

# Administration of lipid emulsions to adult intensive care patients: impact on the blood lipid profile

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## Background and Objective

- Lipid emulsions (LE) are widely used in ICU patients, either in artificial nutrition or as vehicle for sedation (propofol 1% or 2% only available in a 10% LE).
- Hypertriglyceridemia (HTG) is a possible side effect of LE, but its real risk has not been evaluated yet in ICU patients.
- Guidelines<sup>1</sup> recommend to monitor plasma triglyceride concentrations (PTG) during treatment and to decrease the daily amount of lipid when high doses of propofol are used.
- Local guidelines recommend a maximum amount of lipid of 1 g/kg BW over 24h.

## Method

- Retrospective study of patients admitted to the 32-bed adult mixed medico-surgical ICU between February 29 and April 21, 2008.
- Data were extracted from the ICU computerized patient database (Metavision<sup>®</sup>).
- Inclusion criteria were
  - ICU stay > 48 h
  - at least 1 PTG measured.
- PTG were measured 3 times weekly (at 6 AM) and cholesterol level once weekly during the ICU stay
- Hospital admission PTG was not available.
- Analysis was based on the highest PTG during the stay.

## Goals

- Assessing the frequency of HTG in ICU patients.
- Identifying risk factors.

## Main Outcome Measures

- Occurrence of HTG > 2 mmol/l (local upper limit of the normal range) and > 3 mmol/l (International limit based on the percentile 95 of the population<sup>2</sup>)
- Correlation between PTG and administered lipids

### Main parameters collected for each patient :

- All doses of enteral and intravenous lipids during the 24h preceding PTG
- All doses of propofol during the 24h preceding PTG

### Co-factors

- Age, sex
- BMI
- CRP
- Liver or renal failure
- Drugs received (pre-defined list)
- Main pathology (CNS, trauma, burns, cardio, pneumo, transplant, gastro, other)

## Results

### Inclusion:

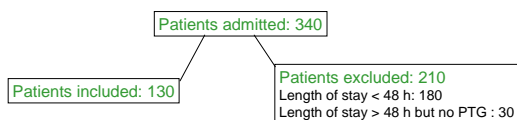


Fig 1: Inclusion of patients

### Frequency of HTG:

Nr PTG measured	448	
Nr PTG ≥ 2 mmol/l	146	32.6%
Nr PTG ≥ 3 mmol/l	40	8.9%
Nr patients with at least one PTG ≥ 2 mmol/l	40	30.8%
Nr patients with at least one PTG ≥ 3 mmol/l	17	13.1%

### Daily doses of lipid:

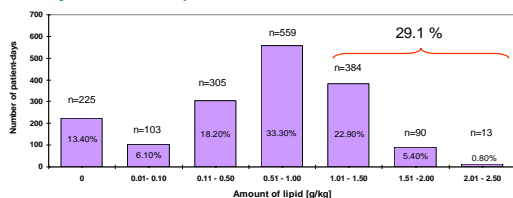


Fig 2: Amount of lipid administered per patient-days

### Correlations :

**PTG were not correlated to any of the defined factors or co-factors (see fig 3 as an example).**

The response of PTG to lipid administration was highly variable between and within the patients.

Cholesterol was unaffected by the lipid dose.

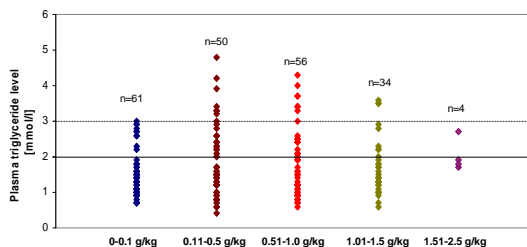


Fig 3: PTG according to the amount of lipid received over the last 24h

## Discussion and Conclusions

HTG is frequently observed in ICU patients (30% vs. 12% in the community).

However, no risk factor could be identified probably because of the large number of patho-physiological and pharmaceutical parameters, which influence PTG in ICU patients.

Daily doses of lipid exceeded local guideline in 29% patient-days.

This study was limited by the low number of patients included and by the absence of PTG baseline.

A larger study should be conducted to confirm the present results and determine the impact of lipid administration in ICU patients.

<sup>1</sup>Jacobi J. et al., *Crit Care Med* 30 (1), 119 (2002).

<sup>2</sup>Assmann G. et al., *Am J Cardiol* 68 (3), 1A (1991).