Diabetic ketoacidosis associated with severe hypertriglyceridemia and acute pancreatitis in type 1 diabetes: 4 pediatric cases

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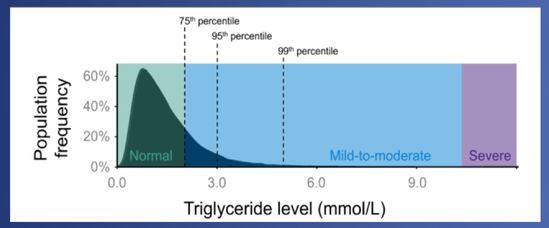
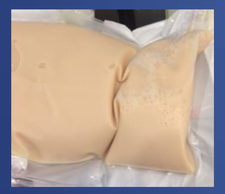
Background[1]

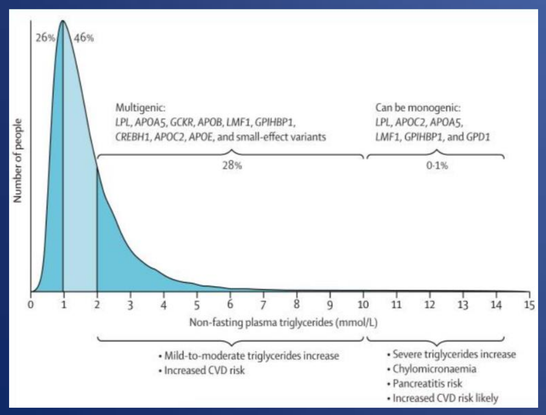
- Definition of severe hypertriglyceridemia (HTG) : TG > 10 mmol/L, very severe HTG > 20mmol/L[1].
- Most cases due to monogenic causes combined with secondary factors, such as obesity or medications.
- HTG due to diabetic ketoacidosis is rare, especially in pediatric patients.





Lipemic aspect of blood in hyperTG

HTG : Genetics[1]



Clinical cases

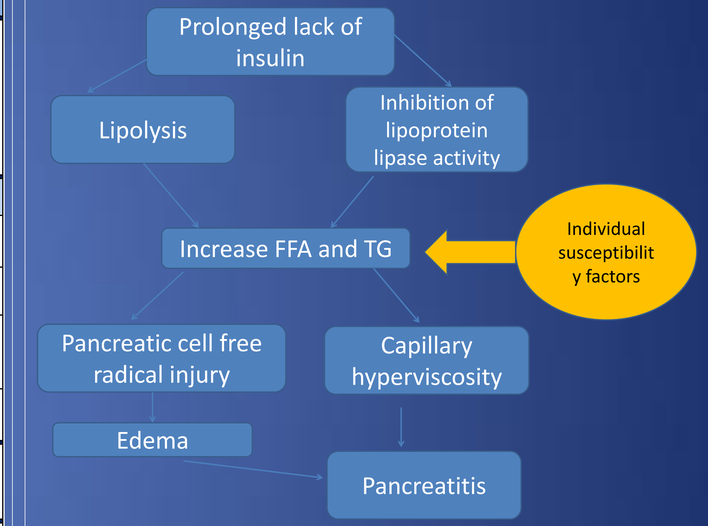
	Patient 1 : 17-year-old girl	Patient 2 : 13-year-old boy	Patient 3 : 13-year-old girl	Patient 4 : 4-year-old girl
Clinical presentation	• Obesity • Polyuria-polydipsia x 1 week • Vomiting x 24 hours • Severe pancreatitis	• Polyuria-polydipsia x few months • Weight loss • Vomiting x 24 hours • Mild pancreatitis	• Polyuria-polydipsia x 8 months • No vomiting but abdominal pain • No pancreatitis	• Polyuria-polydipsia x 2 weeks • Vomiting x 24 hours • Biochemical pancreatitis
Biochemistry				
Glucose *(mmol/L)*	23,3	24	22,1	22,1
Blood gas *(pH/PCO2/Bicarb)*	7,35/25/13,6	6,8/7,5/1,5	7,12/11,6/3,7	7,0/22/5
Triglycerides *(N : 0.4-1.3 mmol/L)*	114,96	75,65	159,8	101
Lipase *(N : 4-39 U/L)*	1725	375	82	451
Management	- Classical insulin infusion 0,1U/kg/h - Plasmapheresis	- High dose of insulin infusion 0,2U/kg/h - Fenofibrates	- High dose of insulin infusion 0,2U/Kg/h - Plasmapheresis	- Classical insulin infusion 0,1U/kg/h
Evolution	Normalization of clinical and biological parameters	Normalization of clinical and biological parameters	Normalization of clinical and biological parameters	Normalization of clinical and biological parameters
Genetics	Negative panel	VUS in the APOA5 gene	Negative panel	Heterozygous mutation of LPL gene : p.Gly215Glu

Conclusion

- Triad DKA-HyperTG-Pancreatitis is rare, particulary in pediatric population
- Some individual susceptibility factors like genetics are probably important for the development of the triad.
- But mechanisms still unclear : in our 4 patients, no correlation between the TG levels and the genetic risk factors.
- No consensus guidelines for the management

Literature review

PATHOPHYSIOLOGY of the triad [3-4-5]



MANAGEMENT[2] : NO CONSENSUS

- IV hydratation
- Insulin infusion : 0,1 to 0,2 U/Kg/h
- Heparin infusion ?
- Plasmapheresis : no clear guidelines
  - TG lowering 50-90% after one session
  - No benefit over conservative approach after 72 hours
  - No benefit on morbidity-mortality
  - Risk at central line insertion or transfusion reaction
- Fenofibates : not recommended in acute management

References

[1]Hegele RA, et al. Lancet Diabetes Endocrinol. 2014 Aug;2(8):655-666.
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[5] Sharma PK, et al. Indian J Crit Car Med. 2017 March;21:176-178