



SONOGRAPHIC FEATURES AND GROUPINGS OF OVARIAN FOLLICULAR MASSES WITH THE ENDOMETRIAL THICKNESS AMONG WOMEN WITH INFERTILITY IN NSUKKA, NIGERIA

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ABSTRACT

Introduction: There are various kinds of follicular cystic masses. This study was carried out to identify the kinds, groupings and sonographic features of ovarian follicular masses found among women with history of infertility as well as the endometrial thickness of the subjects.

Objectives: To assess the sonographic features and groupings of ovarian follicular masses with the endometrial thickness among women with infertility in Nsukka Nigeria

Methods: This is a prospective cohort study. Seventy women with history of infertility participated in the study. Nine (12.8 %) of the subjects had follicular cystic masses. Pelvic scan was carried out on the 70 subjects with transvaginal 5 mHz ultrasound probe. The ovarian follicles were identified and measured when present.

Results: The follicular cystic masses were grouped into four (4), that is group A B C D. Group A (5.7%) had cystic masses with mean size of 39 x 50.5 mm. They had internal echoes which is sonographic evidence of pathologic background, and thin endometrial thickness of about 6.25mm. The features persisted at all levels of the menstrual cycle. Group B, 4.3% had multiple cysts which were about 6 in number in the ovary and each cyst measured about 6mm. They had thin endometrium of about 5mm. Group C had cystic masses that had mean size of about 50 x 59mm with solid component and endometrial thickness of about 3mm. group D had large homogeneous cystic mass that measured about 26mm, with through transmission and mild acoustic enhancement and normal endometrial thickness of 8mm. All the features found in the four groups persisted beyond the normal menstrual cycle. Groups A B C all had thin endometrium while group D had normal endometrium with large homogenous cyst that failed to rupture at the mid menstrual cycle.

Conclusion: Four groups were documented; Group A showed evidences of pathogenic background, Group B were of origins of systemic responses to extraneous substances, Group C were characterized by solid component, Group D showed large follicular cysts with normal cystic characteristics and normal endometrium.

INTRODUCTION

There are various kinds of follicular cystic masses. This study was carried out to identify the kinds, groupings and sonographic features of ovarian follicular cystic masses found among women with history of infertility as well as the endometrial thickness of the subjects. The common and simplest definition for infertility is 12 months of unprotected intercourse without pregnancy among women who want pregnancy. The various definitions of infertility have caused many changes in technology, researches and clinical practice relating to female reproductive health [1]. An estimated four (4) million women, predominantly from developing countries have infertility issues which resulted from maternal sepsis with long term maternal morbidity. Infertility in women was ranked the 5th highest serious global disability among population under age of 60 [2]. Infertility in women have a range of causes including the risk factors like age, alcohol, sexually transmitted infection, exposure to chemicals among many other [3]. Many other causes are directly related to the ovary, ovarian follicles, fallopian tube, myometrium and endometrium. The ovarian follicle develop on monthly bases and at mid menstrual cycle, the follicle ruptures to release the ovum – ovulation. Ovulation disorders appear to be the most common cause of infertility among women. The eggs during ovulation may never be released or may be released only in some cycles. Anovulation or failure to release eggs is an ovulation disorder which can be due to premature ovarian failure when the ovary stops to function before the age of 40 years. This may result in polycystic ovarian syndrome (PCOS) causing infertility. Forms of anovulation can be identified in the ovary, but causes of anovulation are not directly identified by ultrasonography, although ultrasonography can isolate features which are marks of hyperprolactinaemia- a common cause of anovulation. Inadequate ovarian size often found in older women and is a major cause of anovulation or abnormal eggs which cannot sustain fertilization [3]. Normal size of mature ovarian follicles is from

17 – 25mm in diameter [4]. Follicular size less than this is not likely to initiate and sustain successful pregnancy. The ovarian follicle usually grows along with endometrial proliferation or thickening of the endometrial diameter. The endometrial diameter can measure about 7 to 14mm in thickness at ovulation time [5, 6] among normal subjects and can measure about 2 – 5 mm in the pre-ovulation period. For fertilization to occur, the endometrial thickness and size of the ovarian follicle are optimal at the ovulation segment of the menstrual cycle in the normal subjects, but ovarian follicle and endometrium with disorders are not likely to achieve successful pregnancy. This work is to identify the kinds, groups and the sonographic features ovarian follicular masses and the endometrial thickness arising from disorders among subjects with infertility.

MATERIALS AND METHOD

Seventy women with history of infertility participated in the study. These women were between the ages of 20 – 40 years. The women must have had desire to be pregnant and could not. They will each have history of uninterrupted sexual intercourse for at least one year without pregnancy. They were referred for ultrasonography scan from the fertility clinic because of subfertility or infertility. Only subjects who have 28 days menstrual cycle were selected for the study. The scans were carried out between 13th and 14th day of the menstrual cycle. Pelvic scan was carried out on the 70 subjects with transvaginal 5 MHz ultrasound probe. The ovarian follicles were identified and measured when present. The mid sagittal section scan of the uterus was carried out and the endometrial thickness measured in antero – posterior plane at the thickest level of the endometrium. The follicular cysts found were measured, ovarian follicles or ovarian cystic masses that measured up to 16mm were recorded and rescanned on the 18th day. The endometrial thickness were measured in each subject. The result were analysed using descriptive statistical methods, tables and percentages.

RESULTS

Table 1: Age Distribution of the Women

Age (Yrs.)	Frequency (f)	Percentage (%)
20 – 24	5	7
25 – 29	30	43
30 – 34	20	29
35 – 40	15	21
Total	70	100

The table shows that the age group of 25 – 29years had the highest frequency of 30 (43%). The ages of 20 – 24 years had the lowest frequency of 5 (7%).

Table 2: Features OfThe Ovarian Follicular Masses And Endometrial Thickness OfThe Subjects.

S/N	Follicular/ovarian cystic masses	Endometrial thickness (mm)	Frequency	Features of masses
1	43 x 50mm	6mm	1	Cystic internal echoes
2	45 x 50mm	6mm	1	Cystic internal echoes
3	50 x 59mm	3mm	1	Cystic solid component
4	35 x 54mm	6mm	1	Cystic bilateral medial
5	6 x 6mm follicles	5mm	1	Tapering exudates in POS
6	6 x 6mm follicles	4mm	1	Cystic multiple ovarian follicle
7	8x 7mm follicles	5mm	1	Cystic multiple ovarian follicle
8	34 x 48mm	7mm	1	Cystic mass; bilateral internal echoes
9	26mm follicle	8mm	1	Cystic content through transmission

There were 9 Subjects who had ovarian follicular masses and they were selected for rescan days later.

The nine subjects were rescanned on the 18th day, all the parameters remained constant among 8 subjects, while the follicle of the 9th which measured 20mm, measured 26mm on the 18th day.

Table 3: Groupings A B C D, According To The Sonographic Features

Groups	Sonographic feature	Mean Follicle \bar{x} .size mm	Mean Endo thickness \bar{x} mm	Frequency (F)	Percentage (%)
A	Cystic internal echoes	39 x 50.5	6.25mm	4	5.7
B	Cystic multiple cysts	6.6 x 6	5mm	3	4.3
C	Solid content	50 x 59	3mm	1	1.4
D	Cystic large cyst	26mm	8mm	1	1.4
				9	12.8

This table shows that follicular cystic masses with pathogenic background and thin endometrium had the highest frequency of 4 (5.7%), Group B had frequency of 3 (4.3%) while groups C and D have frequency of 1 (1.4%) each.

DISCUSSION

This was a study to identify the kinds, groupings and sonographic features of ovarian follicular masses with the endometrial thickness among women with history of infertility. Seventy women who had history of infertility participated in the study. The sonographic scan was carried out between the 13th and 14th and then on the 18th day of the menstrual cycle of each subject. The age group of 25 – 29 years had the highest frequency of 30 (43%), perhaps, this is the age women tend to desire pregnancy most. The age group of 20 – 24 had the lowest frequency of 5 (7%). Nine (12.8%) of the subjects had cystic masses that persisted beyond the 14th and the 18th day of their menstrual cycles. Cysts which collapse within the menstrual

period are not usually significant. One (1.4%) of the masses persisted beyond the 18th day of the menstrual cycle. The characteristics of the follicular masses and the endometrial thickness were separated into four (4) groups A B C D according to the sonographic features of the origins of the cystic masses with the endometrial thickness of the subjects in the group. (i) Group A, has infective or pathogenic background. (ii) Group B, has background of systemic reaction and responses. (iii) Group C, has solid components. (iv) Group D, has normal cysts with failure to rupture at mid cycle. Group A had the largest frequency of 4 (5.7%), the mean follicular size in this group was 39 x 50.5mm. the cysts had internal echoes; the subjects may or may not have exudates in the pouch of Douglas. They had mean endometrial thickness of 6.25mm. The internal echoes in the ovarian follicle and exudates in the Pouch of Douglas (POD) are sonographic features of pathogenic pelvic inflammatory processes. They had

endometrial thickness of 6.25 which is graded as thin according to Ochie et al. [7] in spontaneous condition.

Group B had a frequency of 3 (4.3%) with multiple cystic masses in each ovary which lined the internal periphery of the ovary. Each of these follicle measured about 6.5mm and numbered between 6 and 7 in each ovary. The endometrium measured a mean thickness of 5mm.

Group C had 1 subject (1.4%). The follicular cyst in this group measured 50 x 59mm and had solid component. The endometrium was thin with a measurement of 3mm. Group D had one (1) subject 1.4% with large cystic mass that measured about 26mm at the second measurement on the 18th day of the menstrual cycle. The cyst showed normal cystic appearances with posterior acoustic enhancement with no internal echoes. The follicular cyst did not rupture by the 18th day of the cycle. Endometrial thickness was normal with measurement of 8 mm.

Menstruation is normally followed by the simultaneous and progressive growth of the follicles and proliferation of endometrium and angiogenesis for nutrition of the incoming new tissue for successful pregnancy [8]. This simultaneous development of the follicles and endometrium can be damaged by Pathogens which trigger inflammatory processes that destroy the normal physiological pathways of the cells with various final changes in morphological features. These changes arising from the pathogens degrade the ability of the follicles to function optimally and impair fertilization in line with group A with pathogenic background.

Other causes of reduced fecundity may be toxic chemicals or excess levels of insulin which may induce acute or chronic responses in the female reproductive organs like the ovaries stimulating them to produce excess amounts of androgen (male hormone) causing follicular arrest and characterized by loss of tissue function (9). This so called follicular arrest restrains the follicular growth with the resultant follicular failure or anovulation like in line with polycystic ovarian syndrome (PCOS) (10). The growth retarded follicles within the ovary interfere with the function of the granulosa cells of the ovarian follicles antagonizing ovulation and inhibiting estrogen supply with the resultant poor proliferation and thin endometrium. Estrogen is extremely vital in endometrial tissue proliferation

(11). The truncation of ovarian follicles physiology by the disorders in groups A B C negatively influenced the formation of ovarian insufficiency or ovarian failure characterized by estrogen deficiency [12]. The group D had 1 subject (1.4%) with a follicle that grew persistently in the 18th day to above 26mm without rupture. This is in line with luteinized unruptured follicle (LUF) syndrome as a failure of ovulation in which despite the absence of follicle rupture and absence of release of oocyte, the unruptured follicle continues to undergo Luteinisation under action of LH (luteinizing hormone) [13]. The ovarian follicle was growing with the granulosa cells, estrogen was produced and the endometrium underwent normal proliferation with normal endometrial thickness of 8mm but pregnancy failed because no oocyte was supplied.

Each group in this study showed the peculiarities of the ovarian follicles disorder and the endometrial deficit.

CONCLUSION

Seventy women with history of infertility participated in the study. Nine (12.8%) of the subject had ovarian follicular cystic masses. There were four groups of follicular cystic masses and endometrium with their characteristic features. Three groups had damage of ovarian follicles which negatively affected endometrium and caused a thickness of less than 7mm. These features persisted beyond the normal menstrual cycle. Four groups were documented; Group A showed evidences of pathogenic background, Group B were of origins of systemic responses to extraneous substances, Group C were characterized by solid component, Group D showed large follicular cysts with normal cystic characteristics and normal endometrium. There are four groups of follicular cystic masses with their specific features; three groups have impaired endometrial thickness. In evaluation of impaired fecundity among women of child bearing age this features should be identified or ruled out.

Conflict of interest: Nil

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