

Research Article

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Nabothian cyst association with infertility in female by trans-abdominal and trans-vaginal ultrasound

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ABSTRACT

Background: Female infertility is contributed to many causes that include genetic and acquired abnormalities of the uterus. Ultrasound is one of the best diagnostic techniques in a large number of patients because it is an excellent, fast, safe and inexpensive method for assessing size, shape, and determining abnormalities of the uterus and both ovaries. The nabothian cyst is one of the causes of infertility which can be assessed by ultrasound.

Objective: To visualize a nabothian cyst by ultrasound and its association with infertility in women.

Methods: This is a study, involving 144 females in the age range of 20–45 years from an ultrasound clinic from December 2020 to April 2022, the examination was done by Samsung HS50 ultrasound device (KOREA), using endo-vaginal and transabdominal approach with EVN 4-9 MHZ and CA1-7AD probes respectively. Women with genital anomalies and polycystic ovary syndrome are not included in this study.

Results: One hundred and forty-four patients were involved in this study and the mean age of patients was $31.36 \pm SD 6.33$, 97 (67.4%) primary infertility and 47 (32.6%) secondary infertility. One nabothian cyst seen in 43 females (29.9%), two nabothian cysts in 31 females (21.5%), three nabothian cysts in 51 females (35.4%) and four nabothian cysts in 19 females (13.4%).

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Conclusions: The study established an important association between the size and number of the nabothian cysts with infertility.

Keywords: *Ultrasound; nabothian cyst; infertility*

INTRODUCTION

Infertility is a common problem faced by couple's nowadays, it is defined as a failure to conceive over a period of 1 year without the use of contraception.¹ Infertility in females is either primary or secondary. It is caused by genetic or acquired problems and the causes include uterine or cervical abnormalities, fallopian tube damage or blockage and ovulation disorders. Cervical factors in infertility may result from blockage or narrowing of the cervical opening, due to which the sperm is not able to reach the fallopian tubes. Nabothian cysts are one of the causes of cervical opening narrowing or blockage, and they are retention cysts.² Nabothian cysts, also called inclusion cysts are the result of retention of secretion of the nabothian gland, and it is a frequent finding in asymptomatic women. They are usually multiple and their sizes differ from a few millimeters to 3 cm. Small cysts are asymptomatic while large cysts may cause heaviness in the vagina, chronic pelvic pain and irregular vaginal bleeding,³⁻⁵ may also cause watery vaginal secretion.⁶ Very large nabothian cysts may protrude out of the vagina or may cause pelvic organs prolapse. Nabothian cyst results from occlusion of the cervical glands. They rarely have a correlation with chronic cervicitis.⁴ In general, they are multiple, their color is white or yellow, they are shiny or opaque in appearance with sizes ranging from a few millimeters to four centimeters in diameter.⁵

Ultrasound examination of the female pelvis is regarded as the first step imaging modality for the diagnosis of many uterine and adnexal pathologies. In ultrasound the cervix appears as cylindrical in shape in the sagittal view and round in the axial view. Both transabdominal and transvaginal

ultrasound are used for female pelvis examination. The abdominal approach gives a general description of the pelvic anatomy. whereas the vaginal approach gives better anatomical details, characterization of tissue, and demonstration of vascular flow. Cervical canal must be examined from the internal os (cervix open into the uterus) to the external os (cervix open into the vagina) searching for any solid or cystic lesion. Color Doppler can detect the vascularity of the lesion and aid in diagnosis of benign from the malignant lesions. For the evaluation of cervical lesions, the transvaginal approach is better than transabdominal scanning.

The nabothian cyst is easily detected by ultrasound either by transabdominal or transvaginal probe. The transvaginal approach is most the effective way for detection of these cysts. Nabothian cysts appear as well-defined, regular outline echo-free cystic lesions,⁷ thin wall with acoustic enhancement, avascular on color Doppler as shown in Figures 1 and 2. Tunnel clusters are a subtype of nabothian cysts which appear as complicated



FIG 1. Multiple nabothian cysts by transvaginal approach.

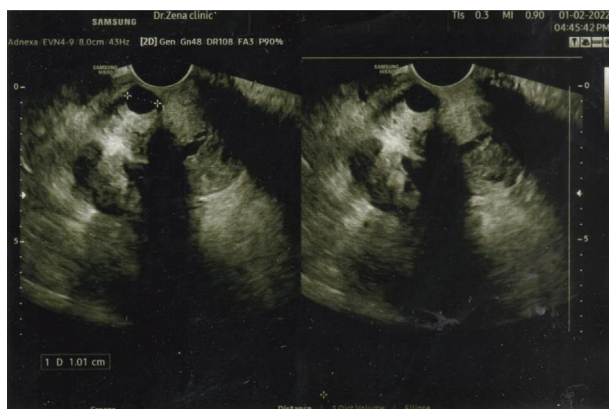


FIG 2. Single nabothian cyst by transvaginal approach.

multicystic lesions which must be differentiated from cervical malignancy. The early detection and treatment of nabothian cysts can improve female fertility slightly and can also resolve many medical and social problems.

METHODOLOGY

This study was conducted at an ultrasound clinic, in Kerbala, Iraq. The time of study was 17 months, and 144 females were included in this study. Verbal approval was taken from all the females before performing an ultrasound scan. The technique of sampling utilized was convenient sampling. All the participants were in the age group of 20 and 45 years. All females with infertility, either primary or secondary, were included in this study. Females with the polycystic ovarian syndrome and with anomalies of the genital tract were excluded from this study. Samsung HS50 ultrasound device (KOREA), using endo-vaginal and transabdominal approach with EVN 4-9 MHZ and CA1-7AD probes, respectively, was used in this study. The examination was done for the uterus, vagina and both adnexa after taking a full history of the patient's infertility state. Females for the transabdominal approach came with full urinary bladder and for the transvaginal approach the participants came with an

empty bladder. An ultrasound exam of the pelvis was done using an ultrasound device to scan the uterus and cervix in both longitudinal and transverse planes for best visualization. The nabothian cyst was measured in the exam and these measurements were done by putting the caliper of the ultrasound device on the borders of the cyst. The collected data from patients were analyzed using SPSS version 24. The qualitative variables such as age, infertility state either primary or secondary, size or number of the nabothian cysts, were presented as frequencies and percentages through tables. Mean, minimum, maximum, and standard deviations were considered for quantitative variables.

RESULT

One hundred and forty-four patients were involved in this study, their statistical results were obtained using graphs and frequency tables. Table 1 shows the mean age of patients which is $31.36 \pm SD 6.33$ (ranging between 20 and 45 years).

Table 2 shows the fertility state of female with 97 (67.4%) primary infertility and 47 (32.6%) secondary infertility.

Tables 3–6 which show the number of cysts and their frequency in primary and secondary infertility. Table 3 shows that out of 144 patients with one nabothian cyst in 30 females (20.8%) with primary infertility and 13 (9%) with secondary infertility, the rest of the participants (100 females, 70.1%) have another cysts. Table 4 shows that out of 144 females with two cysts seen in 23 (16%) with primary infertility and 8 (5.6%) with secondary infertility, 113 females (78.5%) have another cysts.

TABLE 1. Descriptive statistics of age.

Age	No. 144
Mean	31.36
Std. deviation	6.334
Minimum	20
Maximum	45

TABLE 2. Frequency of primary and secondary infertility.

Type of infertility	Frequency	Percent	Valid percent	Cumulative percent
Primary infertility	97	67.4	67.4	67.4
Secondary infertility	47	32.6	32.6	100.0
Total	144	100.0	100.0	

TABLE 3. Frequency of patient having one nabothian cyst in primary and secondary infertility.

One nabothian cyst	Frequency	Percent	Valid percent	Cumulative percent
Primary infertility	30	20.8	20.8	20.8
Secondary infertility	13	9.0	9.0	29.9
Have another number	101	70.1	70.1	100.0
Total	144	100.0	100.0	

TABLE 4. Frequency of patients having two nabothian cysts in primary and secondary infertility.

Two nabothian cysts	Frequency	Percent	Valid percent	Cumulative percent
Primary infertility	23	16.0	16.0	16.0
Secondary infertility	8	5.6	5.6	21.5
Have another number	113	78.5	78.5	100.0
Total	144	100.0	100.0	

TABLE 5. Frequency of patients having three nabothian cysts in primary and secondary infertility.

Three Nabothian cysts	Frequency	Percent	Valid percent	Cumulative percent
Primary infertility	36	25.0	25.0	25.0
Secondary infertility	15	10.4	10.4	35.4
Have another number	93	64.6	64.6	100.0
Total	144	100.0	100.0	

TABLE 6. Frequency of patients having four nabothian cysts in primary and secondary infertility.

Four nabothian cysts	Frequency	Percent	Valid percent	Cumulative percent
Primary infertility	14	9.7	9.7	9.7
Secondary infertility	5	3.5	3.5	13.2
Have another number	125	86.8	86.8	100.0
Total	144	100.0	100.0	

Table 5 shows that out of 144 females three cysts in 36 (25%) with primary infertility and 15(10.4%) with secondary infertility, 93 females (64.6%) have another. Table 6 shows that out of 144 females with four cysts seen in 14 (9.7%) with primary infertility and 5 (3.5%) with secondary infertility, 125 (86.8%) have another number of cysts. The size of the cyst ranged between 2 and 14 mm. Table 7 shows the

TABLE 7. Descriptive statistics of size of nabothian cyst.

Size No. 144	
Mean	5.31
Std. deviation	2.600
Minimum	2
Maximum	14

mean size of nabothian cyst, which was 5.31 mm \pm SD 2.6 (minimum size was 2mm and maximum size was 14 mm).

DISCUSSION

Infertility affects the social and medical aspects of a couple's life from social and medical aspect. There are many causes of infertility, of which 40% are attributed to the wife, 40% are attributed to the husband, 5-10% to both the partners, and 5-10% without any known cause.⁸ In a female partner, the causes of infertility include ovarian dysfunction, tubal causes, uterine, and cervical causes. The nabothian cyst is one of issues that may cause cervical obstruction. Nabothian cysts are mucous retention cysts seen in reproductive-age women,⁹ they result from the proliferation of the squamous epithelium of the ectocervix above the columnar epithelium of the endocervix. The gland of the endocervix continuously secrete mucoid material which is collected under the squamous proliferation and retention cysts are formed,⁶⁻¹⁰ these are usually symptom less, common incidental finding. Their size range from a few millimeter up to 4 cm, and reaching this large size can cause symptoms like abdominal pain and pelvic congestion,¹¹ large nabothian cyst is regarded as a risky lesion. When these cyst reach large sizes up to 8 cm in diameter, they may produce symptoms and some time may get confused with a tumor mass lesion.¹² Large nabothian cysts may cause pressure effects on the rectum posteriorly like tenesmus and abnormal defecation,¹¹ but such cases are rare. Some

cysts cause watery vaginal discharge,⁶⁻⁹ vaginal bleeding, and dyspareunia.⁶ Nabothian cysts arise from the anterior lip of the cervix and may cause recurrent lower abdominal pain and hematometra.¹³ Obstructed labor or cervical prolapses have been reported in some cases with a large nabothian cyst.¹⁴⁻¹⁶ Ultrasound plays an important role in diagnosing the cause of infertility. An nabothian cyst appears on ultrasound as a cystic lesion in cervix, rounded with well-defined margin,¹⁷⁻¹⁸ anechoic with posterior acoustic enhancement and appear avascular on color Doppler.⁹⁻¹⁹ Ultrasounds, either transabdominal or transvaginal, are first line imaging for female pelvic organs demonstration,²⁰ the probe is placed into the vagina for a few centimeters for the demonstration of the cervix. Nabothian cyst looks like a single cystic lesion or as multiple cystic lesions in the cervix, round, with a regular margin. Their small size and well-defined boundaries are used to differentiate nabothian cysts from malignancy. Tunnel cluster is a special type of nabothian cysts,² which are multilocular cysts in the cervix, seen in reproductive-age female, usually after normal vagina delivery. Tunnel clusters are seen in two types, type A (non-cystic type) and type B (cystic type).¹⁸ Tunnel clusters is a benign condition and must be differentiated by a biopsy to exclude multicystic lesions from adenocarcinoma of the uterine cervix, gastric-type (GAS).²¹

Nabothian cyst initially, when it is small, causes no symptoms so dose not needs treatment. The treatment is prescribed only when the patient complains of pain or other symptoms. Some patients become pregnant after removal of large nabothian cyst that obstructs the cervix.²⁶ In some cases, nabothian cyst may be misdiagnosed as malignancy. Rare type of cervical carcinoma is adenoma malignum, which is a well-differentiated tumor that is multicystic mass account for 1-3 % of adenocarcinoma of cervix.²⁷ When patient has numerous large nabothian cysts, it is difficult to differentiated it from adenoma malignum. Doppler study can help in diagnosing between

nabothian cyst and cervical carcinoma. Biopsy and endocervical curettage make the diagnosis of the CA cervix.

CONCLUSION

Early detection and treatment of nabothian cysts can aid in decreasing female infertility. This study focuses on infertility caused by nabothian cysts and their detection by transabdominal and transvaginal ultrasound approaches.

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