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Research Article

**A study on Complement C3 and C4 herd plots
and Hypercomplementemia among multigravida
woman using contraceptives**

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ABSTRACT

The multi-gravida woman herd C3 and C4 levels were found to be of three basic levels; low, moderate and high. These levels simulate the responder levels of the adaptive herd immune response. The C3 herd plot was of skewed type. While, C4 herd plot was of Gaussian distribution type. The controls in both of the cases were not showing such distribution curves. Gravida level have shown to affect C3 and C4 concentration means both for those using and non-using contraceptives. Though those whom using it, their gravid level of three up to five births lead to increment both in the C3 and C4 concentration means. At the same gravid level and among the different contraceptive modality groups have shown to express different effects on C3 and C4 levels. Hypercomplementemia cases were noted among multi-gravida woman with or without miscarriage. A case of combined hyper-complementemia of up to 229.4 and 59.8 mg/dl. for C3 and C4 respectively.

Key words : Multigravida, C3 , C4, hypercomplementemia and contraceptives.

INTRODUCTION

Complement system is one of the immune surveillance system that are composed within the whole assembly of the immune system⁽¹⁾. This complement system has an in common functions between the natural (innate) and adaptive (Acquired) immunity and served as a part of the immune recognition molecules⁽²⁾. It composes of three pathways, the classical, the alternative and the lectin⁽³⁾ and performed their functions both in blood plasma as well as cell surfaces. Each of these pathways passed through stepwise phases of activation as initiation, amplification and membrane attack⁽⁴⁾. The complement system in its structural sense is composed of 20-25 components or fractions, among which C3 and C4 are being of more clinical relevance⁽⁵⁾. In the present work C3 and C4 were quantified in prima and multigravida woman sera having tablet, injection and intrauterine device contraceptive modules, to plot C3 and C4 herd plots

as well as reporting rare cases of hypercomplementemia.

MATERIALS AND METHODS

The studied groups were: Oral contraceptive pills group (10 patients), progesterone depot injection group (10 patients) and intra-uterine contraceptive device IUCD (10 patients) and controls (10 subjects for virgin control and 10 subjects for multigravida control groups). Among which patients and normal control subjects were clinically checked by gynecologist and the history of each, includes; Age, body weight, length in cms, number of births, numbers of miscarriage, duration of therapy, as well as work status (the occupation) of the patients. Samplings were taken and registered by the gynecologist in the team. Test and control groups were enrolled in blood collection procedure to have five mls per each. Sera were saved at -18C till test.

Five micro-liters of each sera was loaded in an anti-C3 and C4, readymade partigens⁽⁶⁾ single radial immunodiffusion plates. Concentrations in mg/dl were decided as per the manufacturer leaflet incorporated with the kit. The precipitation zones were measured to the nearest millimeter. Hypercomplementemia was determined as several folds more increase than control values⁽⁷⁾.

RESULTS

1. Herd Complement:

Three main concentration mean levels were matched among the study groups. These were; Low, moderate and high which correspond to low, moderate and high responders in the herd adaptive responses Table 1.

2. Complement C3 and C4 herd plots ;

The C3 herd plot was shown to be of skewed distribution curve type Figure 1. While, the C4 herd plot was shown to be of normal Gaussian distribution curve type Figure 2. Such distribution curve were not evident among controls.

3. Gravida Woman;

Prima gravid were noted only among those women whom subjected to an intrauterine device and among the control multi-gravida woman. Di gravid were noted as 2,2,5, and 5 among tablet, injection, IUD and control. Multi-gravida dominance seen as 10,10,6,4 for tablet, injection, IUD and control woman respectively Table 2

4. Gravida level and Complement;

C3 concentration mean levels were 195.8, 152.0, 139.67mg/dls, for prima, di, and multi-gravida respectively. It is of decreasing trend as passing from prima to multi-gravida and the controls. Mean concentration values of C3 for the contraceptive using woman was not affected but C4 concentration means were increased. Injection modality, however have shown to increase C3 concentration means as we passed from prima to multi-gravida as 99.55 to 160.33 mg/dl while C4 was of decreasing fashion. In comparison, intrauterine device cause decrease of C3 and increase of C4 as we pass from prima to multi-gravida. The global mean of all modalities has shown that C3 increase and stable C4. Virgin control C3 and C4 levels approximate that of pill taking woman Table 3. Combined C3 and C4 hypercomplementemia was noted in one case taking contraceptive pills, Table 4.

DISCUSSION

Complement components are synthesized and secreted enterocyte, hepatocyte and macrophage⁸. The outcomes of the net protein export from these complement producing cells is mainly affected by the local micro-environmental needs which conveyed

through the cellular signaling peptide⁹. Such signals are mostly encoded by a gene or gene cluster that is linked to class III MHC genes⁽¹⁰⁾. The hormonal balance in virgin control, prima and multigravida controls as well as multigravida woman taking various modalities of contraceptives in each of which accordingly. Any change in hormonal stats of these test groups, may be influenced by the action contraceptives may affect the complement producing cell turnover rates towards increase or decrease in complement concentrations⁽¹¹⁾. In comparison at the molecular sense it may affect splicing or alternative splicing of the complement coding genes and/or gene duplication processes⁽¹²⁾. Thus, the harmony of hormone-gene-immune interactions may give a clue to the notable changes in the levels of C3 and C4 concentrations as related to gravid levels as well as the effect of contraceptive modalities for the same immune-physiologic states for the test and control groups⁽¹³⁾.

Herd plots for C3 and C4 complement components simulate the herd responder levels of an adaptive immune herd state. Though the plot shapes were somewhat different^(14,15).

Gravidation alone do affects the C3 and C4 mean levels, while gravidation plus contraceptives also have similar qualitative but different quantitative effects on C3 and C4 levels. C3 immuno-physiologic behavior among multigravida apparently in isolation from that of C4 behavior since they have different roles in the complement cascade pathways^(16,17,18).

Hypercomplementemia is actually rare condition, it has been documented in association with gingivitis⁽⁷⁾ and periodontitis⁽¹⁹⁾. In the present work, however, it is being reported in multigravida woman using various modalities of contraceptive therapies.

The relation of pregnancy to C3 and C4 levels has been documented^(20,21). Parallel to that study, in this communication C3 and C4 are being suggested to interplay an important role in multi-gravida woman using contraceptive therapy⁽²²⁾.

Being a component of immune cross-road theme, C3 and C4 might be hold as indicator for herd immune response in the sense of immune cross-road function. Though there was no apparent indicator of an immune herd responses, but the three level pattern they displayed clearly Suggestive for this theme⁽²⁾.

CONCLUSIONS

There are three herd complement levels as low, moderate and high. Skewed plot for C3 and Gaussian distribution plot for C4 were evident. Gravida levels and birth numbers for a woman do affect C3 and C4 levels. Likewise, Gravida level and contraceptive therapy modulates C3 and C4 concentrations. Hyper-

complementemia were being reported among multi-gravida woman using contraceptives.

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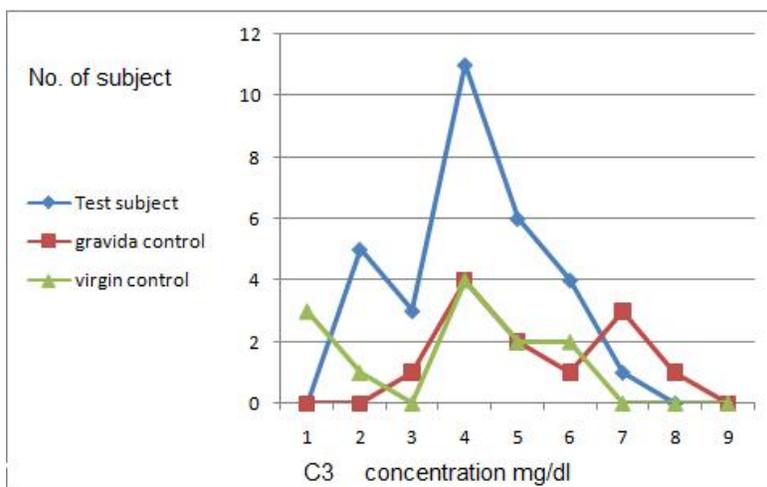


Figure 1
C3 herd plot of multigravida women using contraceptive.

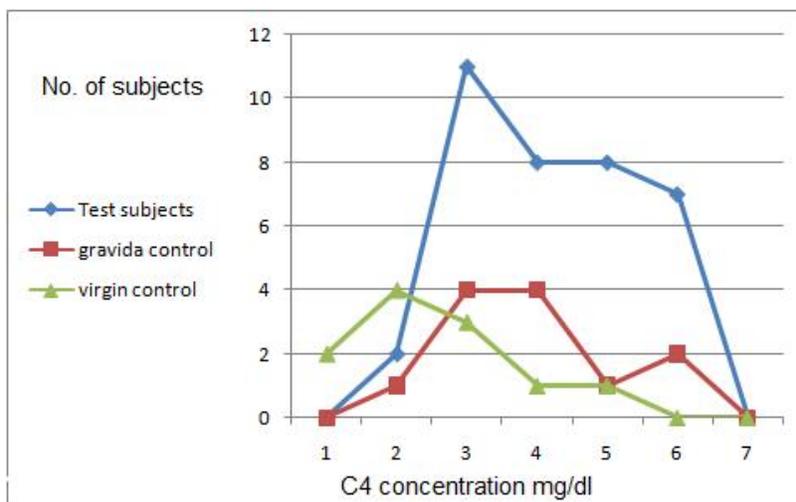


Figure 2
C4 herd plot of multigravida women using contraceptives.

Table 1
Herd mean concentration levels of complement fractions C3 and C4 in mg/dl.

Complement fraction	Low	Moderate	High
C3	60-99	100-159	160 -219
C4	5- 19	20 -39	40 – 59

Table 2
Gravida levels among women study groups

Modality	Monogravida	Digravida	Multigravida
Pill contraceptive	-	2	10
Injection contraceptive	-	2	10
Intra-uterine contraceptive	1	5	6
Multigravida control	3	5	4
Virgin control	-	-	-

Table 3
The complement C3 and C4 concentration levels mg/dl. among various gravid levels among contraceptive taking women and controls

Modality of contraceptive	Monogravida	Digravida	Multigravida
Pills, C3	-	139.7	139.9
C4	-	39.05	45.64
Injection, C3	-	99.55	160.53
C4	-	37.35	32.4
Intrauterine, C3	135.4	136.24	113.85
C4	25.9	31.2	30.4
All modalities, C3	-	125.16	138.9
C4	-	36.13	36.43
Multigravida control			
C3	195.8	152.0	139.67
C4	41.1	23.4	51.21
Virgin control, C3	-	138.3	-
C4	-	20.56	-

Table 4
Hypercomplementemia cases (Cnocentrations in mg/ dl.) among multigravida women taking contraceptive and controlc

Modality	Number of cases	Hypercomplementemia C3	Hypercomplementemia C4
Pills	1	229.4	59.8
	1	-	59.8
	1	-	58.2
Injection	3	192.3	-
Multigravida control	1	202.7	-
	2	192.4	-
Virgin control		-	-

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