# INCREASED PLATELET DEPOSITION UNDER SHEAR STRESS CONDITIONS IN PATIENTS WITH SCLERODERMA

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## INTRODUCTION

Scleroderma is a rheumatic disease involving the skin, lung, gastro-intestinal tract, kidney, heart and the microvascular system. Vascular endothelial damage may contribute to the inflammatory process found in the vessel wall, which in turn contribute to the hypercoagulable state that has already been reported in the disease. Nevertheless some studies fail to support evidence for platelet hyperactivity in scleroderma.

## OBJECTIVES

To support evidence for platelet hyperactivity in scleroderma

## METHOD

In the current study we employed the Cone and Platelet Analyzer (CPA) for assessment of platelet deposition Polystyrene surface (PS) under shear conditions (1800/second). This method allows for investigation platelet aggregation under conditions that mimic blood flow. The assays were applied from 41 patients with scleroderma and from 37 healthy controls. The degree of homeostasis was expressed in two terms: the percent of surface coverage (SC) and average size (AS) of the adherent aggregates.

## RESULTS

Our results demonstrated significant higher SC and AS levels in scleroderma patients. Percent of surface coverage (SC) and average size (AS) of the adherent aggregates were high in majority of patients with scleroderma. Difference between patient and control groups was highly significant (p <0.001). We found also that Homocysteine levels were high in majority of scleroderma patients as well. The difference between scleroderma patients and control group was highly significant (p <0.005 )

### Details of patients and normal controls

|  | Scleroderma No=41 | | Controls No=37 | |
|---|---|---|---|---|
| Age | 48±15.4 | | 52±13.3 | |
| Sex | F=31 (75.6%), | M=10 (24.4%) | F=22 (59.5%), | M=15 (40.5%) |
| Duration of disease | 5.8±4.5 | | | |
| Pulmonary Hypertension | 4 (9.8%) | | | |
| Interstitial Lung Disease | 17 (41.5%) | | | |
| Upper GIT | 35 (85.4%) | | | |
| Lower GIT | 7 (17.1%) | | | |
| Renal | 0 | | | |
| Skin | 41 (100%) | | | |

### Difference Between Patient and Control Mean SC and AS Values

| CPA test | Patients | | Controls | |
|---|---|---|---|---|
|  | Mean* | Range | Mean* | Range |
| SC (%) | 15.1±4.9 | 28.9-7.1 | 10.8±2.4 | 15.8-6.3 |
| AS (µm²) | 44.2±13.7 | 86.4-25.8 | 31.5±3.6 | 39.8-27.1 |

|  | Scleroderma No=41 | Controls No=37 |
|---|---|---|
| Hemoglobin | 13.0±1.4 | 14.1±1.5 |
| Platelet Count | 267,000±71,000 | 284,000±55,000 |
| Hematocrit | 40.2±4.7 | 48.2±4.1 |
| Homocysteine | 13.9±5.3 | 7.9±3.3 |

### Platelets sensitivity test results

|  | No. of Patients | Normal Levels | High Levels | Low Levels |
|---|---|---|---|---|
| ADP | 41 | 31 (75.6%) | 4 (9.8%) | 6 (14.6%) |
| Ristocetin | 36 | 33 (91.7%) | 3 (8.3%) | 0 |
| Collagen | 34 | 34 (100%) | 0 | 0 |
| Epinephrin | 38 | 30 (78.9%) | 0 | 8 (21.1%) |

## CONCLUSIONS

Most of patients suffering of scleroderma exhibit an enhanced adhesion and aggregation of platelets on PS under shear stress conditions compared to healthy controls. In the future, CPA analysis of platelets may be applied to measure hypercoagulability level in scleroderma patients, thus direct us to select the right patients that can obtain benefit from such a treatment