International Journal of Medical Research Professionals
P-ISSN: 2454-6356; E-ISSN: 2454-6364
DOI: 10.21276/ijmrp

IJMRP

Original Research Article.

Analysis of Coagulation Disturbances in PCOS Patients at a Tertiary Care Teaching Centre

Nilofer Poonawala[1], Atahussain Poonawala[2*]

[1]Assistant Professor, Department of Obstetrics and Gynaecology, Vedantaa Institute of Medical Sciences, Palghar, Maharashtra, India.
[2]Assistant Professor, Department of General Surgery, Vedantaa Institute of Medical Sciences, Palghar, Maharashtra, India.

ABSTRACT

Background: The polycystic ovary syndrome (PCOS) is a hyperandrogenic disorder associated with chronic oligo-anovulation and polycystic ovarian morphology. The mechanisms of potential disturbances of the hemostatic system in women with PCOS are unknown. Hence; present study was planned to evaluate the coagulation disturbances in PCOS patients.

Materials & Methods: The present study was planned to analyse various coagulation disturbances in PCOS patients. A total of 20 patients (study group) and 20 healthy controls were included in the present study. Blood samples were withdrawn from all the subjects and complete haematological profile was obtained.

Results: Mean fibrinogen profile of the subjects of the PCOS group and the control group were 3.65 and 2.61 g/l respectively. Mean value of factor VIII of the subjects of the PCOS group and the control group were 1.25 and 0.98 IU/mol respectively. Significant results were obtained while comparing the mean fibrinogen profile among the two study groups.

Conclusion: Coagulation profile shows significant alterations in patients with PCOS.

Key words: Coagulation, Hematological, Polycystic Ovary Syndrome.

***Correspondence to:**

Dr. Atahussain Poonawala,
Assistant Professor,
Department of General Surgery,
Vedantaa Institute of Medical Sciences,
Palghar, Maharashtra, India.

Article History:

Received: 20-09-2019, **Revised:** 15-10-2019, **Accepted:** 09-11-2019

Access this article online	
Website: www.ijmrp.com	Quick Response code
DOI: 10.21276/ijmrp.2019.5.6.031	

INTRODUCTION

The polycystic ovary syndrome (PCOS) is a hyperandrogenic disorder associated with chronic oligo-anovulation and polycystic ovarian morphology.[1-3] It is often associated with psychological impairments, including depression and other mood disorders and metabolic derangements, chiefly insulin resistance and compensatory hyperinsulinemia, which is recognized as a major factor responsible for altered androgen production and metabolism.[4,5] Most women with PCOS are also overweight or obese, further enhancing androgen secretion while impairing metabolism and reproductive functions and possibly favoring the development of the PCOS phenotype.[6]

Genetic and environmental contributors to hormonal disturbances combine with other factors, including obesity, ovarian dysfunction and hypothalamic pituitary abnormalities to contribute to the aetiology of PCOS.[7] The mechanisms of potential disturbances of the hemostatic system in women with PCOS are unknown. Hence; present study was planned to evaluate the coagulation disturbances in PCOS patients.

MATERIALS & METHODS

The present study was planned in Department of Obstetrics and Gynaecology and Department of General Surgery, Vedantaa Institute of Medical Sciences, Palghar, Maharashtra, India. The study was undertaken to analyse various coagulation disturbances in PCOS patients.

A total of 20 patients (study group) and 20 healthy controls were included in the present study. Written consent from all the subjects after explaining them the detailed research protocol was obtained.

Only those patients in the study group who were diagnosed with suffering from PCOS patients were included. Blood samples were withdrawn from all the subjects and complete haematological profile was obtained. ELISA technique was used for measurement of plasma fibrin D-Dimer.

All the results were recorded and analyzed by SPSS software. Univariate regression curve was used for evaluation of level of significance.

Table 1: Comparison of metabolic details of the subjects

Parameter	PCOS	Control	P- value
Insulin (mU/Liter)	11.9	6.1	0.01*
Glucose (mmol/liter)	4.5	4.1	0.52

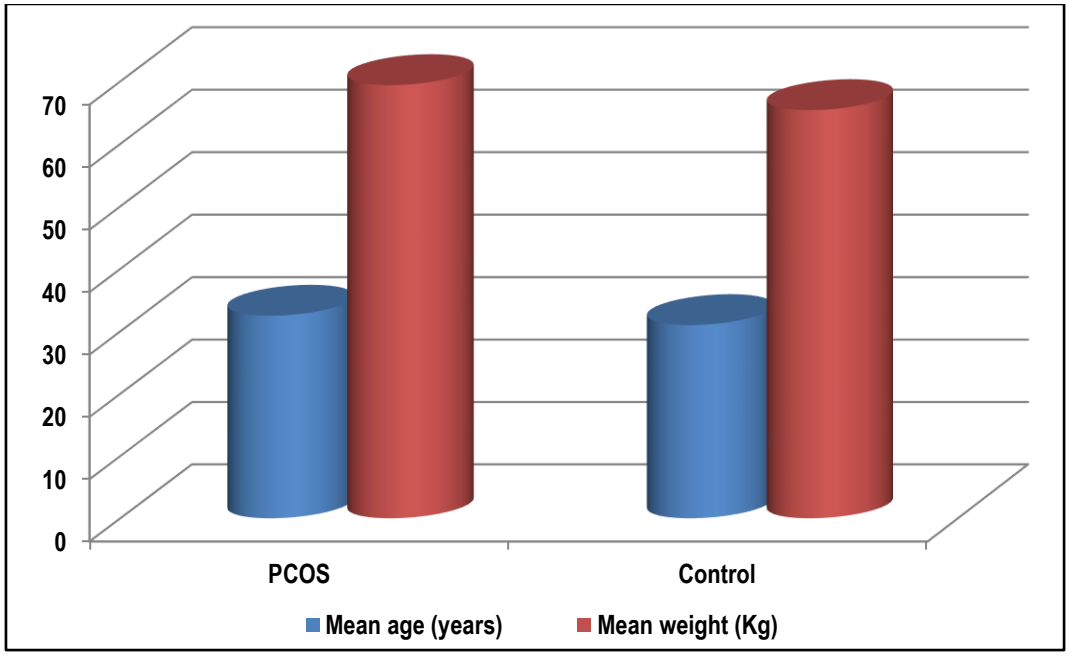
*: Significant

Table 2: Comparison of coagulation variables of patients

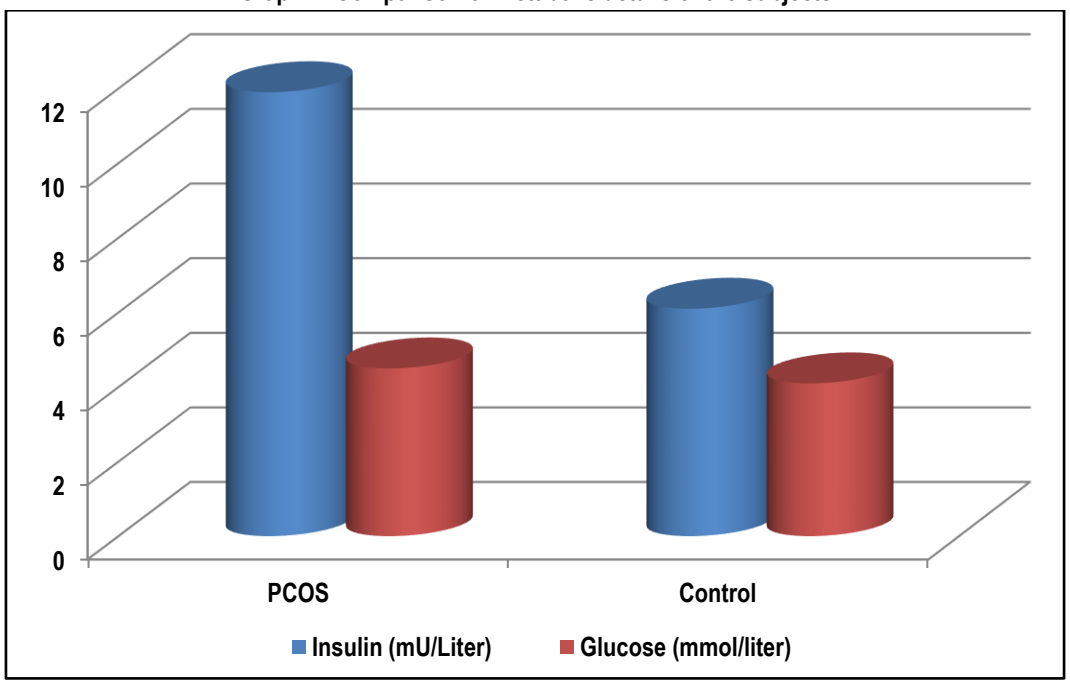
Parameter	PCOS	Control	P- value
Fibrinogen (g/l)	3.65	2.61	0.00*
Factor VIII (IU/mol)	1.25	0.98	0.58
D-Dimer (mg/l)	0.18	0.22	0.71

*: Significant

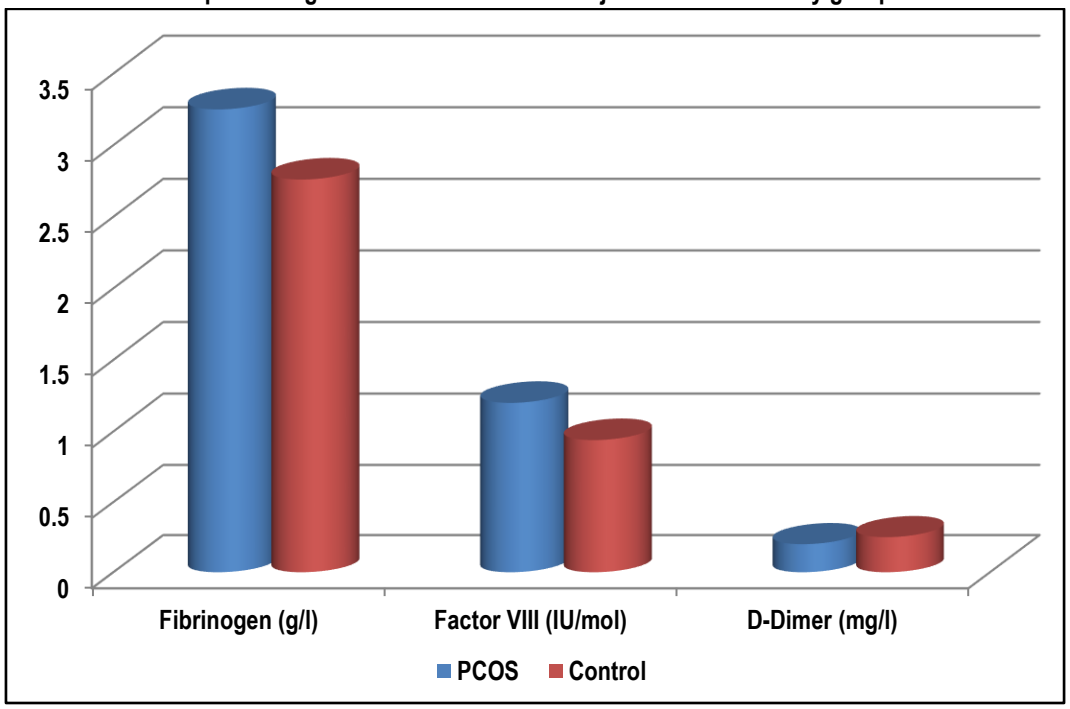
Graph 1: Demographic and clinical details of the patients



Graph 2: Comparison of metabolic details of the subjects



Graph 3: Coagulation variables of the subjects of the two study groups



RESULTS

A total of 40 subjects were included in the present study. Among these 40 subjects, 20 were with PCOS, while the remaining 20 were healthy controls. Mean age of the subjects of the PCOS group and the control group was 32.5 and 31 years respectively. Mean weight of the subjects of the PCOS and control group was 69.4 and 65.4 Kg respectively. Mean fibrinogen profile of the subjects of the PCOS group and the control group were 3.65 and 2.61 g/l respectively. Mean value of factor VIII of the subjects of the PCOS group and the control group were 1.25 and 0.98 IU/mol respectively. Significant results were obtained while comparing the mean fibrinogen profile among the subjects of the two study groups.

DISCUSSION

In the present study, mean fibrinogen profile of the subjects of the PCOS group and the control group were 3.65 and 2.61 g/l respectively. Mean value of factor VIII of the subjects of the PCOS group and the control group were 1.25 and 0.98 IU/mol respectively. Significant results were obtained while comparing the mean fibrinogen profile among the subjects of the two study groups. Biochemical evaluations should look for supporting evidence of PCOS (hyperandrogenism and IR) and rule out the other disorders. It should be noted that direct testing for insulin resistance (IR) is fraught with difficulties and there are many methods in use. Only the simplest, fasting glucose-to-insulin ratio is mentioned for simplicity. It should be noted that the use of the fasting glucose-to-insulin ratio to measure IR has been studied primarily in obese and lean euglycemic, non-Hispanic white adult women and in obese and lean euglycemic, Hispanic adolescents. It is likely not a valid marker in patients with impaired fasting glucose or impaired glucose tolerance, and assessing for IR in patients who are not euglycemic is likely a moot point. Lastly, a 2-hour oral glucose tolerance test may be a better predictor of IR than fasting glucose, and it is extremely useful in categorizing patients' risk of type 2 diabetes mellitus, which may affect therapeutic decisions.[8-11]

Mannerås-Holm L et al investigated whether women with PCOS have disturbed circulating levels of fibrinolysis/coagulation markers and, if so, whether the disturbances are related to hemodynamics, metabolic variables, sex steroids, SHBG, lipids, and inflammatory variables in women with PCOS. Anthropometric variables, hemodynamics, circulating hemostatic and inflammatory markers, and serum lipid profile were measured in women with untreated PCOS (n = 74) and controls (n = 31). After adjustments for age and body mass index (BMI), circulating plasminogen activator inhibitor 1 (PAI-1) activity and fibrinogen levels were higher in women with PCOS than controls; lipid profile, blood pressure, and levels of D-dimer, von Willebrand factor, factor VIII, tissue plasminogen activator, and inflammatory markers were comparable in the two groups. In multiple linear regression analyses including women with PCOS, low SHBG and high insulin predicted high PAI-1 activity ($R2 = 0.526$; $P < 0.001$); elevated high-sensitivity C-reactive protein and soluble E-selectin in combination with heart rate predicted high fibrinogen ($R2 = 0.333$; $P < 0.001$). Differences in PAI-1 activity were not significant after adjustments for age, BMI, SHBG, and insulin. PCOS is characterized by a prothrombotic state, as reflected by increased PAI-1 activity and fibrinogen, without signs of dyslipidemia or a proinflammatory state.[12] Oral B et al investigated the plasma levels of thrombin-activatable fibrinolysis inhibitor (TAFI) in women with polycystic ovary syndrome (PCOS) and its correlation with various metabolic, hormonal and hemostatic parameters. Forty-eight women with PCOS and 43 age- and BMI-matched ovulatory controls were recruited during a 20-month study period. Blood samples were drawn for all tests, which included plasma lipids and lipoproteins, reproductive hormones, glucose, insulin, TAFI antigen concentration, plasminogen activator inhibitor-1 (PAI-1) activity, fibrinogen concentration, thrombomodulin, thrombin-

antithrombin (TAT) complexes, D-dimer, Protein C Antigen, Protein S Antigen, Antithrombin III (AT III) and activated protein C (APC) resistance. Plasma TAFI levels of PCOS patients were found to be significantly higher than in healthy controls. Plasma levels of D-dimer, AT III, PAI-1 and thrombomodulin were also significantly higher in women with PCOS compared with healthy controls. All the other hemostatic parameters (including TAT complexes; Protein C; APC; and Protein S) were comparable between the two study groups. This study showed that plasma levels of TAFI, PAI-1, D-dimer, AT III and thrombomodulin were significantly increased in women with PCOS compared with age- and BMI-matched controls.[1]

CONCLUSION

Under the light of above results, the authors conclude that coagulation profile shows significant alterations in patients with PCOS.

REFERENCES

1. Oral B, Mermi B, Dilek M, Alanoğlu G, Sütçü R. Thrombin activatable fibrinolysis inhibitor and other hemostatic parameters in patients with polycystic ovary syndrome. Gynecol Endocrinol. 2009 Feb;25(2):110-6.

2. Moran LJ, Hutchison SK, Meyer C, Zoungas S, Teede HJ. A comprehensive assessment of endothelial function in overweight women with and without polycystic ovary syndrome. Clin Sci (Lond) 2009; 116:761–70.

3. Tarkun I, Cantu¨ rk Z, Arslan BC, Tu¨ remen E, Tarkun P. The plasminogen activator system in young and lean women with polycystic ovary syndrome. Endocr J 2004; 51:467–72.

4. Mannerås-Holm L, Baghaei F, Holm G, Janson PO, Ohlsson C, Lönn M, Stener-Victorin E. Coagulation and fibrinolytic disturbances in women with polycystic ovary syndrome. J Clin Endocrinol Metab. 2011 Apr;96(4):1068-76. doi: 10.1210/jc.2010-2279. Epub 2011 Jan 20.

5. Stener-Victorin E, Baghaei F, Holm G, Janson PO, Olivecrona G, Lönn M, Mannerås-Holm L. Effects of acupuncture and exercise on insulin sensitivity, adipose tissue characteristics, and markers of coagulation and fibrinolysis in women with polycystic ovary syndrome: secondary analyses of a randomized controlled trial. Fertil Steril. 2012 Feb;97(2):501-8.

6. Balen A. Surgical treatment of polycystic ovary sundrome. Best Practice Research Clinical Endocrinology Metabolism. 2006;20:271–80.

7. Johnstone EB, Rosen MP, Neril R, et al. The Polycystic Ovary Post-Rotterdam: A Common, Age-Dependent Finding in Ovulatory Women without Metabolic Significance. Journal of Clinical Endocrinology & Metabolism. 2010;95(11):4965–72.

8. Dahlgren E, Johansson S, Lindstedt G, Knutsson F, Oden A, Janson PO, Mattson LA, Crona N, Lundberg PA. Women with polycystic ovary syndrome wedge resected in 1956 to 1965: a long-term follow-up focusing on natural history and circulating hormones. Fertil Steril. 1992;57:505–13.

9. Holte J, Gennarelli G, Berne C, Bergh T, Lithell H. Elevated ambulatory day-time blood pressure in women with polycystic ovary syndrome: a sign of a pre-hypertensive state? Hum Reprod. 1996; 11:23–8.

10. Elting MW, Korsen TJ, Bezemer PD, Schoemaker J. Prevalence of diabetes mellitus, hypertension and cardiac complaints in a follow-up study of a Dutch PCOS population. Hum Reprod. 2001;16:556–60.

11. Raynaud E, Pérez-Martin A, Brun J, Aïssa-Benhaddad A, Fédou C, Mercier J. Relationships between fibrinogen and insulin resistance. Atherosclerosis 2000; 150:365–70.

12. Mannerås-Holm L et al. Coagulation and Fibrinolytic Disturbances in Women with Polycystic Ovary Syndrome. The Journal of Clinical Endocrinology & Metabolism, April 2011; 96(4): 1068–76.

Source of Support: Nil. **Conflict of Interest:** None Declared.

Cite this article as: Nilofer Poonawala, Atahussain Poonawala. Analysis of Coagulation Disturbances in PCOS Patients at a Tertiary Care Teaching Centre. Int J Med Res Prof. 2019 Nov; 5(6):133-36. DOI:10.21276/ijmrp.2019.5.6.031