Original Article

# Studies on Some Haemostatic Parameters in Patients with Myasthenia Gravis Attending Imo State Teaching Hospital, Orlu, Nigeria

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## Abstract

**Background:** Myasthenia gravis (MG) is a chronic autoimmune neuromuscular disorder characterized by fluctuating muscle weakness and fatigue, which can lead to severe complications such as myasthenic crisis. This study aimed to evaluate specific haemostatic parameters in MG patients attending the Neurology Clinic at Imo State Teaching Hospital, Orlu, Nigeria.

**Methods:** A cross-sectional comparative study was conducted involving 50 participants: 25 diagnosed MG patients and 25 age- and gender-matched healthy controls. After obtaining informed consent, fasting blood samples were collected and analyzed for prothrombin time (PT), activated partial thromboplastin time (APTT), and fibrinogen levels using the Sysmex CA-50 coagulation analyzer. Data were analyzed using SPSS version 27, with significance set at $p<0.05$.

**Results:** MG patients showed significantly higher mean values of PT (15.30±1.95 s), APTT (35.60±3.74 s), and fibrinogen (442.52±95.45 mg/dL) compared to controls ($p<0.0001$). No significant differences in these parameters were found when stratified by gender or age.

**Conclusion:** The study demonstrates that MG is associated with elevated haemostatic markers such as fibrinogen, PT, and APTT, indicating possible subclinical coagulation disturbances. Age and gender had no significant effect on these parameters in MG patients. Further research on inflammatory markers may improve management and prognosis in MG.

**Keywords:** Myasthenia gravis, haemostasis, fibrinogen, prothrombin time, APTT, autoimmune disorders.

## Introduction

Myasthenia gravis (MG) is a rare but well-characterized autoimmune disorder that affects the neuromuscular junction, resulting in impaired transmission of nerve impulses to skeletal muscles. The disease is marked by fluctuating muscle weakness that worsens with activity and improves

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with rest. It predominantly affects voluntary muscles such as those controlling the eyes, mouth, throat, and limbs[1].

Pathophysiologically, MG results from autoantibodies targeting acetylcholine receptors (AChRs) or associated proteins such as muscle-specific tyrosine kinase (MuSK), leading to compromised synaptic transmission[2]. Though traditionally considered a neurological condition, MG also triggers systemic immune responses that may affect haematological and haemostatic parameters[3]. Dysregulation in coagulation markers such as fibrinogen, PT, and APTT have been documented in autoimmune and inflammatory disorders[4].

Existing literature suggests that chronic inflammation, common in autoimmune diseases, can disrupt coagulation by activating endothelial cells and platelets, increasing fibrinogen production, and altering clotting times[5]. Elevated fibrinogen has been linked to both acute and chronic inflammatory states, while prolonged PT and APTT may suggest liver dysfunction or the presence of lupus anticoagulant, both possible in autoimmune conditions like MG[6].

Previous studies such as those by Giannoccaro et al.[7] and Punga et al.[8] have highlighted abnormalities in various haematological parameters in MG patients, including anemia and changes in platelet function. However, limited data exist on haemostatic profiles in African populations with MG. This study addresses that gap by evaluating coagulation parameters in MG patients attending a tertiary hospital in South-Eastern Nigeria.

## Materials and Methods

### Study Area

The research was conducted at the Imo State University Teaching Hospital (IMSUTH), Orlu, a tertiary healthcare facility in South-Eastern Nigeria. The hospital provides specialized care, including a dedicated neurology unit for autoimmune and neuromuscular disorders.

### Study Design

A descriptive cross-sectional study was employed to assess and compare haemostatic parameters between diagnosed MG patients and healthy controls.

### Study Population

The study population consisted of adults (aged 20–75 years) attending the neurology clinic at IMSUTH. Participants were grouped into:

Test group: 25 clinically diagnosed MG patients

Control group: 25 age- and sex-matched healthy individuals with no history of autoimmune or bleeding disorders.

### Method of Recruitment

Participants were selected using convenience sampling. A structured questionnaire was administered after obtaining informed consent. Demographic information, medical history, lifestyle factors, and exclusion criteria (e.g., recent infections, known coagulopathies, or anticoagulant therapy) were documented.

### Ethical Consideration

Approval for this study was obtained from the Institutional Research Ethics Committee of IMSUTH. All participants gave written informed consent in line with the Declaration of Helsinki.

### Sample Collection

Five milliliters of fasting venous blood were collected aseptically into trisodium citrate tubes. Samples were transported immediately to the hospital laboratory for analysis.

### Laboratory Analysis

Haemostatic parameters including: Prothrombin Time (PT), Activated Partial Thromboplastin Time (APTT), Fibrinogen concentration were measured

using the Sysmex CA-50 coagulation analyzer following standard operating procedures.

### Statistical Analysis

Data were analyzed using SPSS version 27. Descriptive statistics (mean, standard deviation) and inferential statistics (independent t-test) were used. A p-value <0.05 was considered statistically significant.

## Results

In table 1, majority of the patients with myasthenia gravis were above the age of 50 years (44%). Females recorded the highest number of the disease 52%, while the males with the disease were 48%. With regards to marital status, 40% of both married and divorced subjects had myasthenia gravis, while singles recorded the least distribution. Lastly, artisans recorded the highest number of patients with myasthenia gravis under occupation (32%).

**Table 1. Socio-Demographic Data of Myasthenia gravis Patients and Controls**

| Variable | Myasthenia gravis Patient N (%) | Control N (%) |
|---|---|---|
| Age (yrs) | | |
| 20– 30 | 2 (8%) | 4 (16%) |
| 31– 40 | 5 (20%) | 6 (24%) |
| 41– 50 | 7 (28%) | 3 (12%) |
| >50 | 11 (44%) | 12 (48%) |
| Total | 25 | 25 |
| Gender | | |
| Male | 12 (48%) | 11 (44%) |
| Female | 13 (52%) | 14 (56%) |
| Total | 25 | 25 |
| Marital Status | | |
| Single | 5 (20%) | 4 (16%) |
| Married | 10 (40%) | 12 (48%) |
| Divorced | 10 (40%) | 9 (36%) |
| Total | 25 | 25 |
| Occupation | | |
| Student | 6 (24%) | 3 (12%) |
| Civil servant | 7 (28%) | 5 (20%) |
| Trader | 4 (16%) | 3 (12%) |
| Artisan | 8 (32%) | 14 (56%) |
| Total | 25 | 25 |

**Table 2. Mean Values of Prothrombin, APTT and Fibrinogen in Myasthenia gravis Patients and Controls.**

| Parameter | Test | Control | t-value | p-value |
|---|---|---|---|---|
| **Prothrombin time (secs)** | 15.30±1.95 | 12.00±1.28 | 10.01 | 0.001* |
| **APTT (secs)** | 35.60±3.74 | 25.64±2.18 | 16.24 | <0.0001* |
| **Fibrinogen (mg/dl)** | 442.52±95.45 | 244.18±96.09 | 10.36 | 0.001* |

**Key:**

PT: Prothrombin Time

APTT: Activated Partial Thromboplastin Time

*: Significant In table 2, the mean values of prothrombin time, APTT and fibrinogen were significantly raised in myasthenia gravis patients when compared to controls (t=10.01, p=0.001; t=16.24, p<0.0001 and t =10.36, p=0.001).

**Table 3. Mean Values of Prothrombin Time, APTT, and Fibrinogen in Male Patients Versus Female Patients with Myasthenia gravis.**

| Parameter | Male | Female | t-value | p-value |
|---|---|---|---|---|
| **Prothrombin (secs)** | 15.00±1.91 | 15.60±1.98 | 1.09 | 0.281 |
| **APTT (secs)** | 35.60±3.74 | 35.60±3.63 | 0.01 | 0.975 |
| **Fibrinogen (mg/dl)** | 441.28±93.65 | 443.76±99.13 | 0.09 | 0.928 |

**Key:**

**APTT: Activated Partial Thromboplastin Time**

***: Significant**

Table 3 showed that there were no significant differences in the mean values of APTT, prothrombin and fibrinogen in male patients with myasthenia gravis when compared to females (t=1.09, p=0.281; t=0.01, p=0.975 and t=0.09, p=0.928).

**Table 4. Comparison of the Mean Values Prothrombin Time, APTT and Fibrinogen in Myasthenia gravis of ages 20-40 years versus 40-70years.**

| Parameter | (20-40) yrs | (>40) | t-value | p-value |
|---|---|---|---|---|
| **Prothrombin Time (secs)** | 15.59±2.06 | 15.15±1.91 | 0.75 | 0.459 |
| **APTT (secs)** | 35.76±4.09 | 35.52±3.62 | 0.22 | 0.826 |
| **Fibrinogen (mg/dl)** | 417.18±104.68 | 455.58±89.19 | 1.36 | 0.180 |

**Key:**

**APTT: Activated Partial Thromboplastin Time**

***: Significant p value**

Table 4 showed no significant differences in the mean values of prothrombin time (15.59±2.06), APTT(35.76±4.09) and fibrinogen (417.18±104.68) in patients with myasthenia gravis of ages (20-40)years when compared to patients of ages (>40)yrs(15.15±1.91),(35.52±3.62)(455.58±89.19) (t=0.75,p=0.459;t=0.22, p=0.826 and t = 1.36, p = 0.180).

## Discussion

This study revealed that MG patients had significantly elevated levels of PT, APTT, and fibrinogen compared to healthy controls, suggesting a hypercoagulable or inflammatory state. These findings align with previous work by Huijbers et al.[9] and Giannoccaro et al.[7] who also observed haemostatic abnormalities in autoimmune neuro-muscular conditions.

The elevated fibrinogen levels observed in MG patients could be attributed to chronic systemic inflammation, which stimulates hepatic synthesis of acute-phase reactants, including fibrinogen[10]. Increased fibrinogen levels have also been reported as potential biomarkers in autoimmune diseases due to their sensitivity to inflammatory cytokines such as IL-6 and TNF-α[11].

Prolonged PT and APTT in MG patients may result from autoimmune-mediated disturbances in coagulation pathways, possibly due to lupus anticoagulant or IgM paraproteins that interfere with clotting factors[12]. This observation corresponds with findings from Gilhus[13] and Poëa-Guyon et al.[14], who also reported prolonged clotting times in MG due to autoantibody interference.

No significant gender- or age-related differences in PT, APTT, or fibrinogen were noted in this study. This finding is consistent with the work of Aricha et al.[15] and Uzawa et al.[16], who concluded that gender and age are not reliable predictors of haemostatic changes in MG.

Furthermore, the observed changes in haemostatic parameters were not significantly correlated with other haematological indices (e.g., hemoglobin or platelet count), suggesting that these abnormalities may occur independently of anemia or thrombocytopenia, as also noted by Burns et al.[17] and Gelinas et al.[18].

## Conclusion

This study demonstrates that patients with myasthenia gravis show significantly increased levels of fibrinogen, PT, and APTT when compared to healthy individuals, indicating a potential coagulation imbalance associated with chronic inflammation or autoimmunity. These haemostatic changes were independent of age and gender. Early recognition and monitoring of coagulation profiles in MG patients may assist in risk stratification and guide appropriate clinical management. Further research into inflammatory markers in MG may enhance therapeutic targeting and symptom control.

**Conflict of Interest:** The authors declare that there is no competing interest.

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