Health Care Resource Utilization and Costs among Patients with Severe Hypertriglyceridemia and Acute Pancreatitis or Major Adverse Cardiovascular Events

Poster # EE367

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BACKGROUND

- **Background**: Hypertriglyceridemia (HTG) is characterized by elevated levels of circulating triglycerides (TG). Adults with HTG have an increased risk of acute pancreatitis (AP) and non-fatal major adverse cardiovascular events (MACE)[1,2]. However, there is little real-world evidence regarding the health care resource utilization (HCRU) and cost burden of AP and MACE at different levels of HTG.
- **Objective**: To describe the AP- and MACE-related HCRU and costs among adults with mild-to-moderate HTG and severe HTG (sHTG), compared with normal TG levels.

STUDY DESIGN

- **Design:** Retrospective analysis of administrative claims and linked laboratory data from the Optum Research Database for the period between 01 January 2016 to 31 March 2022.
- **Eligibility criteria:** Adults with ≥1 diagnostic test claim for serum/plasma TG. The index date was the date of earliest claim.
  - Continuous enrollment in commercial or Medicare Advantage plans with medical and pharmacy benefits for ≥ 12 months before and after the index date (baseline and follow-up).
- **Patient stratification:** Patients were assigned to one of four TG cohorts based upon serum/plasma TG levels on the index date:
  - Normal TG (35 < TG < 150 mg/dL)
  - Mild-to-moderate HTG (150 ≤ TG <500 mg/dL)
  - sHTG, divided into 500 ≤ TG < 880 mg/dL or TG ≥ 880 mg/dL sub-cohorts
- **Study measures:**
  - **AP:** ≥ 1 inpatient claim or ≥ 2 claims at most 10 days apart, with AP in the primary diagnosis position.
  - **MACE** (composite): ≥ 1 claim with diagnoses of non-fatal myocardial infarction, unstable angina, acute coronary syndrome, stroke or transient ischemic attack, coronary or peripheral revascularization, or heart failure-specific hospitalization/emergency room (ER) visit.
  - **HCRU:** All-cause, AP-, and MACE-related counts of ambulatory and ER visits and inpatient admissions.
  - **Costs:** All-cause, AP-, and MACE-related medical and pharmacy costs.
    - HCRU and costs were calculated as per-patient-per-month (PPPM).
    - Costs were inflation-adjusted to 2021 USD.

RESULTS

- **Study sample:** 134,316 patients were included; the mean (SD) follow-up time was 987 (446) days.

Table 1: Baseline demographic and clinical characteristics

Characteristic	Normal (35 < TG* < 150) n=46,676 (34.8%)	Mild-to-moderate (150 ≤ TG < 500) n=54,090 (40.3%)	sHTG (500 ≤ TG < 880) n=28,556 (21.3%)	sHTG (TG ≥ 880) n=4994 (3.7%)
Age (years), mean (SD)	54.7 (17.4%)	58.8 (15.3%)	55.2 (13.5%)	51.4 (11.9%)
Age ≥ 65 (%)	33.6%	41.0%	26.6%	14.3%
Female, n (%)	26,554 (56.9%)	26,013 (48.1%)	8399 (29.4%)	1126 (22.6%)
36-month baseline AP, n (%)	83 (0.2%)	187 (0.4%)	177 (0.6%)	94 (1.9%)
12-month baseline MACE, n (%)				
Stroke or transient ischemic attack	908 (2.0%)	1302 (2.4%)	615 (2.2%)	76 (1.5%)
Heart attack or unstable angina	372 (0.8%)	624 (1.2%)	418 (1.5%)	54 (1.1%)
Quan-Charlson score[2] (CCI), n (%)				
CCI = 0	35,957 (77.0%)	36,659 (67.8%)	18,319 (64.2%)	3485 (69.8%)
CCI = 1-2	8816 (18.9%)	13,804 (25.5%)	7739 (27.1%)	1182 (23.7%)
CCI = 3-4	1459 (3.1%)	2805 (5.2%)	1860 (6.5%)	251 (5.0%)
CCI ≥ 5	444 (1.0%)	822 (1.5%)	638 (2.2%)	76 (1.5%)
Baseline comorbidities, n (%)				
Hypertension	16,109 (34.5%)	28,469 (52.6%)	16,671 (58.4%)	2692 (53.9%)
Lipid metabolism disorders	14,253 (30.5%)	28,212 (52.2%)	18,066 (63.3%)	2888 (57.8%)
Diabetes (all types)	4488 (9.6%)	11,830 (21.9%)	10,427 (36.5%)	1874 (37.5%)
Hyperglyceridemia	238 (0.5%)	1086 (2.0%)	2304 (8.1%)	523 (10.5%)
Hypothyroidism	5438 (11.7%)	8215 (15.2%)	3984 (14.0%)	527 (10.6%)
Liver disease	1776 (3.8%)	3517 (6.5%)	2822 (9.9%)	509 (10.2%)
Chronic kidney disease	2502 (5.4%)	5134 (9.5%)	3270 (11.5%)	423 (8.5%)
TG-lowering medications, n (%)				
Statins	10,353 (22.2%)	20,278 (37.5%)	11,765 (41.2%)	1820 (36.4%)
Fibrates	394 (0.8%)	1827 (3.4%)	3642 (12.8%)	833 (16.7%)
Omega-3 fatty acids	95 (0.2%)	365 (0.7%)	1091 (3.8%)	231 (4.6%)
AP-inducing medications, n (%)				
Corticosteroids	16,454 (35.3%)	22,009 (40.7%)	11,557 (40.5%)	1839 (36.8%)
Thiazide diuretics	7456 (16.0%)	13,361 (24.7%)	7410 (26.0%)	1088 (21.8%)
Estrogen therapy	3754 (8.0%)	3245 (6.0%)	956 (3.4%)	163 (3.3%)
Immunosuppressants	841 (1.8%)	1181 (2.2%)	604 (2.1%)	81 (1.6%)
Total cholesterol ≥ 240 mg/dL, n (%)	3345 (7.3%)	8419 (15.8%)	10,210 (36.1%)	1959 (56.4%)

* TG levels are in mg/dl; TG, serum/plasma triglycerides; sHTG, severe hypertriglyceridemia; AP, acute pancreatitis; MACE, major adverse cardiovascular events

- **All-cause HCRU:** Compared with the normal TG cohort, the mild-to-moderate HTG cohort and sHTG 500 ≤ TG < 880 sub-cohort had greater HCRU of all types ($P < 0.001$).
  - The sHTG ≥ 880 sub-cohort had greater ER and inpatient HCRU ($P < 0.001$).

Table 2: AP- and MACE-related HCRU (PPPM), by TG level

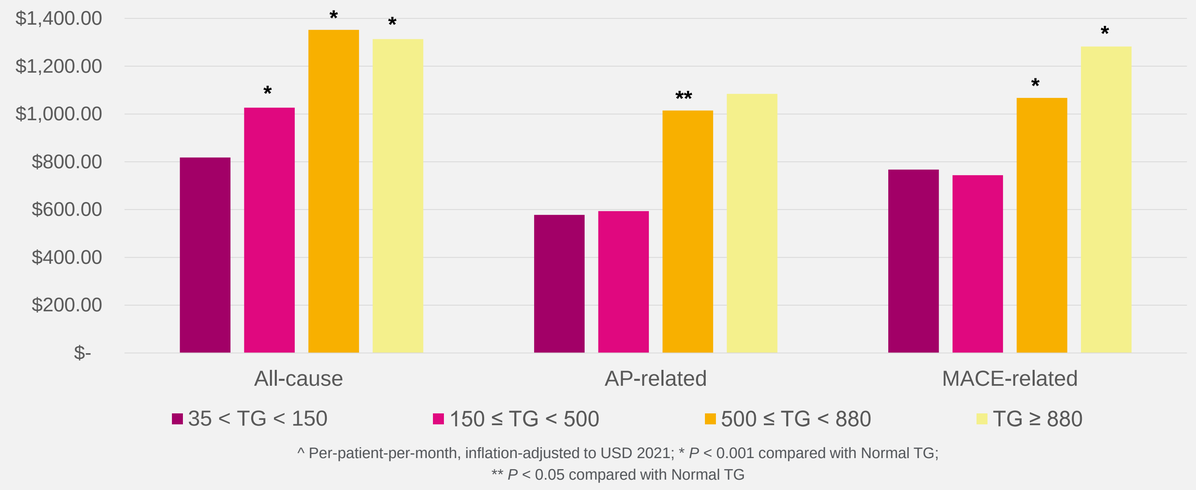
Visit Type	Normal (35 < TG < 150) n=46,676 (34.8%)	Mild-to-moderate (150 ≤ TG < 500) n=54,090 (40.3%)	sHTG (500 ≤ TG < 880) n=28,556 (21.3%)	sHTG (TG ≥ 880) n=4994 (3.7%)
AP-related				
Ambulatory	0.08	0.09	0.10	0.12*
Emergency room	0.02	0.03*	0.03*	0.04*
Inpatient admission	0.02	0.02	0.03	0.03*
MACE-related				
Ambulatory	0.26	0.23*	0.24	0.23
Emergency room	0.02	0.02	0.03*	0.02
Inpatient admission	0.02	0.02	0.03*	0.03*

* $P < 0.05$, compared with Normal TG; HCRU, health care resource utilization

RESULTS

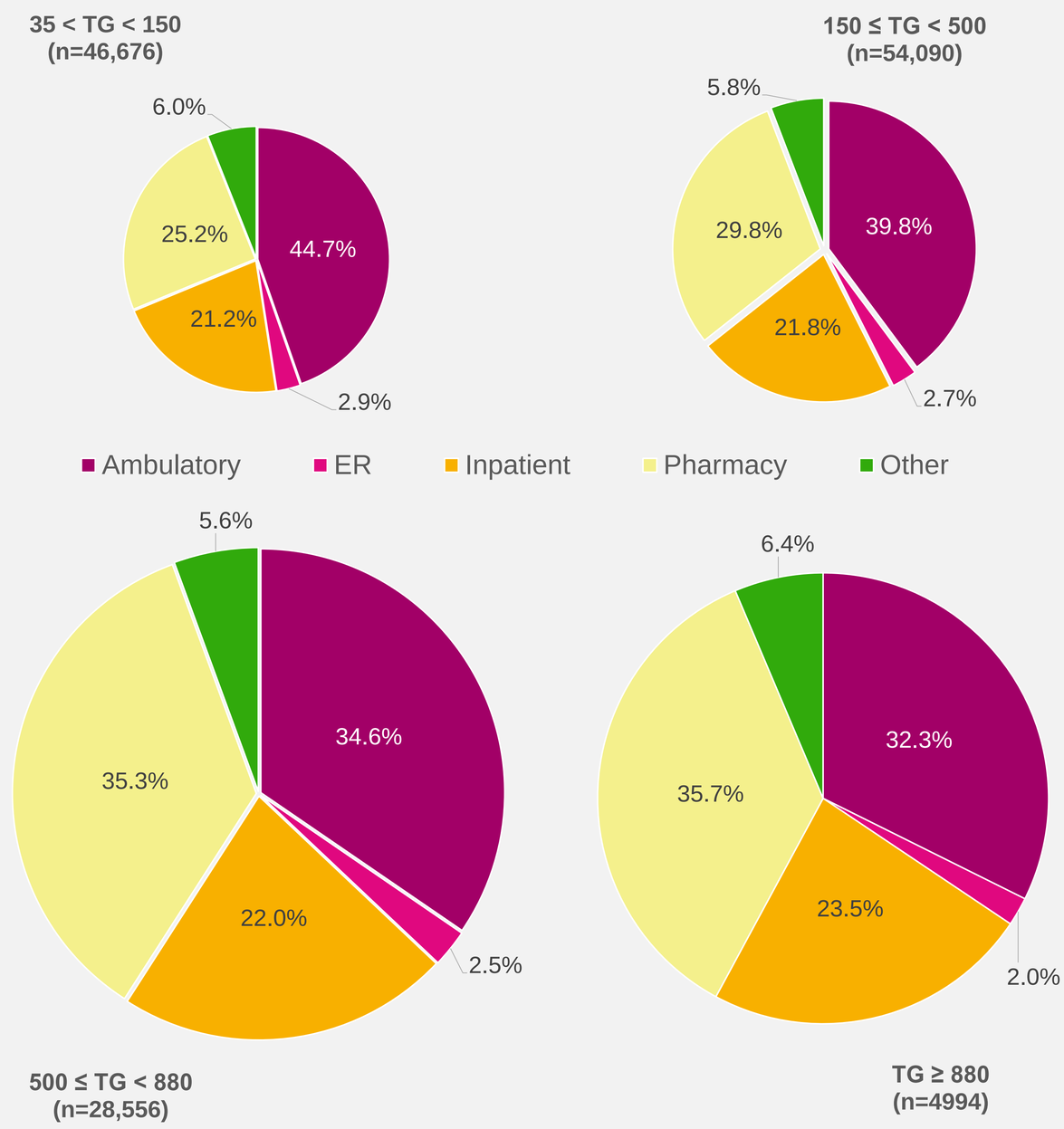
- **All-cause costs:** Compared with the normal TG cohort, all HTG cohorts incurred greater all-cause costs ($P < 0.05$).
- **AP- and MACE-related costs:** Compared with the normal TG cohort, the sHTG 500 ≤ TG < 880 sub-cohort incurred greater total, ER, and inpatient AP-related costs ($P < 0.05$).
- Both sHTG sub-cohorts incurred greater total, ambulatory, and inpatient MACE-related costs ($P < 0.001$).

Figure 1: All-cause costs (PPPM)^, by TG level



^ Per-patient-per-month, inflation-adjusted to USD 2021; * $P < 0.001$ compared with Normal TG; ** $P < 0.05$ compared with Normal TG

Figure 2: Distribution (%) of all-cause costs (PPPM)^, by TG level
The size of each circle is proportional to its TG group's all-cause costs



^ Per-patient-per-month, inflation-adjusted to USD 2021; * $P < 0.001$ compared with Normal TG; ER, emergency room

CONCLUSIONS

- Mild-to-moderate HTG and sHTG were associated with increased all-cause HCRU and costs.
- Inpatient admissions and ER visits were greater among patients in both sHTG sub-cohorts, compared to patients with normal TG.
- Increased inpatient services utilization was the largest contributor to the additional medical costs incurred by the sHTG sub-cohorts.
- Reducing hospitalizations among patients with HTG, especially patients with sHTG, is an important expectation for future research and therapies.

DISCLOSURES

ASK and MVL are employees of Ionis Pharmaceuticals and own company stock; KB and QA are employees of Optum/United Health Group (UHG), which was contracted to conduct this research; QA owns UHG Stock;

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