ORIGINAL RESEARCH PAPER

Volume-7 | Issue-10 | October-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A RANDOMIZED PROSPECTIVE STUDY OF MENSTRUAL IRREGULARITIES IN RELATION TO OBESITY IN TERMS OF BODY MASS INDEX

Medical Science

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ABSTRACT

Introduction: Obesity in women is worldwide problem. Obesity may lead to hyper androgenism resulting in increased extra glandular aromatization by adipocytes leading to anovulation and menstrual irregularities.

Aims and Objectives: To establish relation between obesity and menstrual irregularities in women and also to study the effect of weight reduction on menstrual pattern.

Materials and Methods – It is a randomized prospective study of one year duration in the Dept. of Obstetrics and Gynecology, Calcutta National Medical College, Kolkata. Out of 198 obese females, 62 were presented with menstrual irregularities. Body mass index was calculated to detect obesity. Following investigations were done – serum FSH, LH, Prolactin, T_3, T_4, TSH, testosterone and USG of uterus and adnexa, diagnostic laparoscopy and endometrial biopsy. Result and Analysis: 31.3% of obese women had menstrual irregularities in our study. After reduction of 7-8 kgs, 80% of the women who had reduced weight also had menstrual improvement.

Conclusion: One third of the obese female patients presented with menstrual irregularities. Weight reduction by exercise and balanced diet reduced hyperandogenemia leading to ovulation which ultimately improved menstruation[6].

KEYWORDS

Obesity, Menstrual Irregularity, BMI

INTRODUCTION:

Nowadays Obesity in women is a problem worldwide. Fat is usually a boon to female body but obesity sometimes becomes a curse to them due to hormonal imbalance and disease process. Obesity may be classified as hypertrophic obesity (enlargement of fat cell size) and hyperplastic obesity (increase in the fat cell number).Obesity is often expressed in terms of body mass index (BMI) which can be defined as weight in kg. divided by square of height in meters. (BMI=wt. in kg/ht in meter^2) BMI=20 to 24.9(normal), 25-29.9 (overweight) and 30 and above (obese). Obesity may lead to hyper androgenism due to increased extra glandular aromatization by adipocytes leading to anovulation and menstrual irregularities.[3,4,5]

Obese women have an excess number of fat cells in which exraglandular aromatization of androgens to estrogen (oestrone) occurs. Increased estrone trigger increase in the LH[10], which leads to ovarian hyper stimulation giving rise to increased testosterone which leads to anovulatory cycles and menstrual irregularities[1,2,5,7,9]. Obese women have lower sex hormone binding globulin (SHBG) which allows an increase of free androgen level which leads to hirsutism [1,10].

AIMS AND OBJECTIVES:

- To establish relation between obesity and menstrual irregularities in women.
- To study the effect of weight reduction on menstrual pattern.

MATERIALS AND METHODS

The study was conducted in the department of Obstetrics & Gynaecology, Calcutta National Medical College, and Kolkata from August 2016 to July 2017. The study was randomized and prospective. All the obese patients with body mass index of 25 and above within the child bearing period (15-45 years) with the complaints of menstrual irregularities were selected for the study. Detailed history including menstrual and obstetric history were taken. Thorough examination including gynecological examination were done. Following investigation were done- serum FSH, LH, Prolactin, fT_3, fT_4 and TSH, testosterone, DHEA-S, USG of uterus and adnexa, diagnostic laparoscopy and endometrial biopsy. All the patients were advised for weight reduction by physical exercise and diet with appropriate calorie intake not exceeding 1200 calorie per day (diet chart provided to the patient).

If any pathological cause related to obesity was detected, specific management was undertaken. Patients were advised to report after every 6 weeks for follow up.

RESULTS AND ANALYSIS:

TABLE 1: Distribution of patients according to age (n=62)

Age range of patients	No of patients	Percentage
15-25 yrs	14	22.58%
25-35 yrs	30	48.38%
35-45 yrs	18	29.03%

TABLE 2: Distribution of patients according to marital status (n=62)

Marital status	No of patients	Percentage
Married	47	75.8%
Unmarried	15	24.19%

TABLE 3: Distribution of patients according to body mass index (n=62)

Body mass index (BMI)	No of patients	Percentage
25-29.9 (over weight)	20	32.25%
30 and above (Obese)	42	67.74%

TABLE 4: Distribution of patients according to menstrual irregularity (n=62)[2]

Menstrual irregularity	No of patients	Percentage
Primary amenorrhea	7	11.29%
Secondary amenorrhea	15	24.19%
Oligomenorrhoea	30	48.38%
Hypermenorrhea	10	16.12%

TABLE 5: Showing distribution of patient (n=62) with specific menstrual irregularities according to body mass index (BMI)[2]

Menstrual irregularity	25-29.9	30 and above
Primary amenorrhea	2 (3.22%)	5 (8.06%)
Secondary amenorrhea	4 (6.45%)	11 (17.74%)
Oligo menorrhea	11 (17.74%)	19 (30.64%)
Hypo menorrhea	3 (4.83%)	7 (11.529%)

TABLE 6: Showing distribution of patient (n=62) with specific menstrual irregularities according to biochemical investigations (BMI)[1,5]

Investigations	No of patients	Percentage
All parameters are normal	30	48.38%
Elevated serum FSH level	5	8.06%
Elevated LH/FSH ratio	7	11.29%
Elevated serum prolactin level	2	3.22%
Elevated serum TSH level	6	9.67%
Elevated serum testosterone level only	10	16.12%
Elevated serum testosterone level and dehydroepiandrosterone	2	3.22%

TABLE 7: Showing distribution of patients (n=62) according to primary obesity and obesity due to specific cause after detailed investigation.

Characteristic of obesity	Number of patients
Primary obesity	47(75.8%)
Obesity due to specific cause	15(24.19%)
a) Hypothyroidism b) Polycystic ovarian disease c) Cushing's syndrome	6(9.67%) 7(11.29%) 2(3.22%)

TABLE 8: Showing ultrasonography findings of pelvic organs of obese patients with menstrual irregularities[2]

Ultrasonography	No of patients
Normal study	43 (69.35%)
Less than normal size uterus	12 (19.35%)
Bilateral enlarged ovaries with multiple small cystic appearance with normal size uterus	7 (11.29%)

TABLE 9: Showing diagnostic laparoscopy findings with endometrial biopsy in selected patients (n=27)

Laparoscopic findings	No of patients
Normal size uterus with bilateral patient fallopian tubes	15 (55.55%)
Less than normal size uterus with bilateral patent fallopian tubes	12 (44.44%)
Ovaries • Bilateral normal size ovaries with no ovulation stigma • Bilateral enlarged ovaries with multiple cystic swelling with white glistening capsules with no ovulation stigma	20 (74.07%) 7 (25.92%)
Histopathological findings of endometrium,	No of patients (%)
Non secretary endometrium	27(100%)

TABLE 10: Showing effects of weight reduction schedule and menstrual irregularity.

Result of weight reduction schedule	Number of patients	Improvement of menstrual irregularity (%)
Did not follow the schedule.	6	Nil (0%)
Followed the schedule but did not reduce weight .	21	Nil (0%)
Followed the schedule along with specific treatment was required and reduced weight.	35	28(80%)

TABLE 11: Distribution of patients with regular menstruation after weight reduction according to reduced BMI (N=28)

Reduction of BMI after treatment	Number of patients
Pretreatment BMI 30 and above reduced after treatment to BMI range 25-29.9	7(25%)
Pretreatment BMI 30 and above reduced after treatment to BMI range 20-24.9	10(35.71%)
Pretreatment BMI 25-29.9 reduced after treatment to BMI range 20-24.9	11(39.28%)

Among 198 obese patients within child bearing period (15-45 years) with various complaints who attended outpatients department, 62 patients (31.3%) had menstrual irregularities in our study. Most of the patients (48.38%) were in the age group of 25 to 35 yrs (Table-1).Out of 62 patients ,most of them were married(table-2) with 67.74% obese (BMI 30 and above)(table-3). Table-4 showed most common presentation among these all patients were oligomenorrhea, which was as a major problem in the form of menstrual irregularity (table-4,5) and it was also most common problem among BMI>30(table-6). Biochemical investigations among these patients showed 48.38% had no abnormality and 3.22%have elevated serum prolactin level and testosterone level each (table-7,8) and 9.67% are hypothyroid with elevated TSH and on USG only 7% had suggestive of PCOD. Among these patients, some selected ones (n=27) who was having a work up for infertility had undergone diagnostic laparoscopy which revealed polycystic ovarian features in 25.92% (table-9,10). 6 out of 62 patients did not follow the treatment schedule and remain obese. So, out of 56 patients who underwent weight reduction schedule, 35 patients (62.5%) reduce their weight with an average reduction of 7-10 kgs. (Table-11). Out of 35 patients who reduce their weight, 28 patients resumed normal menstruation. So, actual percentage of patients with resumption of regular menstruation after weight reduction was 80%. (Table-12)

DISCUSSION:

Obesity in females is a problem worldwide. In USA and also in developed countries billions of dollars are spent on dietetic food, exercise programs, weight reduction program and other equipments to maintain a slender habitus and foster weight loss. Women with obesity suffer from different menstrual irregularities. Extra glandular estrogen production is increased in women with obesity, with increased estrogen production, obese women are placed at an increased risk for developing endometrial hyperplasia and endometrial adenocarcinoma.

In our study, 31.3% women with obesity had menstrual irregularities. This is well correlated with a study conducted by Kopelman et al[1] in 1981 who showed that obesity was associated with menstrual disturbances in about one third of the cases.

In our study, 32.25% of the patients were overweight (BMI 25-29.9) and 67.74% of patients were obese (BMI 30 and above)

In our study, the incidence of oligomenorrhoea was high (48.38%) in comparison with primary amenorrhea, secondary amenorrhea and hypo menorrhea.

Hartz et al[2](1979) confirmed the relation between obesity and oligoovualtion. But they observed oligomenorrhoea was present in only 8.4% of obese patients, an incidence less than one might assume if obesity exerted a major influence on reproductive function.

In our study, 75.8% patients were primarily obese with menstrual irregularities and in 24.19% of patients, obesity and menstrual irregularities were associated with specific endocrine disorders of which polycystic ovarian disease (elevated LH/FSH ratio) was 11.29%.Our study correlates with the study of Gambineri A et al[3] in 2002.

Yen SSC[4] in 1980 observed that chronic estrogen exposure in obese oligomenorrhoeic subjects was a major factor in the development of polycystic ovarian disease.

The tonic elevation of estrogen produced by peripheral conversion of androgens results in positive feedback on the pituitary. Increased release of biologically active LH results in stimulation of ovarian stroma androgen production. The increased androgens produced serve as additional precursors for subsequent aromatization and conversion of estrogens within the adipocytes. Thus a vicious cycle is produced. Kaufman et al[5] in 1981 ,observed elevated estrogens, androgens and LH/FSH ratio in obese oligomenorrhoeic adolescents. Their observation was compatible with the clinical observation that PCOD begins shortly after menarche and if left uncontrolled ,might eventually result in hyperthecosis, which is a disorder predominantly seen in obese subjects. The study conducted by Bates ND Whitworth[4] in 1982 supported this finding and this is also evident by the study of Gordon CM[7] and also by franks S[8].

Studies of ovaries in obese oligomenorrhoeic women by Fisher et al[9] in 1974 and Laatikainen et al[10] in 1983 confirmed the role of ovary as a major source of excess androgen secretion in the presence of obesity.

In our study, six patients did not follow the weight reduction program. Out of 56 patients who followed the weight reduction program,35 patients lost their body weight ranging from 7-10 kgs. So 62.55 patients lost their body weight following weight reduction program.

Out of 35 patients, who lost their body weight, 28 patients (80%) had improvement in menstruation. This finding is well supported by Bates and Whitworth[6] in 1982 who showed that 85% of patients who reduced 15% of body weight, regained regular ovulatory function.

Hollman et al[11](1996) showed 80%improvement in menstrual function of patients who reduced weight of 10.2+7.9 kg.

In our study, patients with pretreatment BMI 25-29.9 reduced to 20-24.9 had maximum (39.28%) improvement in menstrual function than the patients with pretreatment BMI 30 and above reduced to 25-29.9(25% improvement) or to 20-24.9(35.71%improvement).

CONCLUSION: In obese women with menstrual irregularities, weight reduction by exercise and balanced diet reduces hyperandrogenemia leading to ovulation which ultimately improves and normalizes the menstrual function.

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