Impact of antiretroviral therapy (ART), viraemia and immunosuppression on lipid levels: The D:A:D study

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Aims/Methods

**Aims of the study:** To investigate the impact of ART, HIV viraemia, immunosuppression and prior AIDS diagnosis (a marker for immunosuppression) on triglyceride (TG), total cholesterol (TC) and high density lipoprotein cholesterol (HDL-C) levels

**Methods**

- First available TG, TC and HDL-C (mmol/L) on/after enrolment in D:A:D Study was considered, with TG being \( \log_{10} \) transformed for its distribution to be Normal
- Associations between each lipid level and ART use, HIV viral load (VL), latest/nadir CD4 count and prior AIDS diagnosis were examined using linear regression
- Models included adjustment for:
  - Age
  - Gender
  - Mode of infection
  - Ethnicity
  - Body mass index (BMI)
  - Smoking
  - Family history of CVD
  - Diabetes
  - Use of lipid lowering drugs
  - Hepatitis-C co-infection
  - Cohort
  - Year of D:A:D entry
Impact of ART, viraemia and immunosuppression on TC

Number of TC measurements (N) = 45169
Median (Interquartile range (IQR)) = 4.80 (4.00-5.70) mmol/L

Difference in TC (mmol/L)

ART with latest VL

- On ART with VL<500
- On ART with VL≥500
- Off ART with VL<100000
- Off ART with VL≥100000
Impact of ART, viraemia and immunosuppression on TC

Number of TC measurements (N) = 45169
Median (Interquartile range (IQR)) = 4.80 (4.00-5.70) mmol/L

D:A:D Study

On ART with VL < 500
Off ART with VL < 100000

On ART with VL ≥ 500
Off ART with VL ≥ 100000

Difference in TC (mmol/L)
Impact of ART, viraemia and immunosuppression on TC

Number of TC measurements (N) = 45169  Median (Interquartile range (IQR)) = 4.80 (4.00-5.70) mmol/L

- ART with latest VL
- Latest CD4 count
- Nadir CD4 count

Difference in TC (mmol/L)
Impact of ART, viraemia and immunosuppression on TC

Number of TC measurements (N) = 45169
Median (Interquartile range (IQR)) = 4.80 (4.00-5.70) mmol/L

ART with latest VL

Latest CD4 count

Nadir CD4 count

Difference in TC (mmol/L)

- On ART with VL<500
- On ART with VL>500
- Off ART with VL<100000
- Off ART with VL>100000

CD4 count <200
CD4 count 200-349
CD4 count 350-499
CD4 count ≥500

D:A:D Study

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Impact of ART, Viraemia and immunosuppression on TG and HDL-C

- Lower TG levels (N=44 322) were seen amongst those:
  - Off ART (compared to those on ART with VL <500 copies/ml)
  - With lower current CD4 count
- Higher TG levels were seen amongst those:
  - With lower nadir CD4 count
  - With prior AIDS diagnosis
- Lower HDL-C levels (N=38 604) were seen amongst those:
  - Off ART
  - On ART with VL>500 copies/ml
  - With a lower latest CD4 count and a lower nadir CD4 count
  - With prior AIDS diagnosis
Summary and Conclusion

- Lipid levels were considerably higher for those on suppressive ART regimen
- The higher TC/TG and lower HDL-C levels seen among those with low nadir CD4 count and with a prior AIDS diagnosis (data not shown), suggests severe immunosuppression may be associated with dyslipidaemia
- Future longitudinal analyses will consider the impact of specific antiretroviral drugs and duration of ART on lipid levels