Lipodystrophy and Dyslipidemia among patients taking HAART: First study from India

Pujari Sanjay[1], Patel A[2], Naik E[3], Dravid A[1], Patel J[2], Bhagat S[1]

1. Department of HIV Medicine, Ruby Hall Clinic, Pune India and CHART India
2. Sterling Hospital, Ahmedabad, India and CHART India
3. Assistant Professor in Epidemiology, Biostatistics and Internal Medicine, USF, Tampa, USA and CHART India

Background and Rationale

- d4T/3TC/NVP is being widely promoted as first line regimen in ART scale up programs in the developing world
- Morphologic and metabolic complications are common in patients taking HAART
- Data about prevalence of these from developing countries is limited

Objectives

- To determine the prevalence of body-shape changes and dyslipidemia amongst patients taking long-term d4T/3TC/NVP
- To determine the risk factors associated with development of dyslipidemia in this population

Methods

- Design
  - Cross-sectional
- Sampling
  - Consecutive adult patients attending tertiary level HIV clinics between July-Oct 2003

Methods

- Patient population
  - **Cases**
    - Confirmed HIV-1 infection
    - Antiretroviral naïve
    - On d4T/3TC/NVP for more than 1 year
    - Adherence assessed by self-report, confirmed by improvement in CD4 counts and/or macrocytosis on hemogram
  - **Non-Cases**
    - Confirmed HIV-1 infected
    - Never exposed to antiretrovirals
    - Did not have HIV related illness 8 weeks before date of assessment

Methods

- Measurements and definitions
  - Body shape changes
    - Patient self report and history taking
    - Physical examination
    - **Lipoatrophy**: hollowing of cheeks, extremities wasting, prominence of veins and flattening of buttocks
    - **Central fat gain**: increased abdominal and breast fat
    - **Mixed**: Occurrence of both in the same patient

Methods

- Measurements and definitions
  - **Dyslipidemia**
    - Blood collection after overnight fasting (12 hours)
    - Lipid (TC, LDL, HDL, TG, VLDL and Chol-HDL ratio) and glucose levels estimated by Beckman Automated analyzer
    - Dyslipidemia defined according to NCEP ATP III guidelines:
    - $TC \geq 240$, $LDL \geq 160$, $TG \geq 200$ and $HDL \leq 40$ (all mg/dl)
- Body-mass index calculated and BP measured
- CD4 estimations done by FACS count
- Demographic information and history of smoking, alcohol intake, family history of CAD collected

Methods

- Statistical analysis
  - Baseline variables compared by Fischer's exact (binary) and Mann-Whitney (continuous variables)
  - Overall Prevalence estimated by the proportion of participants having the complication
  - Differences in the prevalence of dyslipidemia between cases and non-cases assessed by Fischer's exact test
  - Logistic regression analysis
    - Outcome variable: Dyslipidemia
    - Independent variables: Age, gender, family, alcohol and smoking history, CD4 counts and BMI

Results

- Baseline Demographics

Characteristic	Cases (n=88)	Non-Cases (n=56)	P value
Mean Age (SD)	38.1 (9)	36.4 (8)	0.10 (NS)
Men (%)	72 (81.8)	38 (67.8)	0.07 (NS)
Current mean CD4 count (SD)	408.7 (165)	314 (268)	<0.0001 (S)

Median duration of follow up- 19 months (12-41)

Results

- Overall Prevalence of body-shape abnormalities

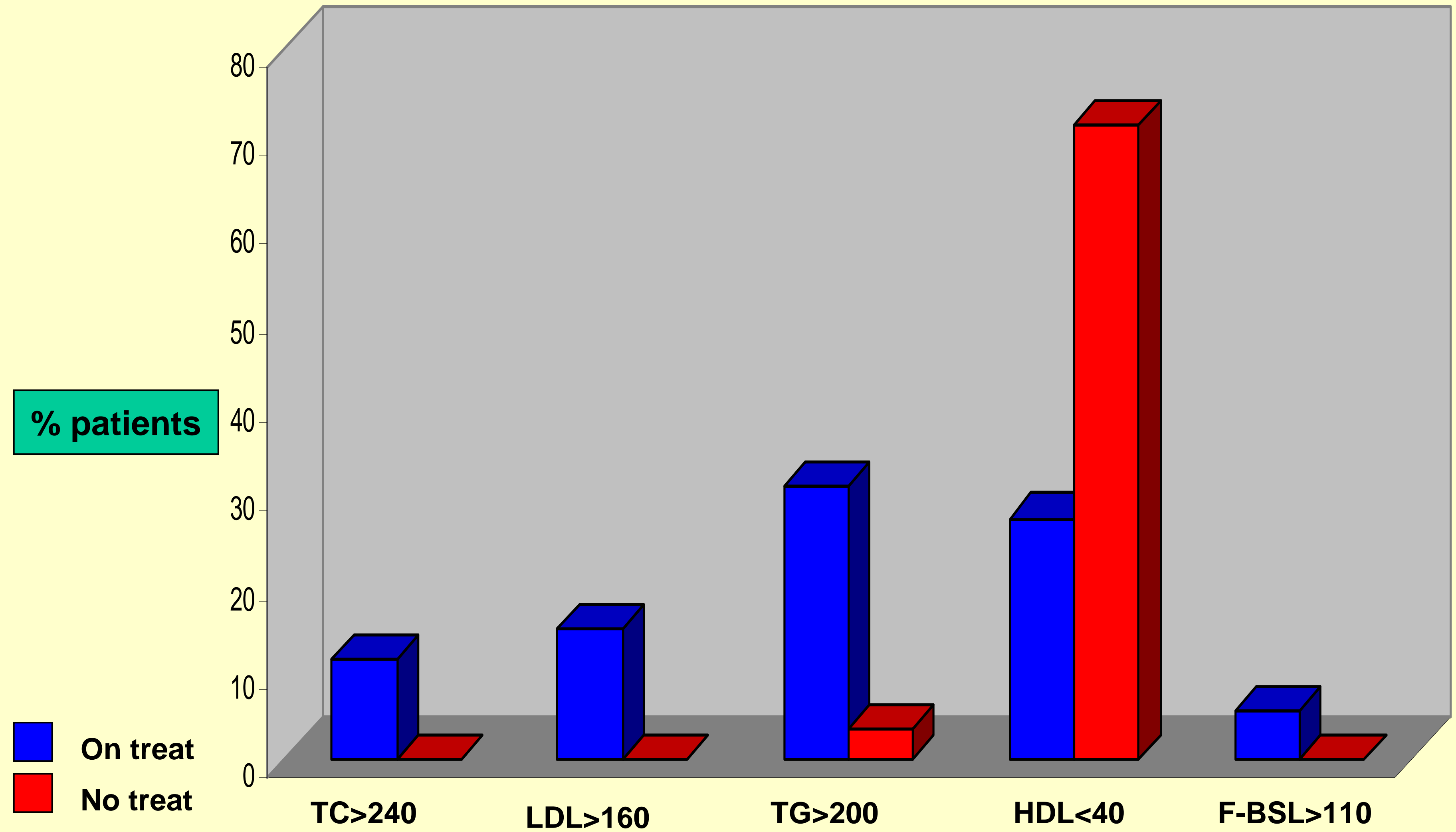
Characteristic	Frequency (%)
Lipoatrophy	14 (15.9)
Central fat gain	13 (14.7)
Mixed	13 (14.7)
Total	40 (45.5)

Results

- Overall Prevalence of dyslipidemia

Characteristic	Cases percentage (95% CI)	Non-Cases percentage (95% CI)	P value
TC≥240	11.4 (4.8-18.04)	0	0.007
LDL≥160	14.9 (7.5-22.3)	0	0.002
TG≥200	30.7 (21.1-40.3)	3.6 (1.1-6.1)	<0.0001
HDL≤40	27.2 (18-36.4)	71.4 (59.8-83)	<0.0001
F glu≥110	5.4 (0.0-9.9)	0	0.13

Dyslipidemia in HIV patients on d4T/3TC/NVP



Results

- Strong association between treatment and dyslipidemia
  - TC$>$240 and LDL$>$160 associated perfectly
  - TG$>$200: Adjusted OR-12.93 (2.6-62.4), p value-0.01
  - HDL$<$40: Adjusted OR-0.11(0.04-0.27), p value$<$0.001
- Positive association of Smoking and age with dyslipidemia

Conclusion

- High prevalence of metabolic and morphologic complications amongst patients taking d4T/3TC/NVP based HAART in India
- Scaling up programs need to incorporate management strategies for these complications, if d4T cannot be avoided in the initial regime
- High HDL cholesterol in cases may be because of inclusion of Nevirapine in the regime

Limitations

- Cross-sectional
- Subjective assessment of body shape abnormalities
- Serum lactate levels not determined
- Selection Bias due to sampling technique