



# Prevalence, and causes of chronic anaemia in HIV infected patients; implications for survival

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## Background

- HIV infection is an important cause of anaemia.
- High prevalence of anaemia amongst HIV infected patients specially those with immunodeficiency has been reported<sup>1</sup>.
- Anaemia has been associated with increased mortality of HIV patients within one year after start of HAART<sup>2</sup>.
- Little data on the prevalence, causes and impact of anaemia in the current HAART era are available.

## Aims

The aim of the present study was to investigate the prevalence and causes of chronic anaemia in a cohort of HIV infected patients on modern HAART regimes..

## Methods

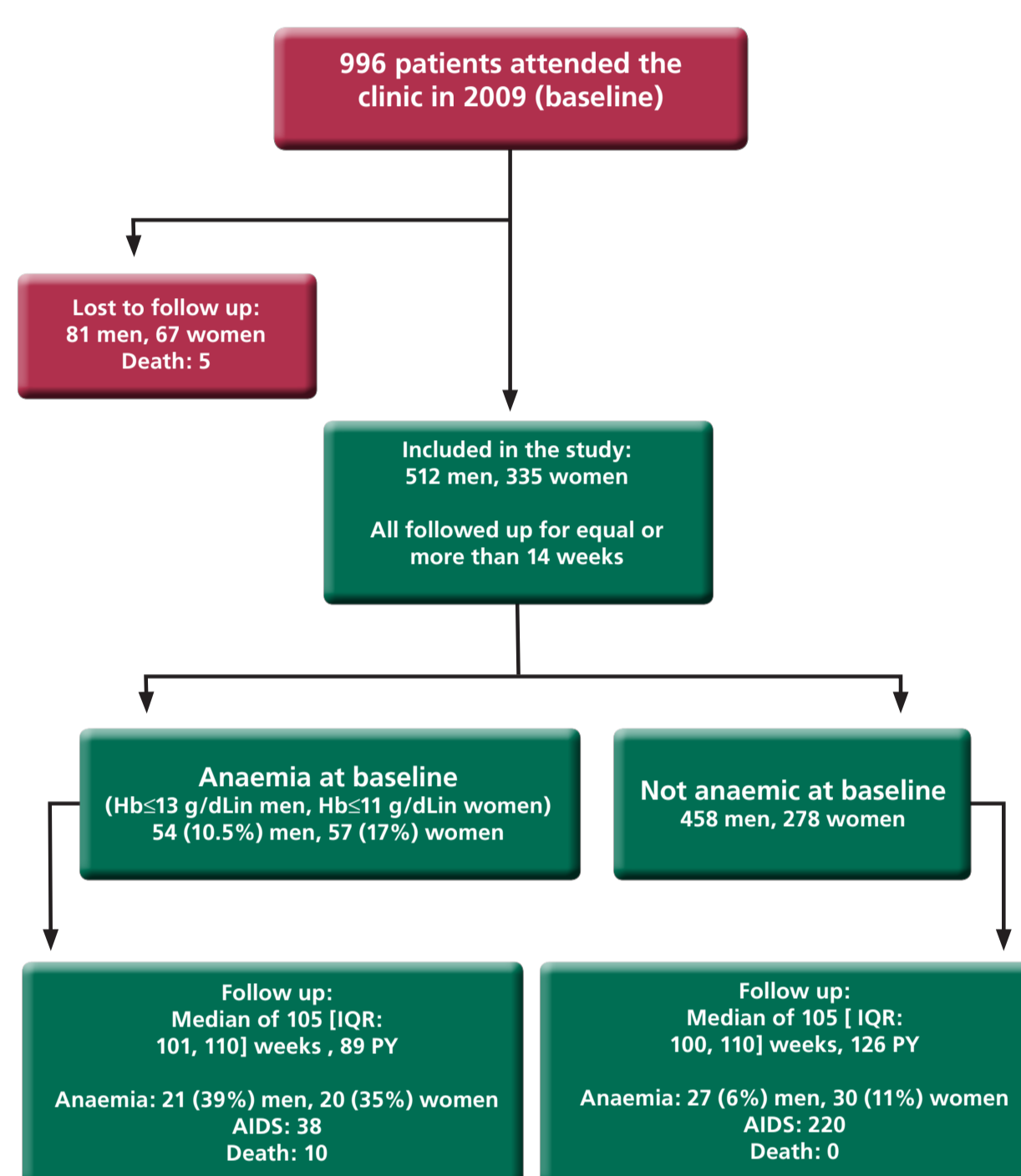
- Cohort study on all HIV infected patients who attended a tertiary HIV centre in 2009 (baseline) and were followed up for equal or more than 14 weeks.
- Anaemia was defined as haemoglobin  $\leq 13$  g/dLin men, and  $\leq 11$ g/dLin women.
- Information on patients' mortality was abstracted from NHS care records service.
- Information on patients' gender, age, duration of HIV infection (weeks), history of AIDS, antiretroviral drugs, and their first measurements of haemoglobin (anaemia per gender or not), CD4 count (less than 350 cells/mm<sup>3</sup> or not), viral load count (less than 50 copies/mL or not) in each calendar year were included in the final analysis.
- Cox's regression was used to calculate Hazard Ratio (HR) for clinical end points (death, death and AIDS).

## Results

- 996 HIV infected patients attended the centre at baseline; 148 patients (81 men, 67 women) were lost to follow up.
- A cohort of 847 patients (512 men, 335 women) were followed up for more than 14 weeks between 2009 (baseline) and 2012 (Figure 1).
- Of those 111 (13%) were anaemic at baseline; 54 (10%) men, and 57 (17%) women. Three women had haemoglobin less than 8 g/dL.

- Common causes of anaemia in patients at baseline are summarised in Table 1.
- Even with modern HAART regimes after a median of 105 weeks, 37% of patients remained anaemic.

## Study overview



Causes of anaemia at baseline

	Men (n=24)	Women (n=57)
Alpha thalassaemia	1	1
Sickle cell anaemia	0	3
Hypothyroidism	0	1
Normal level of haematinics	3	3
Cirrhosis	2	0
Chronic Renal Failure	1	1
<i>H. pylori</i> gastritis	1	1
Low folate	3	2
Low vitamin B <sub>12</sub>	4	0
Iron Deficiency Anaemia	3	6
Hodgkin's lymphoma	1	0
Ischemic colitis	1	0
Myelodysplasia	1	0
Anal cancer	1	0
Raised monoclonalimmunoglobulin	1	0
Not investigated	31	39

- At the end of the study, 10 patients with anaemia at baseline died:
  - Causes of death included malignancy (n=4), liver failure (n=2), renal failure (n=2), and AIDS (n=1). Information on cause(s) of one death was not available.
- Mortality rates:
  - Study cohort: 17.7/1000 patients
  - Patients with anaemia at baseline: 90.1/1000 patients
- On Cox's model, anaemia at baseline [HR: 8.96 (2.21, 36.33); P=0.002], and weeks of HIV infection [ HR 1.003 (1.000-1.006); P=0.025] independently predicted death.

- HR for death on changes of anaemia status are summarised in Table 2

Change in anaemia status and Hazard ratio for death after equal or more than 14 weeks of follow up

Anaemia at baseline	Anaemia at the end of study	Patients, (n)	HR for Death
None	None	679	1 (reference)
Present	None	71	19.56 (6.36, 60.19)
None	Present	57a	---
Present	Present	41	6.91 (1.29, 36.77)

<sup>a</sup> no cases of death for this category; all had history of AIDS

## Discussion

- Chronic mild anaemia is common in HIV infected patients.
- Because it may be associated with high mortality, chronic anaemia in HIV infected patients should be fully investigated and treated<sup>3</sup>.
- Start of HAART in patients with anaemia even at higher than currently recommended CD4 counts may be justified.
- A significant number of patients were not investigated for the cause(s) of their anaemia

## References

- 1.Morcroft A, Ledergerber B, Katalama C, et al. Decline in the AIDS and death rates in EUROSIDA study: an observational study. *Lancet* 2003; **362**:22-29.
- 2.Gupta A, Nadkarni G, Yang WT, et al. Early mortality in adults initiating antiretroviral therapy (ART) in low-and middle-income countries (LMIC): a systematic review and meta-analysis. *PLoSOne*. 2011; **6(12)**:e28691.
- 3.Harris RJ, Sterne JA, Abgrall S, et al. Prognostic importance of anaemia in HIV type-1-infected patients starting antiretroviral therapy: collaborative analysis of prospective cohort studies. *AntivirTher*. 2008;**13(8)**:959-67.