

**RELATIONSHIP OF WHITE BLOOD
CELL COUNTS, HEMOGLOIN AND
ESR WITH IHD**

BY

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Background

- IHD is the leading cause of death all over the world
- Responsible for 50% of mortality in developed countries and 25% deaths in the developing world
- In Pakistan around 1 in 4 middle-aged adults have evidence of ischemic heart disease

Back ground

- Atherosclerosis is a chronic inflammatory disease
- Leukocyte count is a marker of inflammation



Back ground

- Similarly, decreased hemoglobin levels and elevated ESR are known to be associated with an increased risk of coronary atherosclerosis
- However, previous studies are for the Caucasian population and the values may vary with ethnicity. So there is a need for studies to establish the association of these variables with cardiovascular diseases in native population

Objectives

- To find out any association of white blood cell counts, hemoglobin and ESR levels with ischemic heart disease in high risk native population

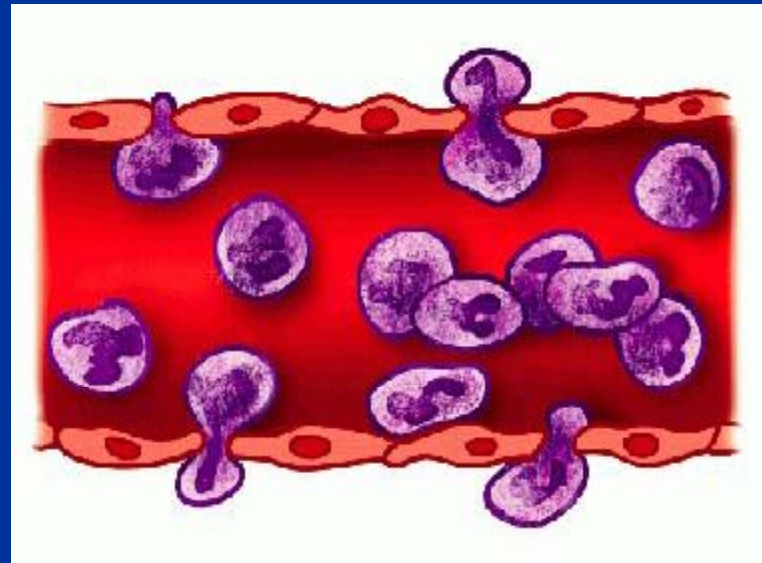
Materials and methods

- Study was approved by the Ethical Committee and research board of the University of health sciences, Lahore
- Written informed consent was obtained from every study participant

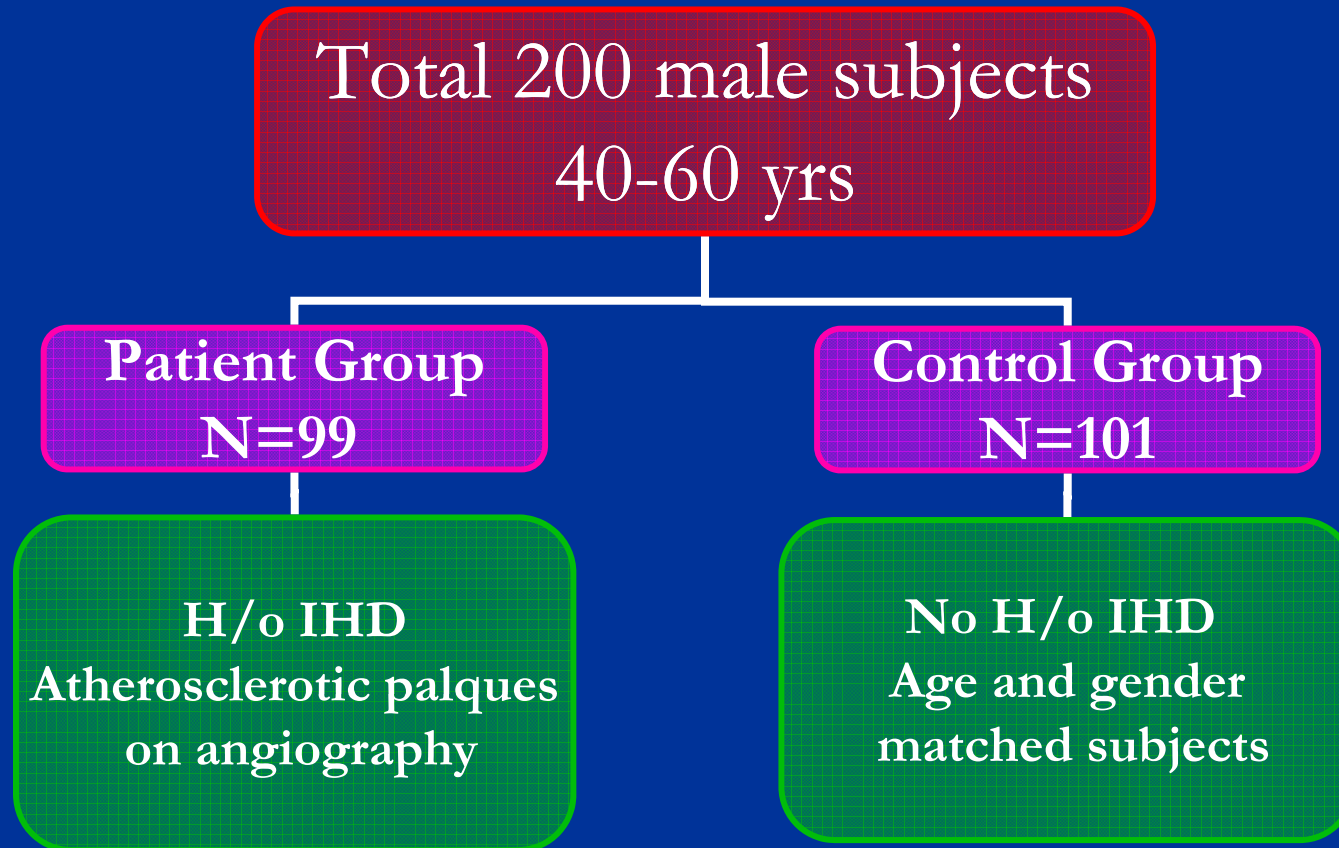
Material and Methods

Study design

- Observational
- Analytical
- Cross-sectional



Study sample



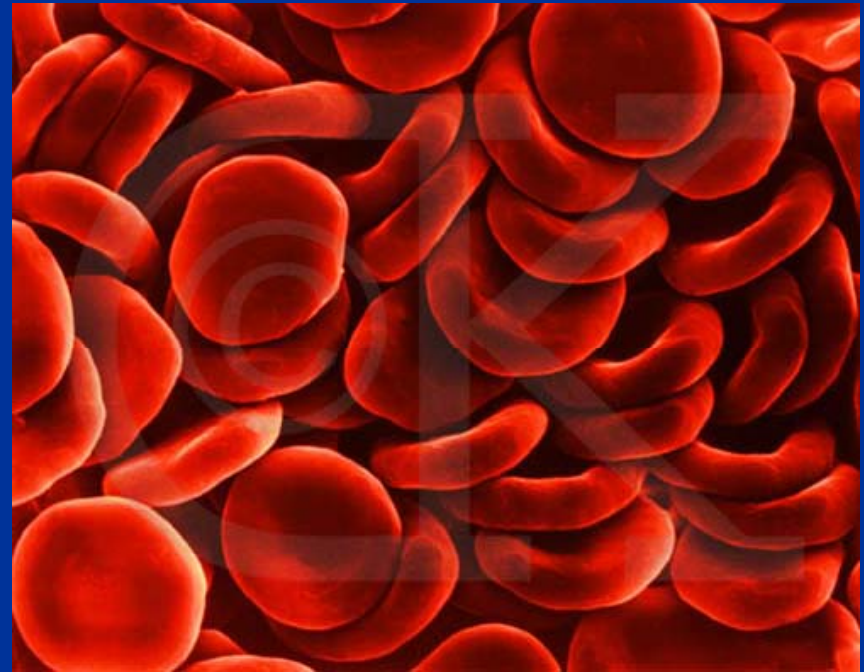
Inclusion Criteria

- Patients of ischemic heart disease and angiographically proven atherosclerotic plaque
- Healthy normal volunteers with no history of ischemic disease as control group

Exclusion criterion

- Subjects with
 - Diabetes mellitus
 - Immunodeficiency
 - Immunoproliferative disorders
 - Acute or recent infections
 - Cardiogenic shock
 - Recent history of immunosuppressive treatment
 - Taking statins (lipid lowering drugs)

Study Variable Determinations



Complete blood cell counts and Hemoglobin

- 5 ml of venous blood was drawn into a purple top (with EDTA) vacutainer tube (B.D)
- Samples were analyzed for complete blood counts and hemoglobin by using hematology auto-analyzer (Sysmex XS-1000i, Kobe, Japan)
- Reports were also confirmed microscopically by making slides of peripheral smears

ESR

- ESR was determined by conventional Westergren tube method
- Venous blood in EDTA tube was mixed and then sucked into the Westergren tube to the 100mm mark by means of a teat
- Tube was placed exactly vertical for 60 minutes and then results were noted

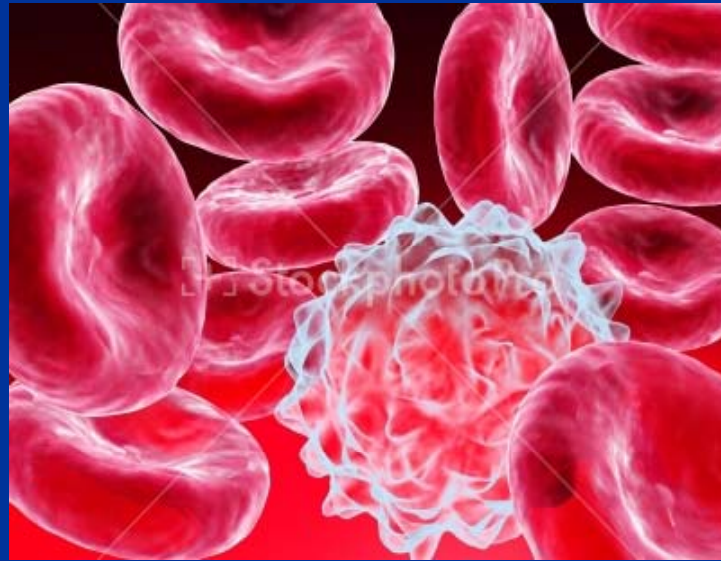
STATISTICAL ANALYSIS

- Statistical analysis was done using SPSS version 12 (SPSS, Inc, Chicago, IL, U.S.A.)
- Categorical data is presented as percentages (frequencies)
- Quantitative data as medians and IQR values.

STATISTICAL ANALYSIS

- For categorical data, Pearson chi-Square test was used to determine any significant association between the groups for different variables
- For quantitative data, Mann Whitney rank sum test was used to determine any significant differences between the study groups
- The p-value ≤ 0.05 was considered statistically significant

RESULTS



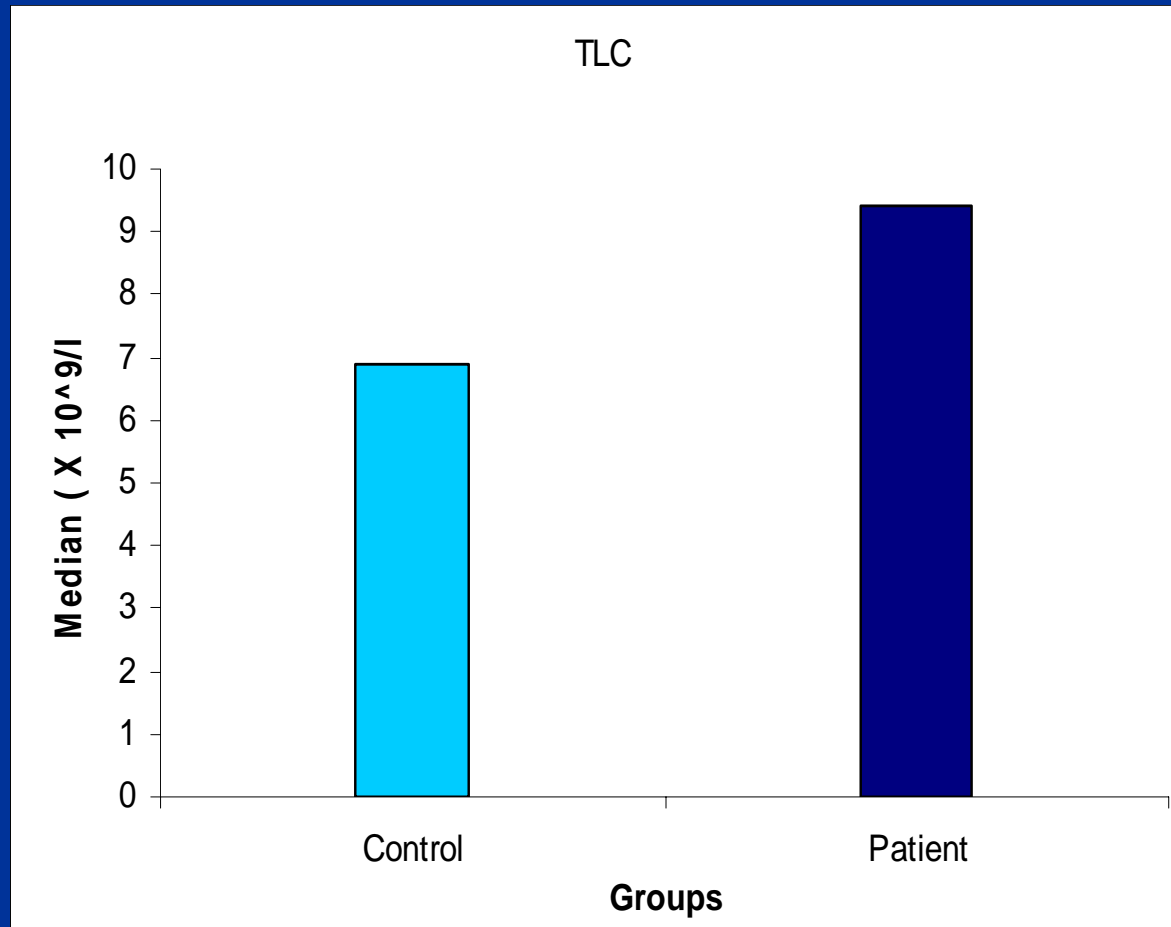
Base line Clinical Characteristics of the study groups

Variables	Control			Patient			p-Value
	Number	Frequency	%age	Number	Frequency	%age	
Hypertension	101	24	24.24	99	20	19.8	0.543
Smoking	101	31	31.31	99	54	53.46	0.003
Family H/O IHD	101	29	29.29	99	41	40.95	0.06

Base line Clinical Characteristics of the study groups

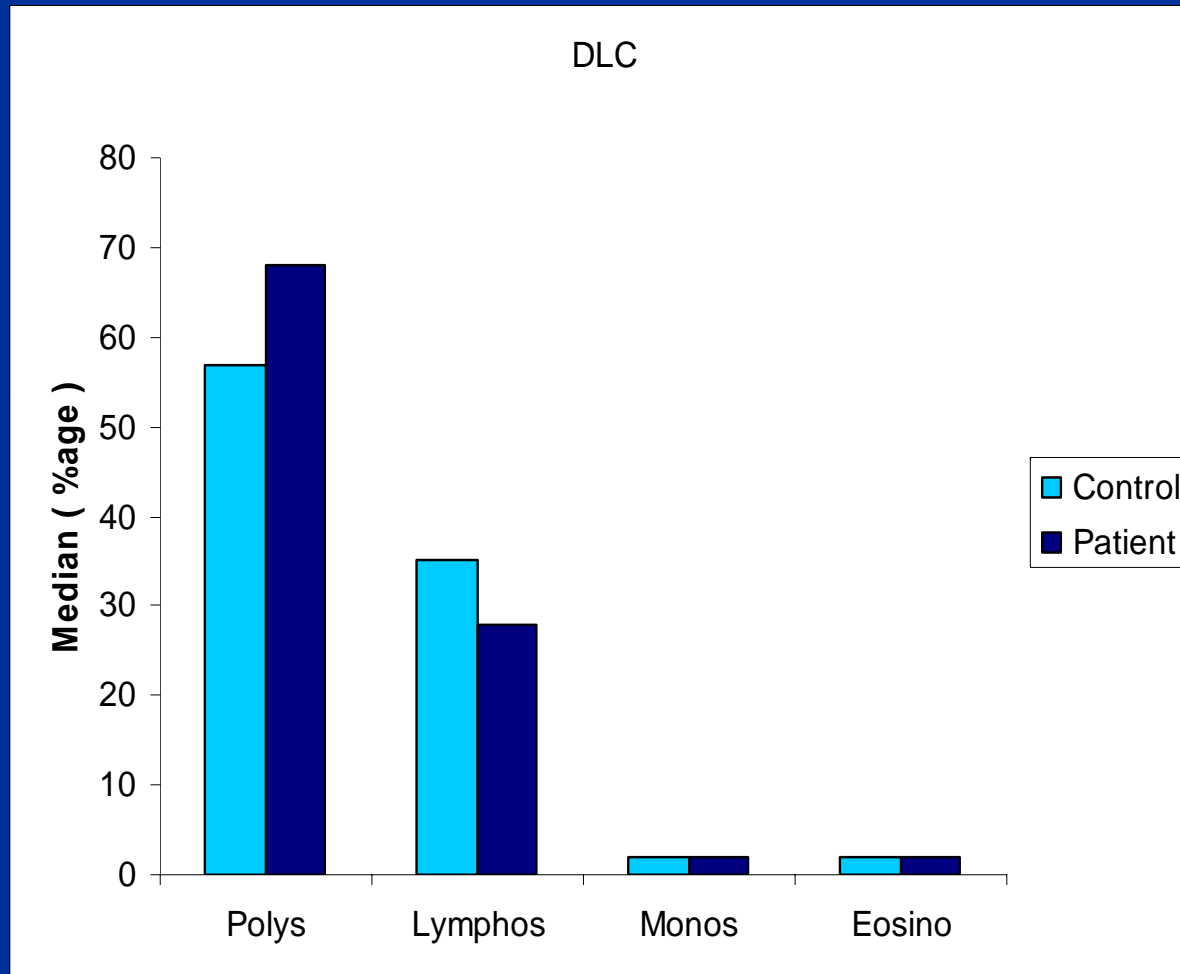
Variables	Control			Patient			p-Value
	Number	Median	IQR	Number	Median	IQR	
Fasting Blood Sugar	101	89	16.5	99	100	16	<0.0001
Cholesterol	101	185	43	99	165	58.50	0.002
Triglyceride	100	156	100	99	124	107	0.101

Total Leukocyte Count



$P=0.001$

Differential Leukocyte Count



P value for Polys =0.001

P value for lymphos=0.001

Total Leukocyte Count

- A strong association of total leukocyte count with angiographically established atherosclerosis

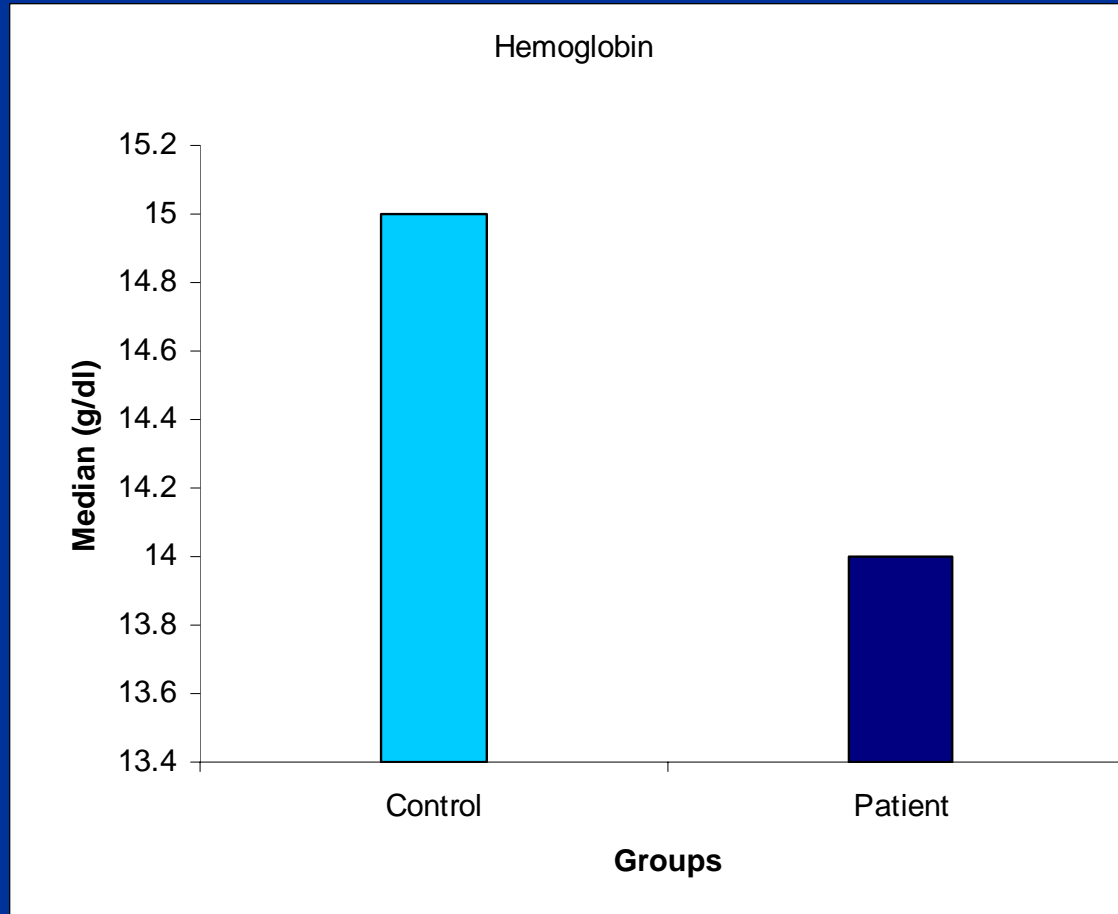
Differential Leukocyte Count

- There is an association between elevated neutrophils and decreased lymphocytes with increased risk of IHD

Jia E et al. *Acta Pharmacologica Sinica* 2005;26 (9):1057-1062

Madjid M et al. *J Am Coll Cardiol* 2004;44:1945-1956

Hemoglobin



$P=0.001$

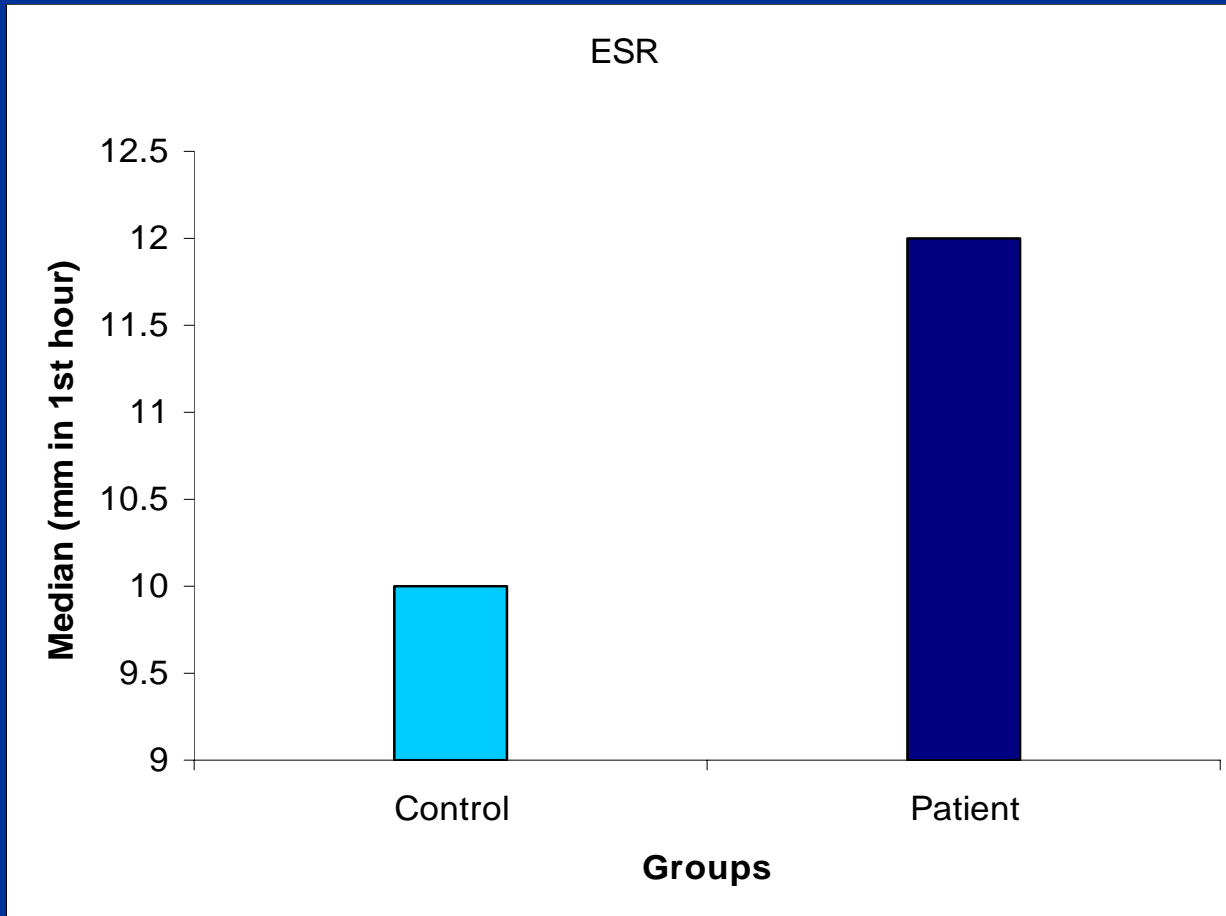
Hemoglobin

- Increased hemoglobin levels are associated with reduced severity of atherosclerosis
- Decreased Hb level is an independent risk factor for CVD in general population

Dijk J.M et al. *Atherosclerosis* 2006;188:444-49

Sarnak M.J et al. *J. Am. Coll. Cardiol.* 2002;40:27-33

ESR



$P=0.030$

ESR

- There is an established correlation between high ESR levels and coronary atherosclerosis
- Progressively higher ESR in the presence of angiographically documented major narrowing of 1, 2, 3-vessel disease

Conclusion

- Although the values of TLC, DLC, Hb and ESR were within normal range in both groups but
 - TLC was significantly higher in patients
 - Neutrophils higher and Lymphocytes lower in patient group
 - Hb lower in patients
 - ESR higher in patients.

Conclusion

- These findings are consistent with the previous studies, indicating the association of these variables with IHD in native population
- These are low cost, good reproducibility test routinely measured by clinicians and may be helpful to predict the future, primary and secondary events in a high risk population

Conclusion

- Moreover, measurement of these variables in some larger studies might substantially further strengthen the present overall results, their interpretation and association with IHD

THANK YOU