THE ROLE OF ULTRASONOGRAPHY IN THE MANAGEMENT OF GYNAECOLOGIC PELVIC MASSES AT KENYATTA NATIONAL HOSPITAL [K.N.H.] A ONE YEAR PROSPECTIVE STUDY

A DISSERTATION SUBMITTED IN PART-FULFILMENT FOR THE DEGREE OF MASTER OF MEDICINE IN DIAGNOSTIC RADIOLOGY UNIVERSITY OF NAIROBI

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SUMMARY

A prospective study to compare clinical and ultrasonographic features as confirmed by laparotomy in patients suspected to have gynaecological pelvic masses was done.

Ultrasound pelvic scans were performed on 350 patients.

The commonest indication for a pelvic sonographic examination at Kenyatta National Hospital [K.N.H.] was found to be a suspected tubo-ovarian mass.

100 patients, who had further management following the results of ultrasound examination were followed up.

Only in very few cases was the definite histological diagnosis obtained.

Out of the 100 patients followed up and confirmed on laparotomy, 22 patients had ovarian cysts, 14 ectopic pregnancy, 8 uterine fibroids, 8 tubo-ovarian abscesses and 6 tubo-ovarian masses.

INTRODUCTION AND LITERATURE REVIEW

The use of ultrasonic waves to create visual images of structures, within the body started as early as 1950's.

The ultrasonic imaging techniques were then poorly understood. The results were ambiguous. Real clinical application, however, took place in the 1960's where Ian Donald et al [10] were able to carry out different obstetric examinations on 4,974 patients in Glasgow.

In the field of gynaecology, sonography has its greatest application in the evaluation of pelvic masses.

The variety and morphologic complexity of pelvic masses make gynaecologic sonography more difficult than obstetrical ultrasound.

The introduction of gray scale instrumentation has noticeably broadened the role of diagnostic sonography. Gray scale image processing affords better delineation of the internal morphological detail of soft tissue masses and the interfaces around them. Modern real time machines have high resolution and the ability to differentiate gut from solid masses.

Sonography provides direct evaluation of the size, location, sometimes origin and internal consistency of a mass within the pelvis.

When sonographic features are combined with good clinical evaluation of the patient, an accurate diagnosis can be achieved.

COMMON TERMINOLOGY IN ULTRASONOGRAPHY

1- SONOGRAPHER refers to the person performing the ultrasound examination.

2- SONOLOGIST refers to the physician or radiologist that interpretes the sonogram.

3- SONOLUSCENT = HYPOECHOIC refers to that structure that reflects low level echoes.

4- ECHOGENIC = HYPERECHOIC refers to the areas that reflect high level echoes.

5- TRANSONIC refers to the area that reflects no echoes.

MATERIALS AND METHODS

The study was carried out at Kenyatta National Hospital, X-ray department. 350 patients were referred to the x-ray department from acute gynaecological ward and the out-patient gynaecology clinics.

The x-ray department at Kenyatta National Hospital has a static ultrasound machine [of ALKA ECHO VISION SSD-180 MODEL]. It has a real time attachment. The real time transducer is of the linear array type with a frequency of 3.0 mega hertz.

It also has a compound transducer with a frequency of 3.5 mega hertz.

With the real time transducer, the pelvic mass is located within the pelvis as well as the dynamic function of the mass. The compound transducer is used to produce clear images of the structures involved.

Mineral oil was used as the coupling agent. Patients were requested to report to the x-ray department with a distended bladder on the morning they were to have the scan done.

If they did not have a full bladder, they were given water to drink and wait for some time before scanning was done.

A distended bladder is pre-requisite before performing a pelvic ultrasound scan.

It helps to attain better visualization of the uterus and adnexia.

The scans were performed in the presence of a competent sonographer. The interpretation was done with consultation of a radiologist.

Using the real time transducer, scans were done in the longitudinal, oblique and transverse planes. The longitudinal scans were done starting from the midline and moving the transducer to either side of the midline. The transverse scans were done starting from the suprapubic area and angling the transducer in cephalad manner in order to visualize pelvic organs much better.

Representative images were taken using a multiformat camera which is a component of the machine.

RESULTS

TABLE I

DISTRIBUTION OF PATIENTS ACCORDING TO CLINICAL INDICATION FOR PELVIC SONOGRAPHY

Type of Pelvic Mass	Number of Patients	Percentage
UTERINE FIBROIDS	74	21.1
OVARIAN CYST	34	9.7
ECTOPIC PREGNANCY	86	24.6
TUBO-OVARIAN MASS	106	30.3
OTHERS	50	14.3
TOTAL	350	100

TABLE II

DISTRIBUTION OF PATIENTS ACCORDING TO SONOGRAPHIC DIAGNOSIS

Type of Pelvic Mass	Number of Patients	Percentage
UTERINE FIBROIDS	92	26.2
OVARIAN CYST	72	20.6
ECTOPIC PREGNANCY	50	14.3
TUBO-OVARIAN ABSCESS	35	10.0
TUBO-OVARIAN MASS	30	8.6
OTHERS	71	20.3
TOTAL	350	100.0

TABLE III

DISTRIBUTION OF PELVIC MASSES IN PATIENTS WHO HAD FURTHER MANAGEMENT

Type of Pelvic Mass	Number of Patients
UTERINE FIBROIDS	13
OVARIAN CYST	22
ECTOPIC PREGNANCY	21
TUBO-OVARIAN ABSCESS	9
TUBO-OVARIAN MASS	11
OTHERS	24
TOTAL	100

TABLE IV

AGE DISTRIBUTION OF PATIENTS WHO HAD FURTHER MANAGEMENT AFTER PELVIC SONOGRAPHY

Age [years]	Number of Patients	Percentage
Under 20	17	17
21 - 30	57	57
31 - 40	18	18
41 - 50	5	5
51 - 60	3	3
TOTAL	100	100

RANGE: 18 - 60 Years

MEAN: 28.6 Years

TABLE V

COMPARISON BETWEEN SONOGRAPHY AND LAPAROTOMY

Type of Pelvic Mass	Sonography	Laparotomy	Percentage
UTERINE FIBROIDS	13	8	61.5
OVARIAN CYST	22	22	100.0
ECTOPIC PREGNANCY	21	14	66.6
TUBO-OVARIAN ABSCESS	9	8	88.8
TUBO-OVARIAN MASS	11	6	54.5
OTHERS	24	18	75.0

TABLE VI

RESULTS IN PATIENTS CLINICALLY SUSPECTED TO HAVE ECTOPIC PREGNANCY

Way Detected	Number of Patients
CLINICALLY SUSPECTED	37
SONOGRAPHICALLY SUSPECTED	21
SONOGRAPHICALLY SUSPECTED AND CONFIRMED BY LAPAROTOMY	14
NOT SONOGRAPHICALLY SUSPECTED BUT FOUND AT LAPAROTOMY	5
SONOGRAPHICALLY SUSPECTED BUT NOT FOUND AT LAPAROTOMY	2
TOTAL NUMBER CONFIRMED AT LAPAROTOMY	19

TABLE VII

AGE DISTRIBUTION OF PATIENTS CLINICALLY SUSPECTED OF ECTOPIC PREGNANCY

Age [Years]	Number of Patients	Percentage
Under 20	9	24.3
21 - 30	22	59.5
31 - 40	5	13.5
41 - 50	1	2.7
TOTAL	37	100.0

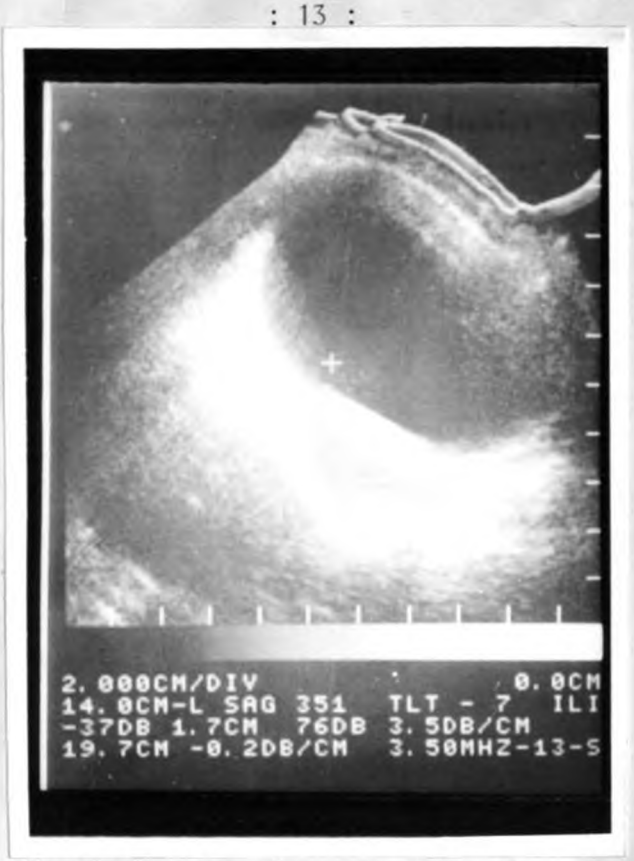
RANGE: 18 - 45 Years

MEAN: 24.2 Years

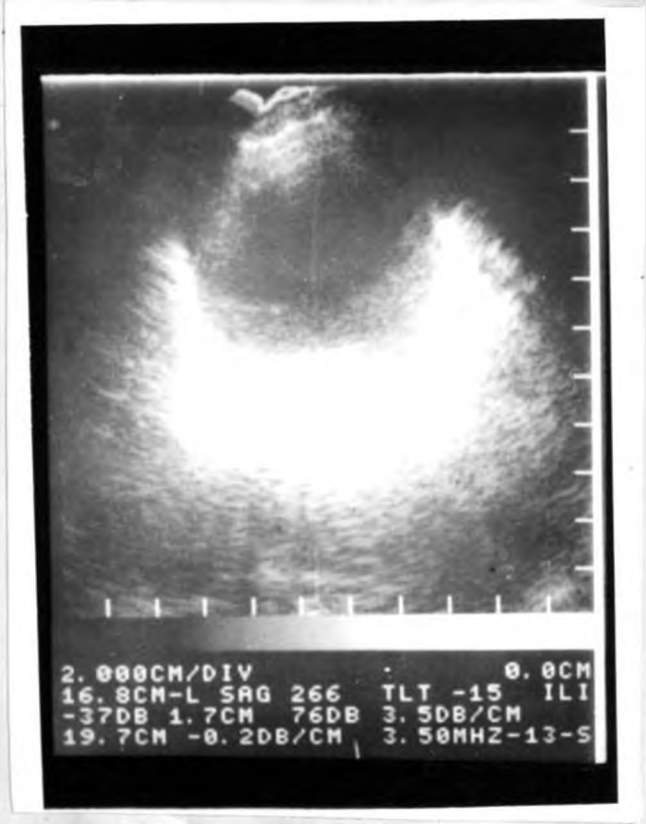
TABLE VIII

ACCURACY OF ULTRASOUND IN ECTOPIC PREGNANCY

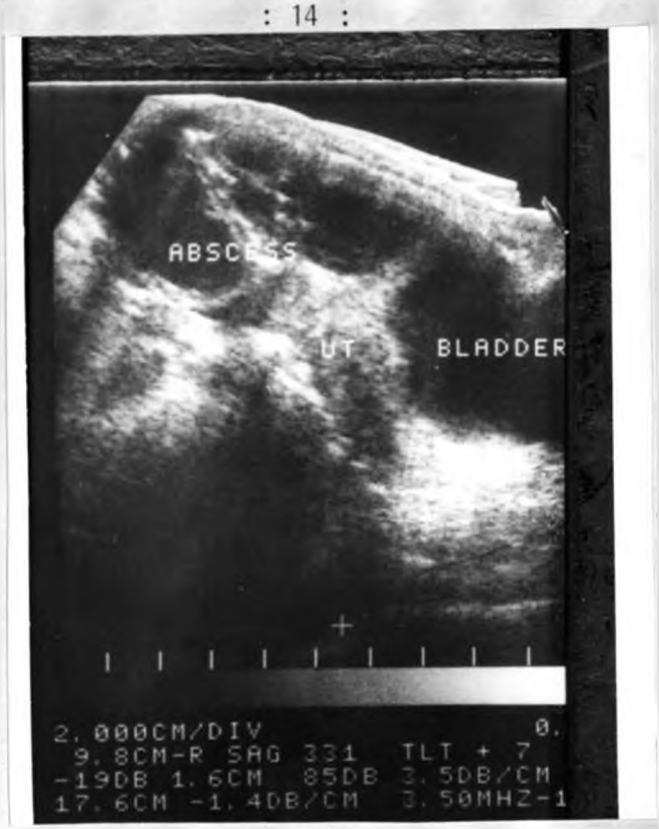
	Number of Patients	Percentage
NUMBER SUSPECTED BY ULTRASOUND	21	100.0
NUMBER CONFIRMED BY LAPAROTOMY	14	66.6
FALSE POSITIVE	7	33.3
FALSE NEGATIVE	5	23.8



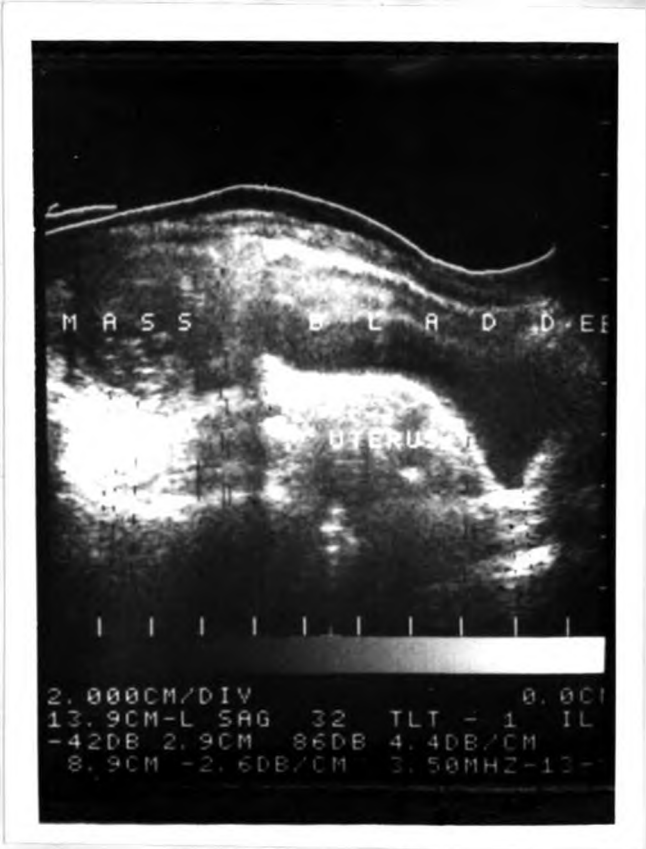
A longitudinal sonogram of a normal female pelvis



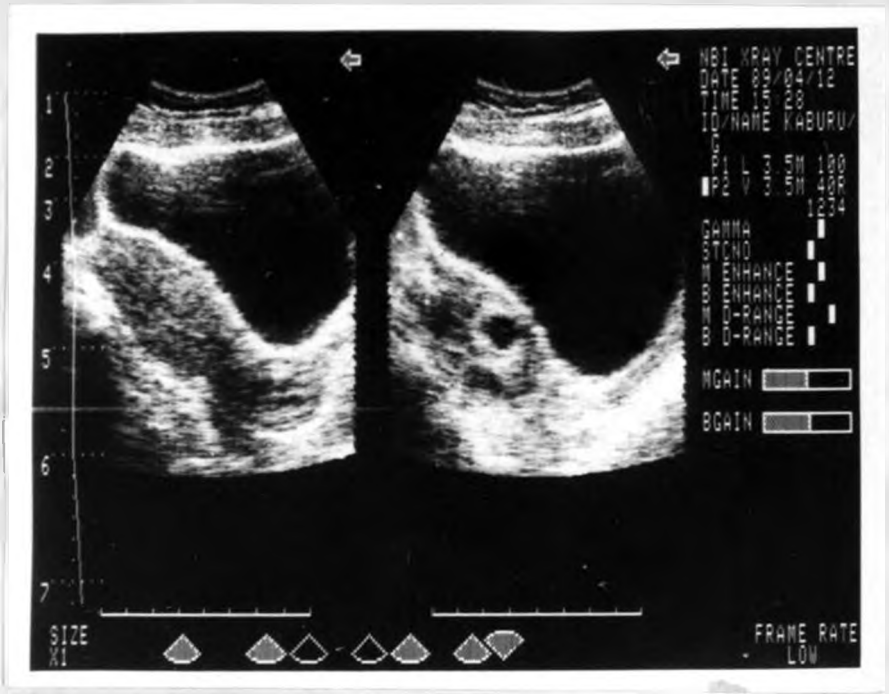
Transverse sonogram of a normal female pelvis



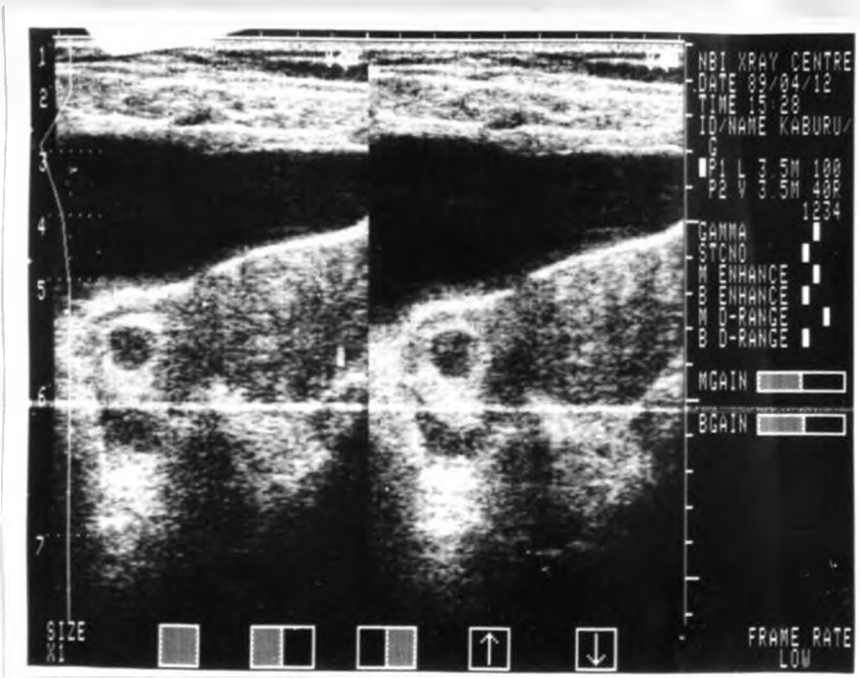
A longitudinal sonogram of a tubo-ovarian abscess



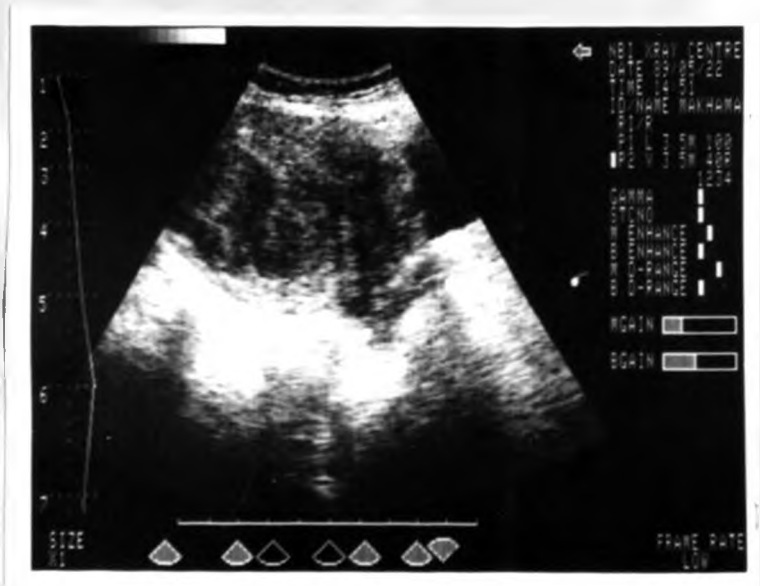
A longitudinal sonogram of tubo-ovarian mass



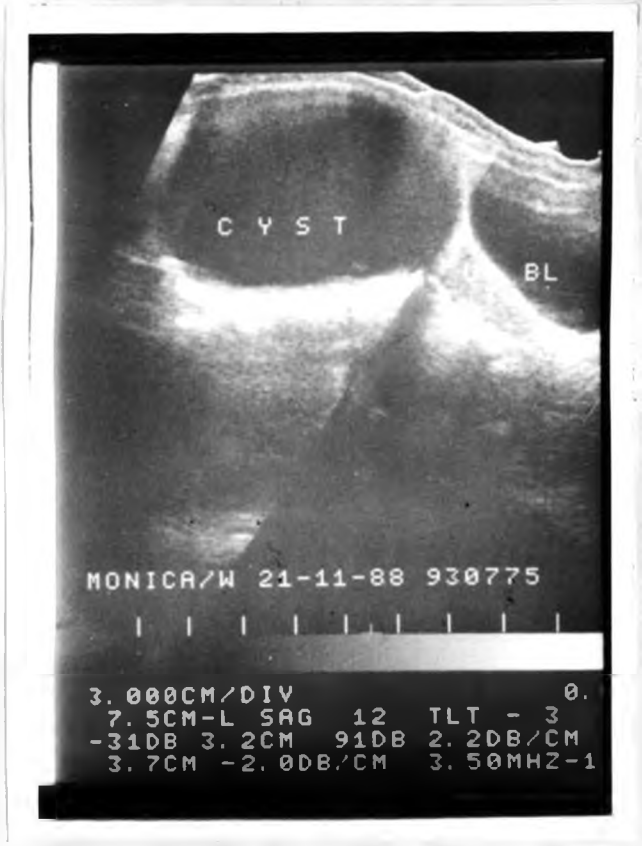
A longitudinal sonogram to show a classical ectopic



A transverse sonogram to show a classical ectopic



A longitudinal sonogram to show uterine fibroids



A longitudinal sonogram of a simple ovarian cyst

DISCUSSION

In the field of Gynaecology, sonography has its greatest clinical application in the evaluation of pelvic masses.

The introduction of gray scale instrumentation has noticeably broadened the role of diagnostic ultrasound. However, the varied morphologic complexity of these masses makes diagnostic ultrasound difficult to appreciate.

INDICATIONS FOR PELVIC SONOGRAPHIC EXAMINATION

COCHRANE W.J. et al. [9] have the following indications:

1- Confirmation of presence, size and internal morphological structure of a pelvic mass as well as its follow up.

2- Localization of intrauterine device.

3- In suspected ectopic pregnancy.

4- Pelvic Abscess: Surgical Management, decision on drainage site and extent and also to gauge the therapeutic response to antibiotic therapy.

5- Haematoma detection.

6- Abdominal Ascites.

7- Unsatisfactory pelvic examination due to either obesity or extremes of age especially paediatric age group.

8- Detection of lymphadenopathy associated with a pelvic mass.

9- To decide on treatment fields and doses when intracavitary device is used.

NORMAL ANATOMY OF FEMALE PELVIS ON ULTRASOUND

A normal female pelvis contains the bladder and ureters, uterus with its fallopian tubes, ovaries, broad ligaments, rectum, muscles and blood vessels.

The bladder sonographically appears transonic when filled with urine. The uterus is seen as a homogeneous low echo organ.

Occasionally, however, a line of echoes representing the uterine cavity is seen in a midline position of the uterine fundus.

These are weak and should never be confused with the echoes emanating from an intrauterine device. Echoes emanating from an intrauterine device are much stronger in intensity.

Normal adnexal structures are not often visualized. Occasionally, however, ovaries may display as sonoluscent masses lying adjacent or posterior to the uterus.

PELVIC PATHOLOGY

The aetiology of gynaecologic pelvic masses varies from physiological, infective to neoplastic causes.

Sonography cannot pin-point out the cause of a pelvic mass. It can only be able to locate it within the pelvis. Also information about ints internal consistency and its borders is obtained when performing a pelvic scan.

The final diagnosis of a pelvic mass is obtained from the histopathologist.

In a study to analyse the specificity and accuracy of gray scale ultrasonography in the diagnosis of pelvic masses, Lawson T.L. et al [15] analysed, 251 patients who were proven to have pelvic masses by laparotomy.

Ultrasound correctly identified the presence or absence of a mass as well as its consistency and location in 229 patients.

This gave the study an overall accuracy of 91%.

In another study of differential diagnosis of pelvic masses, Arthur C. et al. [2] found the following:

Out of 198 patients who underwent sonographic examination, 170 were confirmed by laparotomy or laparascopy.

A control group consisted of patients with negative scans and 12 asymptomatic volunteers. From this study a sonographic criteria to differentiate pelvic masses was formulated. The same criteria was used by the author.

1. LOCATION AND SIZE OF MASS	UNILATERAL OR BILATERAL	ADNEXAL UTERINE PELVO-ABDOMINAL INDETERMINATE
2. INTERNAL CONSISTENCY	CYSTIC	HOMOGENEOUS SEPTATED SOLID FOCI
	COMPLEX	PREDOMINANTLY CYSTIC PREDOMINANTLY SOLID
	SOLID	MILDLY ECHOGENIC MODERATELY ECHOGENIC MARKDELY ECHOGENIC
3. BORDERS		WELL DEFINED MODERATELY WELL DEFINED POORLY DEFINED

Using this criteria, they came out with the following results:
Categorical diagnoses were correct in 91% of the cases.
Specific histological diagnoses were correct in 71% of the cases.

The specificity of sonography of pelvic masses was found to be 91% and accuracy 98%.

They also deduced the fact that sonography is more accurate in diagnosing cystic masses than solid ones.

Physiological ovarian cyst, serious cystadenoma, hydrosalpnix and endometriomas are among the common cystic adnexal masses. They are homogeneously cystic and have well defined borders on sonography.

Pseudomucinous cystadenomas are pelvo-abdominal in location and sonographically appear as cystic mass with septations. Their borders are well to moderately well defined.

In the group of solid masses, ectopic pregnancy and dermoid cyst are the commonest, seen in the adnexa. Sonographically, they appear dense and their boders are moderately well defined.

Of the complex masses, intrauterine pregnancy is seen sonographically as predominantly cystic with variable borders and within the uterus. Uterine leiomyoma is also an intrauterine mass but is predominantly solid with moderately well defined borders.

Tubo-ovarian abscess, ectopic pregnancy, ovarian cystadenoma sonographically appear within the pelvis and outside the uterus. They are complex but predominantly cystic with moderately well defined borders.

An extrauterine mass that is predominantly solid with well to moderately well defined borders is commonly due to solid ovarian tumours.

Bowel loops on real time sonography appear as undeterminated masses of variable echogenicity and definition. Their dynamic nature is also evident and helps to differentiate it from real pelvic masses.

The pattern specificity of the common pelvic mass is summarised as follows:

MASS	COMMON SONOGRAPHIC FEATURES
Physiologic ovarian cyst	Cystic, Adnexal
Serious cystadenoma	Cystic, Adnexal
Dermoid cyst	Complex with echogenic focus
Ovarian pseudomucinous cystadenoma	Predominantly cystic pelvo-abdominal and septated
Hydrosalpinx	Cystic Adnexal
Ectopic pregnancy	Complex, extrauterine
Tubo-ovarian abscess	Complex, predominantly cystic, Adnexal
Uterine Leiomyoma	Midly to moderately echogenic Nodular uterine enlargement
Endometrioma	Multiple cysts of various sizes

In this study, the pelvic masses encountered were, uterine fibroids, ovarian cyst, ectopic pregnancy, tubo-ovarian masses and others.

In the group "others" included are cases where pelvic sonography revealed normal intrauterine pregnancy or a mass outside the pelvis.

Majority of the patients were of the young age group with the youngest being 18 years and a mean age of 28.6 years.

This indicates that pelvic masses are more common during the active reproductive period. Also the masses seen during this period are either physiological or secondary to infection rather than neoplastic.

Of the 350 patients referred to Kenyatta National Hospital [KNH] X-ray department, 106 of them [30.3%] had a clinical suspicion of a tubo-ovarian mass. This was found to be the commonest clinical indication for pelvic sonography in this study. (see Table 1)

TUBO-OVARIAN MASSES

The term includes all the space occupying lesions that are located in the region of the fallopian tubes and the ovaries.

The majority of these are a result of infection rather than neoplasia.

The infective processes usually end up in abscess formation. In such cases, the masses are specifically referred to as tubo-ovarian abscesses. The rest retaining the name "tubo-ovarian mass".

In this study, out of 106 patients in whom a tubo-ovarian mass was suspected, clinically. 75 of them were thought to be tubo-ovarian abscesses. 31 of them were thought to be due to the other tubo-ovarian masses. But out of 100 patients who had further management after sonography.

Sonography had diagnosed 9 patients to have tubo-ovarian abscesses, and laparotomy confirmed the diagnosis in 8 of them. 11 other patients were diagnosed by sonography to have a tubo-ovarian mass other than abscess. Laparotomy confirmed only 6 of them. This agrees with the work done by other authors [2] and [15].

On sonography, a tubo-ovarian abscess may not be easily differentiated from a hydrosalpinx. Both are adnexal masses that are cystic. Echogenic focii that result from the presence of debri appear in both masses. They both tend to have thick irregular wall. Correlation of clinical data with sonographic features is vital before making a diagnosis of tubo-ovarian abscess.

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Majority of patients are young. They are febrile.

Pelvic manual examination usually reveals presence of a tender boggy mass that is relatively fixed in position.

The commonest cause of a tubo-ovarian abscess is bacterial infection. Commonest organism encountered is the Neisseria gonoccocus. In this study, cultures were not done. When the abscess becomes organized the features of an abscess are lost and all one picks on sonography is the presence of a mass.

The other common tubo-ovarian masses are fibromas, carcinoma of the ovary and dermoid cysts. On sonography these masses appear as ill defined adnexal, of semisolid nature. Occasionally, an ectopic kidney may cast a shadow of an ill defined mass in the adnexa. However, careful scaning one should be able to see the central echoes representing the collecting system.

ECTOPIC PREGNANCY

An ectopic pregnancy by definition is the implantation of a blastocyst outside the endometrial cavity of the uterus. The majority of these implantations are within the fallopian tubes. By extending the definitio further, ectopic pregnancy is subdivided into acute ectopic pregnancy and chronic ectopic pregnancy.

The acute form of ectopic pregnancy has a dramatic presentation, while the chronic form has insidious onset.

Ectopic pregnancy is a serious clinical condition responsible for almost 30% of maternal death [14].

It carries no specific clinical symptoms. However, majority of patient clinically suspected to have an ectopic pregnancy will have a positive history of:

a) a period of ammenorrhoea
b) lower pelvic pain

c) vaginal bleeding
d) manual examination reveals presence of a pelvic mass in most of the patients.

Early diagnosis of ectopic pregnancy remains difficult despite the availability of a large number of diagnostic procedures. These include:

1- Pregnancy test
2- Haematocrit determination
3- Culdocentesis
4- Laparoscopy
5- Dilatation and curretage for microscopic examination of the endometrium

Pregnancy test for the beta subunit of HCG [Human Chorionic Gonadotrophin] is sensitive and useful when combined with sonography. A positive test *does not* differentiate between ectopic and intrauterine pregnancy.

When pregnancy test is combined with sonography, an ectopic is diagnosed correctly as sonography shows the site of the gestational sac.

Sonographic features however, may be non-specific, but when combined with clinical data and interpretation of pregnancy test then an accurate diagnosis is made.

Ultrasound is of greatest help in excluding ectopic pregnancy in cases where normal intrauterine pregnancy can be demonstrated. Detection of the fetal heart activity and foetal pole makes a diagnosis of intrauterine pregnancy completely reliable. However, in 1 out of 30,000 intrauterine pregnancies an ectopic pregnancy may co-exist [14]. This is very rare, but when it occurs, the clinical symptoms of ectopic pregnancy predominate.

Difficulties are encountered in sonographic diagnosis of ectopic pregnancy in early pregnancies, 5-6 weeks gestation. In such cases there is no demonstrable foetal pole and the sonographic feature will simulate the so called pseudogestational sac of ectopic pregnancy.

Sonographic features of a classical ectopic pregnancy include:

1- A moderately enlarged uterus with no intrauterine gestational sac, but with an abnormal uterine echo pattern.

2- The demonstration of a gestational sac or foetus in an extrauterine location.

3- An oval or elongated fluid filled adnexal mass containing echo dense ring-like structure representing the gestational sac. Occasionally this may just be a complex mass occupying the adnexa and culde sac.

4- Detection of fetal heart motion within the extrauterine mass on real time scanning. This is only present when the foetus is viable and the pregnancy at least 10 weeks gestation.

Sonographic features that point to the possibility of rapture of an ectopic pregnancy include:

1- An extrauterine gestational sac in association with a complex mass representing a haematoma.

2- Displaced or deviation of the uterus by an oval complex mass with presence of fluid in the pouch of Douglas.

3- The uterus is moderately enlarged with or without abnormal echo pattern.

4- Free intraperitoneal fluid may be seen.

Recent reports in literature indicate [17] that the incidence of ectopic is increasing. This is thought to be due to an increase in the number of healed salpingitis. These infections lead to adhesions within the fallopian tubes. These adhesions are important factor in the development of ectopic pregnancy.

Acute ectopic pregnancy usually presents drammatically and there is no time for investigating the patient.

In this study, patients with acute form of ectopic were taken to theatre before the sonographic examination. The cases of the study were therefore those of subacute or chronic.

Out of the 100 patients who had further management after sonography, 37 of them had the clinical suspicion of an ectopic pregnancy. 21 of these were diagnosed on ultrasound. On laparotomy, 19 ectopics were confirmed. Of these 19, only 14 of them had been shown by sonography. In other 5 cases confirmed, sonography had shown presence of a mass but not necessarily an ectopic pregnancy. 7 false positive cases by sonography and 5 false negatives.

In this study the accuracy of sonography in detecting ectopic pregnancy was 67%. These results closely resemble those of other authors [16, 17, 18]. Lawson [16] found the accuracy of ultrasonic diagnosis of ectopic pregnancy to be 77%. This slight difference in results as compared to this study may be due to the machine used for scanning. The resolution of the machine used in this study may be lower than what the other authors used.

ALL the patients suspected to have ectopic pregnancy in this study were young with the youngest being 18 years old. The mean age was 24.2 years.

All the patients had a positive history of a period of ammenorrhoea. (2) irregular vaginal bleeding and (3) in a few of them pelvic pain.

Out of the 19 ectopics confirmed by laparotomy, in 14 of them ultrasound had correctly suggested an ectopic pregnancy. In the '5' ectopic found at laparotomy, sonography had shown presence of a mass but did not show the typical features of an ectopic pregnancy.

The commonest masses for which an ectopic pregnancy may be confused for are:

1. a Haemorrhagic Corpus Luteum cyst
2. Hydro/pyosalpinx
3. Tubo-ovarian abscess
4. Rarely, fluid filled loops of bowel may simulate an ectopic pregnancy

In this study, ectopic pregnancy and tubo-ovarian abscess were confused for one another.

Despite the non-specificity, sonography remains a very valuable initial means of evaluating a patient suspected to have an ectopic pregnancy.

UTERINE FIBROIDS [LEIOMYOMA]

According to clinical indication for a pelvic sonographic examination at Kenyatta National Hospital, uterine fibroids ranked the third on the list. Out of the 350 patients referred to x-ray department for pelvic sonograms, 74 [21%] had been clinically suspected to have uterine fibroids. However, in the course of sonographic examinations, more cases were suspected than the clinician had thought. The number of uterine fibroids suspected on sonography were 92 [26.2%] out of the total number of patients. However, in this study only 100 patients who had further management after the scans were done are considered. Only 13 [13%] of them in whom ultrasound had suggested uterine fibroids. Laparotomy confirmed only 8 of the 13 or 61.5% to be uterine fibroids.

The reason for such low number of the followed up patients was found to be that most of the patients were still being investigated before laparotomy was to be done. Even after investigations, patients with uterine fibroids did not receive active surgical management unless there were complications.

On ultrasound, uterine fibroids produce a variable picture, depending upon their size and location. They may simply cause uterine enlargement with no other specific diagnostic features. Usually, large simple fibroids have a smooth outline, may sometimes be lobulated and the outline is continuous with the uterus. They are of mixed echogenicity, the hard echoes are thought to be due to degeneration. Degenerated fibroids may look purely transonic and difficulties may then be encountered in making the diagnosis. In such cases they simulate characteristics of a simple cyst.

Small subserous fibroids are usually difficult to differentiate from a cyst closely adjacent to the uterine wall. Fibroids calcify, but ultrasound can only demonstrate those that are grossely calcified. Fibroids or leiomyomas, are found in more than 30% of women over the age of 35 years [14]. They are benign and are responsible for a wide spectrum of clinical complaints, such as: menorrhagia, menstrual pain, acute severe pain if infarction of the fibroids occurs, pressure sensation, urinary retention or obstipation.

Fibroids are usually multiple, all originate out of the myometrium of the uterine body and fundus. Their occurrence in the cervical region of the uterus is very rare. They are classified into three main categories:

- Intramural
- Subserous
- Submucous

The intramural tumours are more common while the submucous ones are the least common.

Rarely, malignant transformation to leiomyosarcoma occurs. Sonography will not show such transformation, but will suggest its possibility. When serial scans are done in a patient with uterine fibroids, an increase in transisonicity or areas of variable transionicity throughout the fibroid is suggestive, but not diagnostic of malignant change.

Commonly, uterine fibroids are seen in association with pregnancy.

In this study, uterine fibroids with pregnancy were present in 2 cases. However, these were not followed until delivery. Both were out-patients and could not be easily reached at regular basis.

It is reported that the occurrence of uterine fibroids in pregnancy ranges from 0.3 - 2.5% [6]. Most of them are small and have no clinical bearing on the outcome of the pregnancy.

In the first two trimesters of pregnancy, large uterine fibroids may be associated with an increased rate of spontaneous abortions and ectopic pregnancies.

In the third trimester, uterine fibroids may precipitate premature labour, premature rapture of membranes, placenta abruptio, fetal malpresentation and soft tissue dystocia during labour.

They cause a lot of pain when they undergo degeneration. Degeneration is a result of interruption of their blood supply.

Sonography is helpful in reaching the diagnosis of uterine fibroids. It is also useful in the follow up of patients with fibroids and intra-uterine pregnancy.

During pregnancy the uterus appears sonographically smooth and regular in outline. Any irregularity in outline raises the possibility of uterine fibroids. If they are big, they cause a buldge from the uterine wall. This buldge cannot be separated from the uterus on sonography. Encapsulated or pedunculated fibroids however may appear separate from the uterus. (see picture on page 16).

During pregnancy, serial scans will demonstrate the relation of the fibroid and placenta. Such scans also determine the rate of growth of the foetus and fibroid. It is very useful in patients who wish to terminate their pregnancy because of a suspected uterine fibroid.

Presence of fibroids during pregnancy cause discripancy of dates. Ultrasound is able to demonstrate the presence of the fibroid and to correctly assess the gestational age.

It is also useful in patients with fibroids, who require amniocentesis for any reason.

CYSTIC MASSES

Ovarian cysts are the most common adnexal masses encountered. They appear as well defined echo-free spaces separate from the uterus. They are characterized by a well defined wall that is thin and shows posterior acoustic enhancement.

In simple multiloculated cysts, septations that vary in number and thickness may be seen. Simple ovarian cysts can occupy various positions in the pelvis.

Specificity of ultrasound in cystic adnexal masses is low. Correlation of sonographic features with good clinical information is of vital importance in making the correct diagnosis.

Physiologic or functional ovarian cysts in practice are the commonest cause of cystic adnexal mass. Sonographically, they are transisonic with a thin wall that shows posterior accoustic enhancement.

Physiological ovarian cysts include the follicular and corpus Leteum systs. They are of average size of 3.5 cm in diameter. They regress with time. Are seen in association with menstrual changes and anything increasing blood supply to the ovaries may lead to the formation of these cysts.

Sonography provides a means of monitoring these cysts until they completely regress. Rarely, malignant transformation of simple ovarian cysts to malignant occurs. Sonographic features suggestive of malignant transformation include:

1- Alteration in thickness of the cyst wall.
Malignant cyst wall is thicker than benign.

2- Number and thickness of septae.
Malignant cysts tend to have thicker and more septations than simple cysts.

3- Presence of internal echogenic focus.
This represents proteineceaus material haemorrhage or sebum.
Internal echoes are seen in malignant cysts.

4- Evidence of fixation of the mass.
Simple cysts are mobile, while malignant cysts tend to get fixed.

Inflammatory and neoplastic adnexal masses may simulate ovarian cysts. Among the inflammatory masses, hydrosalpinx and pyosalpinx are included. It is however possible to differentiate these as their walls are irregularly thick and show no accoustic enchancement.

In this study 22 cystic adnexal masses were picked. All of them were of size greater than that of physiological ovarian cyst.

Laparotomy was done in the 22 cases and a cystic lesion within the ovary confirmed. Bilateral disease was suggested in 3 cases by ultasound and confirmed by laparotomy. All the 3 patients were of the young age group with a mean age of 26 years.

One patient 60 years old sonography showed features of a malignant mass and at laparotomy a tomour 10-15 cm diameter was found but no histological diagnosis was obtained.

In one patient, 21 years old sonography suggested presence of a tumour arising from the pelvis to the abdominal cavity. At laparotomy a large encysted ovarian abscess was found.

Ovarian cyst in pregnancy was found in one patient. Cystectomy was done during lower uterine segment caeserian section.

All in all then, sonography has the ability to detect the presence of a cystic mass but cannot pin-point the true nature of the cystic lesion. Definite diagnoses can only be given by the histopathologist.

In this study, the group of masses termed as "others" are the cases where the clinician thought that the mass was in the pelvis, but sonography found it to be elsewhere or was intrauterine pregnancy. 50 patients [14.3%] had been suspected by clinical examination to have such a mass but according to sonography many more masses that had been thought to be in the pelvis were not found to be so. According to sonography 71 [20.3%] out of the total 350 had masses outside the pelvis.

Out of the 100 patients who had further management following sonography, 24 of them had sonographically suspected to have a mass outside the pelvis. Laparotomy confirmed 18 of these. Much emphasis was not put in this group as the purpose of the study was pelvic masses.

Majority of these masses were within the abdominal cavity. The cause of over interpretation in this group could be due to presence of fluid within the gut. This may then sonographically resemble a cystic mass in the abdomen. This is more likely in patients who have had surgery in the past and develop adhesions. These adhesions may pull loops of bowel close together and on scanning may be misinterpreted as a mass in the abdomen.

PITFALL OF THE STUDY

For good images, ultrasound machines should regularly be serviced. This standardises the gain settings which avoids unnecessary shadows that may be interpreted as lesions.

In this study, the machine was only occasionally serviced. It is also an old model with poor resolution as compared to the modern real time equipment. In few cases then interpretation of ghost shadows as lesions due to darkened screen could have occurred.

CONCLUSION

In this study, it has been found that the role of sonography in evaluation of gynaecologic pelvic masses at Kenyatta National Hospital agrees with the work done elsewhere.

Sonography affords an accurate assessment of presence, size, location and internal consistency of a pelvic mass. From sonographic features, a diagnosis can be formulated.

In this study, sonography suggested presence of pelvic mass in 86 patients who had further management after sonography. In 56 of these, laparotomy confirmed the presence of the mass.

However, sonography remains non-specific in as far as reading a definitive diagnosis. Nevertheless, sonography remains useful modality in evaluation of pelvic masses. The atraumatic & noninvassive qualities will always make it an initial modality of investigation that can be repeated at any stage of patient management. This has been found to be true at Kenyatta National Hospital. All the patients who had surgery had sonography done before operation. Sonography was useful, but not definitive in the diagnosis.

Because of no proven harm to a pregnant woman and her foetus, sonography is very helpful in the diagnosis and follow up of pelvic masses that coexist with pregnancy.

When sonographic features are reviewed together with good clinical data and preliminary tests such as pregnancy test, diagnosis of ectopic pregnancy may be achieved. Sonography is of greatest help in excluding ectopic pregnancy in cases where intrauterine pregnancy is demonstrated. One has to remember that coexistence of an ectopic pregnancy with normal intrauterine pregnancy is very rare -- 1 in 30,000 normal intrauterine pregnancies.

All in all then, ultrasound pelvic examination is a very useful, safe and quick modality of evaluating gynaecologic pelvic masses. It, however, carries a degree of making errors. These can be produced by the machine as well as the operator.

Sonography is of more help if performed with a good clinical history and co-operation from the clinician of the case in question.

In this study, this close co-operation was nonexistent. In most, if not all, the requisition form just indicated the tentative diagnosis e.g. Lr T.O.M. or pelvic mass with no other clinical history.

Team spirit in patient management is important particularly in patients who will require sonographic examinations.

The clinician should acquaint himself with the common indications for sonographic examination so that unnecessary or irrelevant requests are not pressed to the X-ray department.

RECOMMENDATIONS

1. Ultra sound has proven to be a valuable method of investigating gynaecologic pelvic masses especially with rapid improvements of real time equipment. I would therefore recommend it as an initial means of evaluating patients suspected to have pelvic masses. The scanning should preferrably be done by someone with clinical experience or the person who has examined the patient.

2. SERIAL OR follow up ultrasound scans to show the progress of the disease should be performed in all patients who do not undergo immediate surgery.

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MEDICAL