ACCELERATED ATHEROSCLEROSIS AND CAUSES OF MYOCARDIAL INJURY IN PEOPLE LIVING WITH HIV

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Background:

The risk for developing coronary heart disease in people living with HIV (PLWH) is increased by 1.5 to 2.0 fold based on American data.
Controversially in England this was not validated by our GP database analysis during Q-Risk 3.
We care for over 3,000 PLWH in our centre, analysing our coronary intervention data our average age is 50.7 years versus a national average of 64.2 years old implying accelerated atherosclerosis in our cohort of vulnerable patients.

Methods:

We performed a single centre retrospective analysis of our HIV cohort. We searched our pathology results system over a 3 year period looking for high sensitivity Troponin T (hsTropT) results. We used <52 ng/L as a negative result. We then analysed patient's notes to confirm if they had a myocardial infarction, classify the type and attribute a cause.

Results:

490 results were reported, 16 samples were haemolysed, on 208 PLWH. 119 tests were positive (>52ng/L) in 36 patients (Figure1). Some patients had multiple events (48 in total).
Interestingly none of the PLWH who had a hsTropT < 100 had a coronary event. There were 10 acute coronary syndromes (ACS), but 28 PLWH had other causes for their raised hsTropT.
All of the ACS were Caucasian men with 60% having ST elevation Myocardial infarctions (STEMI). Interestingly 2 PLWH had a 2nd STEMI within the same admission to hospital, implying a prothrombotic effect above and beyond the normal population.
The majority of PLWH had another diagnosis for raised hsTropT, implying a number of low grade inflammatory causes including heart failure, pericardial disease and arrhythmia. There was a difference between the ACS group and those with end stage renal failure (ESRF) (Table 1).

		Total	hsTropT+	ACS	ESRF
Patients		208	36	8	13
Tests		490	119	18	64
Average hsTropT ng/L (SD)		76.5 (±202)	264 (±340)	680 (±508)	209 (±146)
Average Age Years (SD)		53 (±11)	56 (±10.8)	57 (±8.9)	55 (±11)
Sex	Male % (n)		75% (27)	100% (8)	46.2% (6)
	Female		25% (9)	0% (0)	53.8% (7)
Ethnicity					
	Caucasian		48.6% (17.5)	75% (6)	23.1% (3)
	African/Caribbean		41.7% (15)	6.3% (0.5)	69.2% (9)
	Asian		9.7% (3.5)	18.7% (1.5)	7.7% (1)

Table 1. Demographics and spread of Troponin.

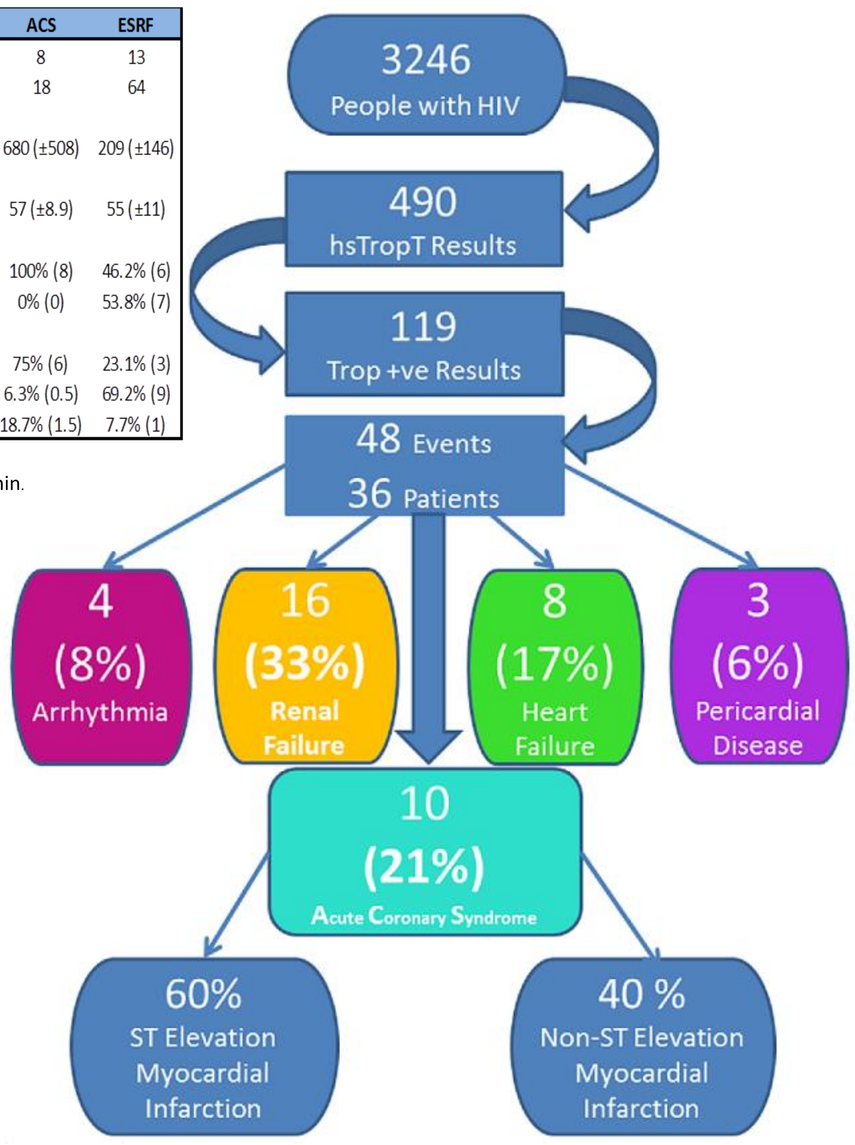
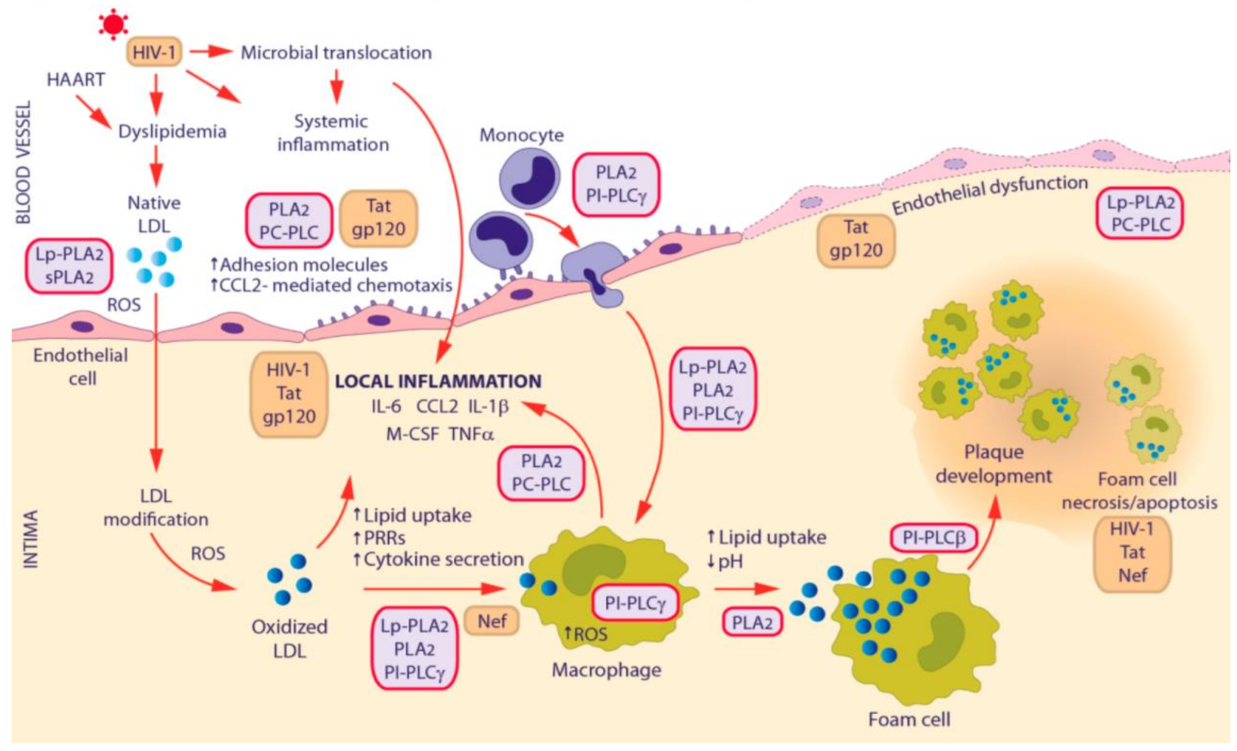


Figure 1. Flowchart of People Living with HIV, their Troponin results and final diagnosis.

Figure 2. Inflammation pathway and macrophage activation in HIV infection leading to atherosclerosis[1] .



Discussion:

Conflicting evidence exists regarding increased cardiovascular disease risk within the HIV population. Here we have a current retrospective study demonstrating our cohort of PLWH are having ACS and myocardial injury at an earlier age than the general population.
We can explain our findings of accelerated atherosclerosis in PLWH due to the medication causing dyslipidaemia, systemic inflammation due to HIV and macrophage activation all eventually leading to increased plaque formation (Figure 2)[1]. Of particular interest are sCD14 and sCD163 which are shed by monocytes and macrophages in the pro-inflammatory response and have been demonstrated to be an independent marker of mortality in HIV.
Troponin is secreted from the myocardium during ischaemia; in PLWH this could be due to micro-necrosis due to pro-coagulant pathways (Figure 3)[2].
A further avenue of potential research involves a genetic pre-disposition caused by HMBG1 which we intend to investigate further.

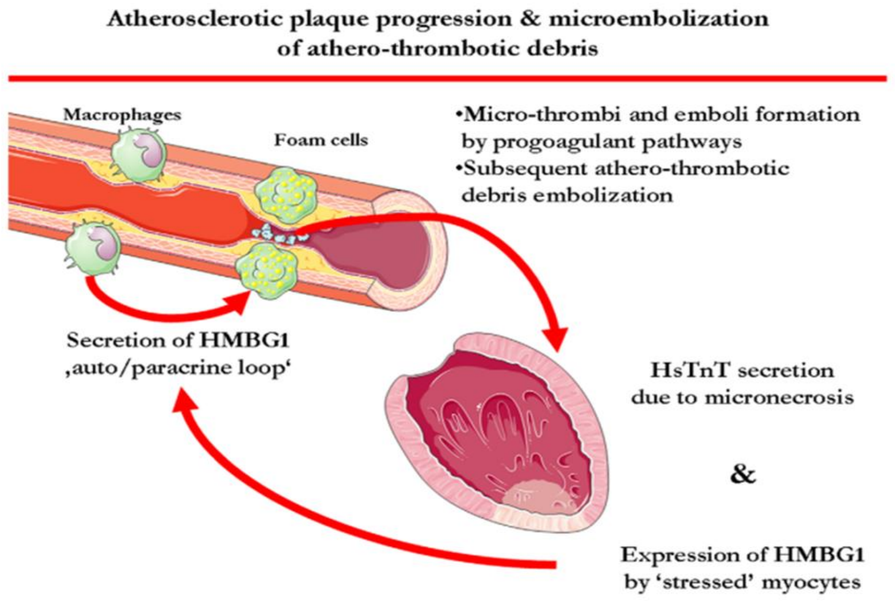


Figure 3. Macrophages and foam cells causing myocardial injury and Troponin T release[2].

Conclusions:

From our data it does appear that PLWH are developing atherosclerosis and plaque rupture at a younger age than the general population (57yrs Vs 66yrs). Renal disease in PLWH may account for a significant proportion of raised hsTropT. Other non-coronary causes of raised Troponin appear prevalent in PLWH. Low grade systemic inflammation due to HIV, immune reactivation and effect of anti-retroviral drugs are contributing confounding factors and requires further investigation.
Of those patients who have a coronary event, it appears PLWH are at higher risk of having a STEMI than the normal population.

References:

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2. Andrassy M, Volz HC, Maack B, et al. HMGB1 is associated with atherosclerotic plaque composition and burden in patients with stable coronary artery disease. PLoS One. 2012;7(12)

Conflicts of Interest: None declared