family history of premature CVD; and
  - LDL cholesterol is >130 mg/dL in children with diabetes mellitus.

SEIZURES???????

- Encephalopathy in Type I Hyperlipidemia- Hasan Önal*
- The highly abnormal lipid profile pretreatment not responding to medical treatment rapidly, along with pancreatitis would have lead to vascular compromise similar to that seen in neonates with polycythemia and the hyperviscosity syndrome.The resultant 'lipid transient ischemia' would have caused the convulsions.

INDIAN PEDIATRICS VOLUME 44__APRIL 17, 2007

No Pancreatitis /Xanthomas

- Usually seen when the triglycerides level were >2000 mgs/dl.

Williams textbook of endocrinology 11th edition

- Child was started on omega 3 fatty acids,fat soluble vitamins ,statins.
- Mother was councelled regarding diet and complications.
- Child is currently on sodium valproate ,levitaracetam,clonazepam.
- Child is free of seizure since discharge.

THANK
YOU