

Modified Moghissi Cervical Mucus (Cm) Score and Body Mass Index (BMI) in Spontaneous and Clomiphene Citrate Ovulation Induction Program.



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Abstract

A comparative study was performed to determine the effect of clomiphene citrate (CC) on cervical mucus (CM) sampled in the preovulatory period in ovulatory cycle patients (control) and CC treated patients, moreover the correlation between CM score and body mass index (BMI) was studied in these two groups. One hundred-three infertile women were evaluated in outpatient clinic attending Institute for Embryo Research and Infertility/University of Al-Nahrain/Baghdad from February to August 2005, these patients were divided into two groups, the first group (number= 45) was ovulatory (control) group, this group took no treatment and the second group(number= 58)was CC-treated group, they were given dose of CC 100 mg/day orally for 5 days starting from cycle day 2 .Follicular growth was monitored in both groups starting from cycle day 10 using transvaginal ultrasound when the dominant follicle size was 16–20 mm, the CC score was done to all patient. Body mass index (kg/m^2) was measured for the all patients and its effect on CM score was evaluated. There was highly significant reduction in volume, consistency, spinnbarkeit, cellularity, and total CM score in treated CC cycles compared to control cycle, whereas there was no statistically significant difference in regard to ferning test between two groups. The PH of CM of patients in the CC treated cycle increased but not to a significant level as compared to control cycle. This study also demonstrate a negative linear correlation with CM and BMI in controls cycle, whereas there is no correlation in CC treated cycle .It was concluded from these results that, CC cause a marked reduction in the quality and quantity of cervical mucus

Key Words: Cervical mucus score, clomiphene citrate, body mass index.

Introduction

Cervical mucus (CM) is a complex secretion produced by the glands of the endocervix, its pH is usually alkaline, several physical characteristic of CM can be evaluated by the clinician one of these characteristics is the CM score [1], moreover CM production is an indicator of systemic circulating estradiol (E2) concentration and is one parameter which has been utilized to monitor ovulation induction [2]. This parameter has also been observed during stimulation of multiple follicular developments in intrauterine insemination (IUI) and in programs of in vitro fertilization (IVF) and has been

certified to be a key indicator (in addition to E2 concentration) in the determination of the most beneficial time for human chorionic gonadotropin (hCG) administration [3].

Clomiphene citrate (CC) is a non-steroidal compound with antiestrogenic properties, it has been successfully used for induction of ovulation in group II of WHO classification (an ovulation and unexplained infertility) [4].

It is a safe non-invasive and non-expensive medication. It is administered during the follicular phase of the menstrual cycle, it acts by increasing gonadotropin release from the pituitary, leading to enhanced follicular recruitment and growth [5], however, it has been

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established that pregnancy rates (PRs) for women who take CC are less than expected based on ovulation rates. The causes of this discrepancy between the PRs and the ovulation rates have been explained by the anti-estrogenic effect of CC on estrogen-dependent tissues such as cervical gland and the endometrium [6]. Despite these adverse effects, CC therapy is so widely administered in addition to human menopausal gonadotropin (hMG) to normally ovulatory women with expectation of inducing multiple ovulation and increasing the chances of conception relative to a spontaneous cycle [7,8].

Studying the effect of body weight on human health is a world wide trend nowadays. Overweight is associated with increased incidence of menstrual abnormalities, hormonal changes infertility, and increased androgenic activity [9]. Frequency of obesity in women with anovulation and polycystic ovary syndrome (PCO) has been reported as 35-60%, moreover the first line approach for treatment was weight loss and regular physical activity [10].

The aim of the study was twofold. First, to determine the effect of CC on CM sampled in the preovulatory period. Second, to study the correlation between CM score and body mass index (BMI).

Materials and methods

One hundred-three patients were recruited from the patients attending the infertility clinic of the Institute of Embryo Research and Infertility Treatment, University of Al-Nahrain / Baghdad from February to August 2005, these patients were divided into two groups spontaneous (control) group (number = 45) and CC-induced cycles (number = 58). They fulfilled the following criteria: regular menstrual cycle 26 to 30 days, absence of

congenital anomalies of the reproductive system, patent fallopian tubes, normal base line reproductive hormonal level, and normal seminal analysis. Subjects with a history of cervical surgery (cone biopsy), or treatment for cervical dysplasia (conoutry or cryotherapy) were excluded from this study.

All patients underwent a CM score test, which is currently the World Health Organization [11] reference test, in the laboratory of the institute as part of an infertility evaluation tests, CC was administered orally for CC-induced group in a dose of 100 mg / day from cycle day 2 to cycle day 5 (CC: Ovamit ; Remedica Ltd , Limassol-Cyprus, Europe). CM score was timed by measurement of estradiol (E2) and monitoring the follicles by ultrasound. Estradiol concentration should be 300 pg/ml per follicle in preovulatory time. Baseline transvaginal sonography was performed on cycle day 3 and again on cycle day 10 to 12 to evaluate ovarian follicular response, when the diameter of follicle 16-20 mm and the E2 300 pg/ml.

CM was immediately evaluated using the modified Moghissi CM score in accordance with the World Health Organization [12] according to this method a score of 0 to 3 was assigned for the presence of mucus quantity, consistency, spinnbarkeit, ferning, and cellularity .The maximum score is 15 .Score greater than 10 is usually indicative of good CM, score less than 10 represent unfavorable CM and score less than 5 represent hostile. Body mass index (BMI) is the weight divided by the square of the patient height (Kg/m^2) .Paired t-test at level of significance equal to 0.05 and 95% confidence interval , was used for comparison of significant differences between spontaneous and induced cycle groups regarding all parameters of CM scores. The correlation between BMI and

total CM scores, for both groups, was assessed by using Pearson linear correlation coefficient.

Results

One hundred-three patients were recruited in this study; their age ranged from 24 to 39 years with a mean \pm SEM age of 32.111 ± 0.744 . There was no significant difference between the two groups in regard to age, duration of infertility, percentage of type of infertility, and body mass index (BMI) (Table 1). Table 2 shows results of sample of CM in the preovulatory period in both groups, it is obvious from this table that there is reduction in volume, consistency, spinnbarkeit, cellularity, and total CM score of CC-induced group compared with spontaneous cycle group, whereas there is no significant difference in regard to ferning between two groups. The pH of CM is increased (more alkaline) in CC cycle compared with spontaneous cycle group. Body mass index (BMI) was measured in both groups. Results indicated a significant linear negative correlation between BMI and total CM score in spontaneous cycle group (Figure 1), while in the CC cycle group, the correlation was also negative but it was non significant (Figure 2).

Discussion

It was found from this study a highly significant reduction in all CM parameters in CC cycles, this finding is in agreement with the study done by [13]. The adverse effect of CC on CM reported may be postulated to fact that estrogenic hormonal modification of vascular permeability [14]. Also blockade of E2 receptor in the stroma and epithelium of the cervix could result in a decreased

hydration of CM, thus producing the significant increase in viscosity and reduction in spinnbarkeit in CC cycles [15]. Further possible explanation for the reduction of the CM score in CC induced cycle, is the preovulatory elevation of progesterone in CC cycle as suggested by [16]. This explanation disagree with results of [17,18] since they demonstrated a marked decline in CM score after ovulation in association with rapidly increasing progesterone and falling E2 in spontaneous cycle and therefore the moderate elevation of progesterone wouldn't explain the highly significant reduction in CM score.

There is a negative linear correlation between BMI and CM score in spontaneous cycle group, this type of relation may be related to the fact that overweight female show lower sex hormone binding globulin activity and higher free testosterone level, these metabolic changes may predispose those females to develop a hyperandrogenic state [19,20]. Reported that, there is an excessive production of dehydroepiandrosterone sulfate in overweight female, thus elevated level of androstenedione and testosterone may be behind the reduction of CM score with increasing BMI in spontaneous cycle. In CC cycle, the negative correlation between CM score and BMI was not significant and this may be related to the adverse effect of CC that significantly reduce the total CM score, so it will superimpose the effect BMI.

Conclusion

It was concluded from these results that, CC cause a marked reduction in the quality and quantity of cervical mucus.

Table (1): Clinical characteristics of spontaneous and clomiphene citrate induced groups.

Parameter	CC cycle group (N=45)	Spontaneous cycle group(N=58)
Number	45	58
Age(years)	32.111±0.745	31.67±0.65
Duration of infertility(years)	4.59±0.464	5.512±0.612
Primary infertility	34(75.55)%	41(70.69)%
Secondary infertility	11(24.44)%	17(29.31)%
Body mass index	28.43±0.37	30.1±0.76

-Values are mean ± SEM

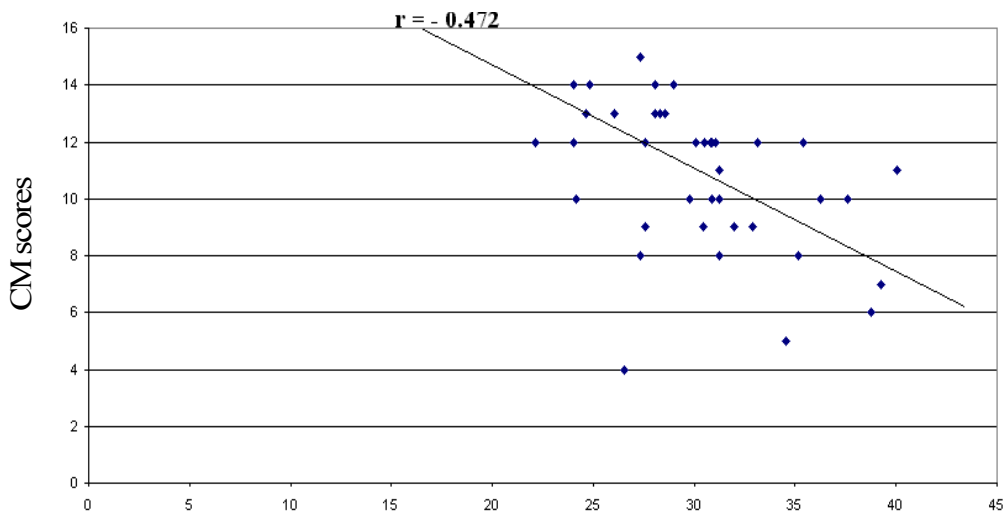
-No significant difference for all the above values

Table (2): Data of, cervical mucus score and pH, of patients in spontaneous and induced cycles.

Parameter	Spontaneous cycle M ± SEM	Induced cycle M ± SEM	P-Value
Volume	2.177 ± 0.115	1.488 ± 0.108	0.001 *
Consistency	1.911 ± 0.104	1.4 ± 0.111	0.004 **
Spinnbarkeit	2.177 ± 0.124	1.488 ± 0.129	0.001 **
Cellularity	2.244 ± 0.101	1.844 ± 0.138	0.02 **
Ferning	2.222 ± 0.145	2.155 ± 0.131	0.7
Total	10.8 ± 0.379	8.355 ± 0.401	0.001 *
pH	6.766 ± 0.132	6.877 ± 0.184	0.6

** p < 0.001 (highly significant)

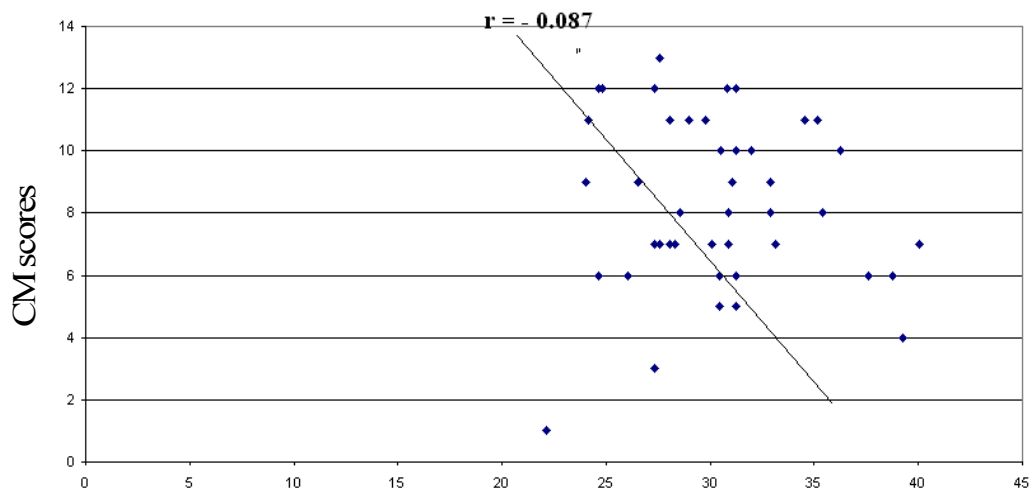
* p < 0.05 (significant)



Body mass index (BMI)

Significant negative correlation between BMI and total CM score ($P < 0.05$, $r = -0.473$).

Figure (1): Person correlation between BMI and total scores of the spontaneous cycle group.



Body mass index (BMI)

Non significant correlation ($P > 0.05$, $r = -0.087$) between BMI and total CM scores of the induced cycle.

Figure (2): Person correlation between BMI and total CM scores of the CC-induced cycle group.

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پێوهری موغناقیسی بە بەر دەوامی بۆ پێوانی ئەو جوۆره تیکه لاو وه (تیکه لاوه لینیجیهی که دهرده چیته ناو ره حمی ئافرهته وه له به روشك نه بوونه وهی دیواره کانی هیلکه دان) که له قولایی هیلکه دانایه وه پێوریت وهک پارچه یهک له لهش له خوێی سه به خوێی کۆ نه ندای زاوزی وه خولی به به کارهینانی حه بی (الکلومید) بۆ یاده دانی خولی مانگانه .

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پوخته

بۆچونی باسه که نه مه بووه گهران به دواي کارتیکردنی حبی (الکلومید) بۆ سه ره نهو تیکه لاوه لینیجیهی ناو قولایی مندا لاند (CM) که وه رگراوه له پیش دابه زینی هیلکه ده (preovulatory period) به به کارهینانی حبی کلومید، له گه ل نه وشدا لیکۆئینه وهی زانستی بۆ گۆراوه ته وه له په یوه نی نیوان تاقیکردنه وهی لینیجای ناو ره حم (Cervical Mucus Score) نهو پێوانه ی نهو پارچه ی له شه (BMI) له دوو جاره خولی سه بوخوی زاوزینی، وه چاره سه رکردن به امبولی کلومید. له لیکۆئینه وه یهک که سه دووسی ژنی گرتنه وه، وه نه خوشه کان کران به دوو به شه وه کۆمه له ی یه که م نه وانه بوون که خویان خولی مانگانه دابوون، وه کۆمه له ی دووه نه وانه بون که به حبی کلومید یان وه رده گرت، هه رده و کۆمه ل خرا نه ژیر چاودیری وه سوری زاوزی سه ربه خووه (به بی دهرمان وه رگرتن). وه کۆمه له ی دووه م به وه رگرتنی حبی کلومید 100 ملغم له دواي رۆژی دووه می خوله که وه، وه نا رۆژی پینجه می، وه ده ستکرا به چاودیری کردنی شوینی گه شه ی چاندنی هیلکه که له رۆژی ده یه مه وه هه رواها به به کارهینانی (نامیری سه روو ده نگه کان)، کاتی که قه باره ی تۆوه که له هیلکه داندا له (16-20 ملم) نه و کاته ده ستکرا به تاقی کردنه وهی تیکه لاوه که که له قولایی هیلکدان وه هه ره وه ها ژمار کردنی پێوانه ی پاچه که ی ناو هیلکه دانه که (کغم / 2م) بۆژنه کان وه کار یگه ری تیکه لاوه که ناو هیلکه دان. ده رکه وت که نه نجامی لیکۆئنه وه کان به نزمبوونه وه یه کی زۆر کار یگه ر ($P < 0.001$) له کۆمه لک خاندنا له تیکه لاو بوون و قه باره ی تیکه لاوه که. هه ره وه ها ده رکه وت نزمبوونه وه یه کی به توانا ($P < 0.05$). له ژنه که دا ماده تیکه لاوه که وه توانای ماده ی تیکه لاوه که بیتوانایی تیا هه ستییده کریت وه شوازی خانه که شی له ناو تیکه لاوه که دا. له هه مان کاتا توانای ماده تیکه لاوه که منه بوته وه له سه ر ماده کر یستالیه که که به توانایه یه له کۆمه لک چاره سه رکردن و به راوردنا به کۆمه لیک خولی سه ربه خوێی زاوزی. هه ره وه ها نهو پێوانه یه ی کار که ی تر شه لۆکی (pH) له کۆمه لی چاره سه رکردن که به زۆری، به لام نه م زۆریه به توانایه، له گه ل نه وه شدا نهو په یوه ندییه سه ر ژمیرییه له نیوان پێوانه ی دوو پارچه جسمه که دا و تاقیکردنه وهی تیکه لاوه که له و کاته دا له قولایی هیلکه دان هیلکی سارده (نیگه تیف) له ناو کۆمه له ی خولی مانگانه له کۆنه ندای زاوزی نه مه له کاتی که دا که نه م په یوه ندییه به م شیوه یه نابینریت له ناو کۆمه له ی چاره سه ردا به حبی کلومید. له نه نجامدا نهو راستیه دیه به ره هم که (کلومید هۆکاره نزم بوته وهی دیار له چه ندییتی وچونیه تی نهو ماده تیکه له له ناو قولایی هیلکه داندا) .

مقياس موغونزي المعدل لقياس المادة المخاطية لعنق الرحم و معيار كتلة الجسم في الدورات التلقائية التناسلية و الدورات المحفزة باستخدام عقار الكلوميدي المستخدم لنتشيط الدورة الشهرية .

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الخلاصة

كان هدف الدراسة هو التحري عن تأثير عقار الكلوميدي على المادة المخاطية لعنق الرحم (CM) و الماخوذة في فترة ما قبل الإباضة (preovulatory period) , باستخدام عقار الكلوميدي , بالإضافة إلى دراسة العلاقة المتبادلة بين اختبار المادة المخاطية لعنق الرحم (cervical mucus score) و حساب معيار كتلة الجسم (BMI) في مجموعتي الدورات التناسلية التلقائية و مجموعة العلاج بعقار الكلوميدي. شملت الدراسة مائة وثلاثة امرأة, قسم المريضات إلى مجموعتين, المجموعة الأولى كانت مجموعة الدورات التناسلية التلقائية و المجموعة الأخرى كانت مجموعة العلاج بعقار الكلوميدي, تمت متابعة المريضات في مجموعة الدورات التناسلية التلقائية (بدون علاج) و مجموعة العلاج باستخدام عقار الكلوميدي و بجرعة 100 ملغم ابتداء من ثاني يوم في الدورة و لغاية اليوم الخامس منها. كما تمت متابعة نمو الجريبات المبيضية من اليوم العاشر من العادة باستخدام جهاز الموجات فوق الصوتية المهبلية, و عندما وصل حجم الجريبة المبيضية من 16 إلى 20 مليمتر, حينذاك تم إجراء اختبار المادة المخاطية لعنق الرحم كما تم كذلك حساب معيار كتلة الجسم (كغم / م²) للزوجات و دراسة تأثيره على المادة المخاطية لعنق الرحم. أظهرت نتائج الدراسة انخفاضاً عالياً المعنوية ($p < 0.001$) في مجموع نقاط خواص المادة المخاطية و حجم المادة المخاطية. كما أظهرت النتائج أيضاً انخفاضاً معنوياً ($p < 0.05$) في لزوجة المادة المخاطية و قابلية المادة المخاطية على التمثل بالإضافة إلى الخاصية الخلووية للمادة المخاطية. في حين لم يكن الانخفاض في قابلية المادة المخاطية على التبلور ذا قيمة معنوية في مجموعة العلاج مقارنة بمجموعة الدورات التناسلية التلقائية. كذلك فإن قياس معامل الحموضة (pH) في مجموعة العلاج على الرغم من زيادته إلا أن هذه الزيادة غير معنوية, كما أن العلاقة الإحصائية بين معيار كتلة الجسم و اختبار المادة المخاطية لعنق الرحم كانت خطية سالبة في مجموعة الدورات التناسلية التلقائية بينما لم نجد هذه العلاقة قائمة في مجموعة العلاج بعقار الكلوميدي. نستنتج من هذه النتائج أن عقار الكلوميدي يسبب انخفاضاً ملحوظاً في نوعية و كمية المادة المخاطية لعنق الرحم.