Assessment of the frequency of propofol-associated hypertriglyceridemia and pancreatitis in an adult intensive care unit at a large tertiary care centre

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Background

- Propofol is an anesthetic used in intensive care units (ICUs) for sedation and facilitation of mechanical ventilation
- Propofol is highly lipophilic and is formulated as an oil-in-water emulsion for administration
- Hypertriglyceridemia and acute pancreatitis have been associated with propofol administration
- Hypertriglyceridemia is an important risk factor for the development of acute pancreatitis
- Pancreatitis is a life-threatening condition typically characterized by abdominal pain and elevated serum lipase
- Sparse literature evaluating the incidence of hypertriglyceridemia and pancreatitis in patients on propofol
- Many patients on propofol do not receive triglyceride monitoring, despite the potential risk of these adverse events

Objectives

- In adult ICU patients receiving propofol infusions:
  - Determine the incidence of acute hypertriglyceridemia
  - Characterize the management of incident hypertriglyceridemia
  - Determine the incidence of acute pancreatitis

Methods

- Retrospective chart review of adult patients admitted to the ICU at Royal Columbian Hospital
- Inclusion
  - ≥ 18 years of age
  - Admitted to the ICU during or prior to December 2015
  - Received a propofol infusion for ≥ 24 h
  - At least one triglyceride measurement during the infusion
- Exclusion
  - Baseline triglyceride ≥ 2.3 mmol/L
  - Concomitant lipid-containing products (eg. TPN)
  - History of pancreatitis

Table 1: Baseline patient characteristics.

Parameter	HTG Patients (n=14)	No HTG Patients (n=136)	Overall (n=150)
Age (y)	53 (42-62)	60 (49-69)	58 (47-69)
Male – no.(%)	10 (71)	93 (68)	103 (69)
Weight (kg)	93 (81-100)	81 (70-92)	82 (70-95)
BMI (kg/m^2)	31 (28-32)	27 (23-30)	27 (23-30)
Service – no.(%)			
Medical	5 (36)	64 (47)	69 (46)
Surgery/Trauma	9 (64)	72 (53)	81 (54)
APACHE II#	21 (21-31)	22 (15-25)	22 (15-25)
Length of ICU Stay (d)	15.1 (7.6-18.8)	6.4 (4.1-12.0)	7.3 (4.2-15.0)
Total duration of infusion (h)	50.0 (33.3-73.1)	48.0 (34.2-63.4)	48.0 (34.1-64.3)

*Values are presented as median (IQR) unless otherwise specified
#Scores available for only 116 patients
HTG = Hypertriglyceridemia

Figure 1: Incidence of hypertriglyceridemia in patients receiving a propofol infusion.

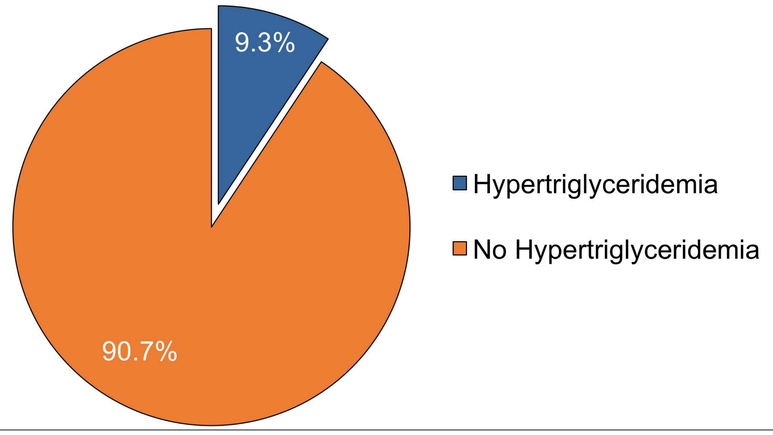

Table 2: Triglyceride and infusion characteristics in patients who developed hypertriglyceridemia.

Parameter	Value
Time to detection of hypertriglyceridemia (h)	36.4 (28.2-62.1)
Infusion rate at time of detection of hypertriglyceridemia (mcg/kg/min)	58 (41-79)
Total propofol exposure (mg/kg)	119 (87-213)
Highest detected triglyceride level (mmol/L)	5.9 (5.5-7.6)

*Values are presented as median (IQR) unless otherwise specified

Results

- 14 of 150 patients developed hypertriglyceridemia
- None of these patients developed acute pancreatitis
- Median time to discontinuation of propofol after detection of hypertriglyceridemia was 7.4 h
- The propofol infusion rate was reduced in 6 of 14 patients at a median of 0.7 h after detection of hypertriglyceridemia
- One patient was changed to an alternative sedative agent 6.8 h after detection of hypertriglyceridemia

Discussion

- Lower incidence of hypertriglyceridemia and acute pancreatitis than the 2005 trial by Devlin et al., which found an incidence of hypertriglyceridemia and pancreatitis of 18% and 1.8%, respectively
- Difference may be explained by chance or infusion duration
  - Both trials had a small sample size of approximately 150 patients
  - Median infusion duration was 50 h in our study compared to 89 h in the Devlin trial for patients who developed hypertriglyceridemia

Limitations

- Does not capture patients who received propofol for < 24 h
- Many patients excluded because no triglyceride levels available
  - May have led to a falsely low incidence of hypertriglyceridemia
  - May have led to a falsely high incidence if monitoring was selective for higher risk patients
- Few patients with baseline triglyceride levels, thus unable to exclude the possibility that triglycerides were elevated at baseline
- Potential for missed cases of acute pancreatitis as a result of sparse lipase monitoring
- Small sample size

Conclusions

- A clinically relevant number of patients receiving prolonged propofol infusions develop hypertriglyceridemia
- The incidence of acute pancreatitis in patients receiving propofol infusions appears to be low, but larger trials are needed
- Propofol is discontinued within 24 h in most patients who develop hypertriglyceridemia
- Triglycerides should be monitored more routinely in patients on prolonged propofol infusions