LOW-LEVEL VIREMIA AND VIROLOGICAL FAILURE IN HIV ANTIRETROVIRAL THERAPY

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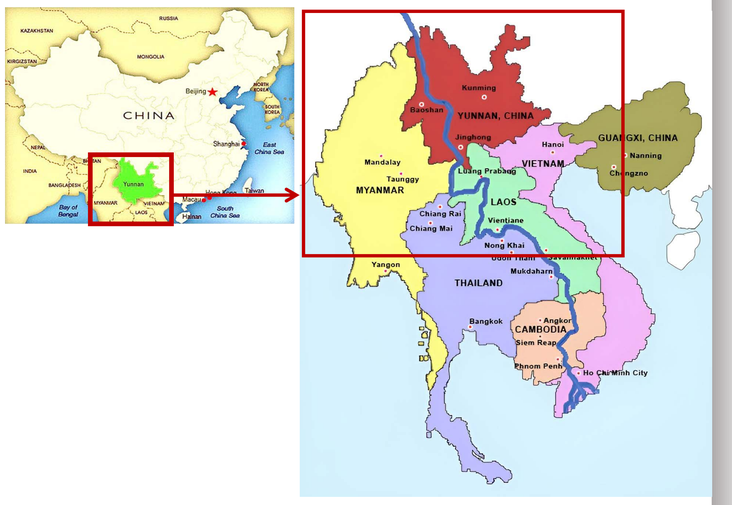
BACKGROUND

- HIV plasma viral load (pVL) is an important indicator to monitor treatment response in combination antiretroviral therapy (cART).
- Yunnan, a less developed province in southwestern China, as near Golden Triangle region, saw the first local AIDS cases in mainland China in 1989 and has been confronted with the heavy AIDS burden since then. In 2020, 92% people living with HIV received cART, and 91% of them had viral load with less than 1000 copies/mL.



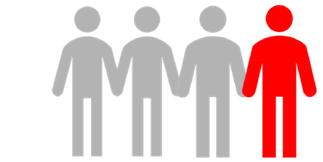
- During cART course, patients may experience small increases in pVL, namely 50 to 999 copies/mL, not reaching the threshold for viral failure(≥1000 copies/ml, VF) based on China guideline, known as low-level viraemia (LLV).
- However, the overall impact of LLV on clinical outcomes remains largely unknown. The objective of this study was to investigate the long-term impact of LLV on VF in patients receiving cART.

METHODS

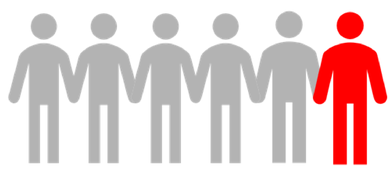
- Data were extracted from the cohort of Yunnan in National Free HIV Antiretroviral Therapy Program. The cART-naive adults cases, initiated from 2004 to 2018, were analyzed.
- LLV was defined as the occurrence of at least one time of plasma viral load measurement of 51–999 copies/mL during cART. Instances of LLV were grouped in ranges of 51–199, 200–399,and 400–999 copies/mL. Patients with multiple instances of LLV were classified in the range of their highest results.
- Incidence rates of VF(one or more viral load measurement of ≥1000 copies/mL) after LLV were reported. Cox multivariate regression analysis were applied to assess the association of LLV with VF.

RESULTS

LLV is even more common than VF

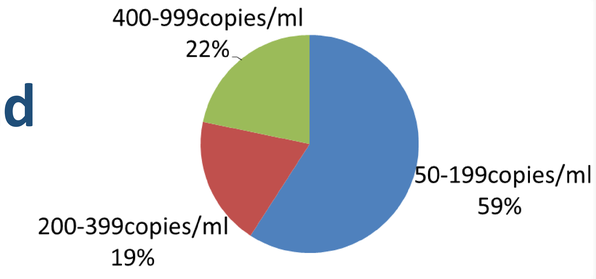


1 in 4 cases have experienced or are experiencing LLV



1 in 6 cases have experienced or are experiencing VF

More than half of LLV cases had 50-199copies/ml LLV



Incidence rates of VF after LLV

LLV category	Patients (n)	Patient years of follow-up	Patients with VF (n)	Incidence rate [95% CI] (per 100 person-years)
LV 0-50copies/mL	52499	212954	3875	1.82[1.76-1.88]
LLV51-999copies/mL	17832	103414	2570	2.49[2.39-2.58]
LLV51-199copies/mL	10542	60800	1077	1.77[1.67-1.88]
LLV200-399copies/mL	3413	19714	550	2.79[2.56-3.03]
LLV400-999copies/mL	3877	22900	943	4.12[3.86-4.38]

- A total of 76,736 patients were included. The median age was 37 years (IQR, 30–44 years), 63.6% were male, median baseline CD4+ count was 247 (176–411) cells per milliliter. Median follow-up length was 184 weeks (IQR 94week-305weeks).
- After excluding 6,405 patients with initial VF, 12779 patients with only one viral load result, and 694 patients with less than 1 year of follow-up on ART, the rest 56,858 patients were adopted for cox proportional hazards analysis.

		Adjusted HR	95% CI
LLV: 51-199cop/ml	(VS.VL 0-50cop/ml)	0.90	0.84-0.97
LLV: 200-399cop/ml	(VS.VL 0-50cop/ml)	1.39	1.27-1.53
LLV: 400-999cop/ml	(VS.VL 0-50cop/ml)	2.02	1.87-2.18
Sex: female	(VS. Male)	0.81	0.76-0.86
route of transmission: MSM	(VS.IDU)	0.28	0.23-0.35
route of transmission: Heterosexual transmission	(VS.IDU)	0.61	0.58-0.66
Age at start of ART: 30-50years old	(VS.<30years old)	0.76	0.71-0.81
Age at start of ART: >50years old	(VS.<30years old)	0.90	0.82-0.98

CONCLUSIONS

- In Yunnan cohort, LLV200-399copies/mL and LLV 400–999copies/mL were strongly associated with the VF of viral load measurement ≥1000cop/ml. Management of LLV and re-identification of VF in China cART guideline should be considered.
- It is suggested that medical intervention time based on the VL definition should be changed to VL above 200 cop/ml in both WHO guideline and China Guideline, not as the current definition of VF threshold with above 1000 copies /ml and above 400 copies/mL.

DISCLOSE

- This study was supported by the Joint Fund Program of Applied Basic Research of Yunnan Provincial Sci &Tech Department and Kunming Medical University （202001AY070001-105）