COMPARISON OF ULTRASONOGRAPHY WITH CLINICAL EXAMINATION UNDER ANAESTHESIA IN THE STAGING OF CARCINOMA OF THE CERVIX AT THE KENYATTA NATIONAL HOSPITAL

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SUMMARY

An analytical prospective study was done. 100 patients admitted in a gynaecology oncology ward with a diagnosis of carcinoma of the cervix were recruited. They were staged both by clinical examination under anaesthesia and by ultrasonography and the results of the two staging methods compared. The main aim of the study was to assess the accuracy by which ultrasonography can be used in staging of carcinoma of the cervix as compared to clinical staging under anaesthesia which was taken to be the standard.

Ultrasound examinations were done using a transabdominal 3.0 MHZ sector transducer. Examinations of the pelvis, kidneys, liver, para-aortic regions and spleen were done. Ultrasonography was found to be of great value in staging of late carcinoma of the cervix that is stage III and IV and this is because renal involvement with hydronephrosis and infiltration into the bladder was well demonstrated. Stage I and II were not well demonstrated. As ultrasound was not good in demonstrating parametrial, vaginal and pelvic wall involvement. Ultrasound would play an important role if used together with clinical examination under anaesthesia in the staging of cervical carcinoma.
INTRODUCTION AND REVIEW OF LITERATURE

Cancer of the cervix is the commonest malignancy in women in Kenya and subsahara Africa as a whole (14, 15). It accounts for 71.5% of all gynaecological malignancies seen in the Kenyatta National Hospital (10, 13). The age at presentation in Kenya is lower than that seen in the developed countries. The majority of the patients (60%) are found to be between 30 and 49 years old (14). Most of the patients present with advanced disease, 55% have stage III and above, 38% have stage II and the remaining 7% have stage I (14, 15). More than half of the patients present with abnormal vaginal bleeding and pain in the lower abdomen or in the extremities (14).

The cause of cervical carcinoma is not known but there are certain predisposing factors. (2). Sexual activity seems to be positively correlated with the disease and coitus at a relatively young age is a highly significant factor. It has been observed that communities with high incidence of the disease have low standards of living, have a high parity and have an early age at first coitus (14, 15). Viral etiology has been suggested by demonstration of a possible association between herpes simplex type 2 cervical infections and squamous cell carcinoma of the cervix. Human papilloma virus has also been implicated (2).
About 85% of all cervical carcinoma's are squamous cell carcinoma. The remainder are composed of various types of adenocarcinoma, subcolumnar reserve cell carcinoma and adenosquamous carcinoma (2), carcinoma of the cervix begins at or close to the squamo-columnar junction of the endocervical os. Overt carcinoma presents as a fungating ulcerative or infiltrative cancer (1).

Staging of the cancer of the cervix is important because the mode of treatment and the prognosis of the disease depends on the stage. (1). Stage I is mainly managed surgically. Stage II surgery and radiotherapy can be combined. Stage III and IV managed mainly by radiotherapy. In stage IV the disease is usually very advanced and its usually managed palliatively. The earlier the stage the better the prognosis.

Currently staging is done using the international classification adopted by the International Federation of Gynaecology and Obstetrics (FIGO) classification. (shown on table I).

Staging is based on the spread of the carcinoma. Currently at the Kenyatta National Hospital staging is done by examining the patient under anaesthesia. Local extension is looked for in the vagina and parametrium by digital exami-
nation (19). Anterior extension into the bladder is checked for by cystoscopy (19). Radiological procedures undertaken to aid in the staging are plain radiography especially chest X-Ray and Intravenous Urography. Intravenous Urography in advanced carcinoma of the cervix shows ureteral obstruction which leads to hydrourerter, hydronephrosis and in cases of complete obstruction to non-functioning kidney. (2, 17, 20) Computerised Tomography may be helpful in defining the extent of more advanced lesions (2).
TABLE 1
FIGO STAGING OF CARCINOMA OF THE CERVIX (2, 20, 23)

PRE INVASIVE CARCINOMA

Stage 0  - Carcinoma in situ
          - Intra epithelial Carcinoma

INVASIVE CARCINOMA

Stage 1  - Carcinoma strictly confined to cervix, extension to the corpus uteri should be disregarded.

1a  - Micro invasive carcinoma
1b  - All other cases of stage 1

Stage II - Carcinoma extends beyond the cervix but has not extended into the pelvic wall.
          - The carcinoma involves the vagina but not the lower 1/3.

IIa  - No obvious parametrial involvement

IIb  - Obvious parametrial involvement
State III - The carcinoma has extended into the pelvic wall.

- On rectal examination, there is no cancer free space between the tumour and the pelvic wall.
- The tumour involves the lower 1/3 of the vagina.
- All cases with hydronephrosis or non-functioning kidney.

IIIa - No extension into the pelvic wall.

IIIb - extension into the pelvic wall and or hydronephrosis or non-functioning kidney.

Stage IV - The Carcinoma has extended beyond the true pelvis or has clinically involved the mucosa of the bladder, or rectum.

Stage IVa - Spread of growth to adjacent organs

Stage IVb - Spread to distant organs.
Carcinoma of the cervix commonly spreads through lymphatics. It spreads first to the pelvic, then iliac and then the para-aortic lymph nodes. It also spreads by direct extension to the body of the uterus, vaginal wall, urinary bladder and the cellular tissues of the broad and urethrosecreal ligaments. In the broad ligament the growth surrounds and constricts the ureters but does not invade them (20). In the pelvic wall and sacral plexus carcinoma of the cervix causes compression leading to sciatic pain but does not penetrate the nerve sheath. (20). Haematogenous spread is not frequent but embolic metastasis can be seen in the ovary, brain, bones and lungs. (20).

Ultrasonography is an imaging modality that does not involve ionising radiation, it is non-invasive and does not require contrast media. It is safe, quick, easy to perform and its relatively cheap. It can be easily repeated with little risk. Using ultrasound you can differentiate cystic from solid lesions (8, 9, 16, 19). Ultrasonography was originally developed for use in obstetrics where it's advantages are indisputable. (9, 10, 11, 16, 19). It also plays a major role in gynaecology where it has been found to have 92% accuracy in diagnosis of Hydatiform Mole (11, 12). Ultrasound has the ability of detecting tumour spread to neighbouring structures and distant metastasis. (6, 19, 16,
19) for example in carcinoma of the cervix spread to the body of the uterus, the vagina, the bladder can be demonstrated. Metastatic lesions to the liver can be demonstrated. Both intra and extra peritoneal metastasis can be visualised (12, 16). Ultrasound can detect lymph node enlargement. Neoplastic lymph node enlargement of greater than 2cm may appear as a confluent or lubricated mass over the aorta or the inferior vena cava. (12, 16). Lymphoid tissue because of its internal homogenicity contains few reflecting surfaces and has the appearance of fluid filled areas. Lymph node enlargement can be seen as one or more sonolucent masses (8, 16).

Pelvic organs can be well visualised by ultrasound using a full bladder as an acoustic window. The vagina is seen as a double walled structure producing what is referred to as the vagina stripe. The vagina forms fornices on either side of the cervix. (19). The cervix is seen as a bulge in the vaginal lumen with its own internal channel; visualised as an echogenic line of 2-3mm thickness. The body of the uterus is ovoid with distinct points at the cornua. The uterine cavity is seen as an ovoid echogenic band. Uterine muscle is poorly echogenic and presents a homogenous echopattern (19). Any abnormalities or distortion of the normal anatomy can be detected by ultrasound.

Ultrasonography shows cancer of the cervix as a solid...
mass (3). The presence and site of the pelvic mass can be determined.

The walls of a full bladder are well outlined and any irregularities due to tumour infiltration can be demonstrated. However infiltration into the rectum is difficult to assess by ultrasound because of the gas in the rectum (1). Presence of dilated ureters and evidence of hydronephrosis can be well demonstrated by ultrasonography.

Metastasis to the liver can be well demonstrated and these are seen as masses of different echogenicity from the normal liver parenchyma.

Ultrasonography has been shown to be of great value in staging of advanced cervical carcinoma, where the presence of hydronephrosis and bladder infiltration by the tumour is well demonstrated. But ultrasonography is of little value in early cervical carcinoma where the cervical mass can be missed especially if it's small. The parametrial and pelvic infiltration is not also well demonstrable by transabdominal ultrasonography (9, 16).

Other imaging modalities can improve the staging of cervical carcinoma. For example endovaginal ultrasonography where the ultrasound probe is inserted into the vagina. In
this modality the probe is close to the cervical tumour. But it's not favourable to both the patient and the operator; especially in advanced stages where there is a fiable mass or foul smelling vaginal discharge. There is also a risk of cross infection especially HIV infection as it's not possible to sterilise the probes and also the use of condoms is not 100 percent safe.

Computerized tomography is another modality that can be used in staging of carcinoma of the cervix. It can demonstrate the spread of the tumour into the lymph nodes and other surrounding structures. Retroperitoneal lymphadenopathy and spread of tumour to the pelvic side wall's can be well demonstrated by computerised tomography (11). Unfortunately computerised tomography is expensive and involves ionising radiation and at the time of the study was not available at the Kenyatta National Hospital.

Magnetic resonance imaging has been found to be very accurate in detection of early cervical carcinoma (24). But magnetic resonance imaging is very expensive and is not yet available in Kenya.

This study tries to define the role ultrasound could play in the management of cancer of the cervix at the Kenyatta National Hospital. The study concentrates on the staging of
the cancer and not follow up after treatment.
OBJECTIVES

A. BROAD OBJECTIVES

1. To assess the accuracy by which ultrasonography can be used in the staging of carcinoma of the cervix as compared to the current methods used in the staging of this cancer at the Kenyatta National Hospital.

2. To determine if ultrasonography can be used in place of the present methods of staging of carcinoma of the cervix. This is because ultrasound is non-invasive and cheap.

B. SPECIFIC OBJECTIVES

1. To determine the spread and extent of metastasis of carcinoma of the cervix using ultrasonography.

2. To assess the spread of cervical carcinoma to other pelvic organs for example the vagina, parametrium, pelvic lymphnodes, pelvic wall and urinary bladder.

3. To determine the presence of hydrenephrosis.
4. To detect distant metastasis to the para-aortic lymph nodes, kidneys, spleen and liver.

5. To establish staging by ultrasound findings, using the same criteria used in the clinical staging of carcinoma of the cervix. (FIGO Classification).
MATERIALS AND METHODS

The study is an analytical prospective study with double blinding.

The study was done within a period of seven months.

The sample size was 100 patients.

Patients with a clinical diagnosis of carcinoma of the cervix were admitted in the gynaecology oncology ward for staging and biopsy under anaesthesia.

In this study in addition to the patients being staged by examination under anaesthesia, they were also staged by ultrasound. In both the staging methods the same criteria was adopted which was the FIGO classification (shown on table I).

The patients were first staged by ultrasound but the ultrasound findings were not put into the patients file until after the clinical staging by examination under anaesthesia was done.

The examinations under anaesthesia was done by a gynaecological registrar under supervision of a consultant gynaecological oncologist. And the ultrasound staging was done by the investigator of the study under supervision of a consultant.
In the examination under anaesthesia the extent of the tumour was checked for digitally. The extension into the vagina, parametrium, pelvic wall, bladder and rectum was looked for and the tumour staged according to its spread.

In the ultrasound examinations, pelvic ultrasounds were done on patients with a full bladder and both longitudinal and transverse scans were done to demonstrate the vagina, cervix, uterus and adhexa. The para-aortic regions were scanned in search for lymph node enlargement. The kidneys were examined to check for evidence of hydromephrosis. The liver and spleen were also examined to look for metastasis. On completion of the examinations the results were recorded in different data sheets examples of which are shown in the appendix.

The ultrasound findings were recorded first to reduce bias.

A 3.0 MHZ sector transducer on an orion philips machine was used. The selected images were printed on a high density printing paper.
RESULTS

100 patients were recruited and examined in this study. The ages ranged from 24 to 80 years with a mean age of 45 years. (fig. 1).

Parity ranged from para 1 to para 14. 79% of the patients being between para 5 and para 8. only 21% were para 4 and below. (fig. 2).

Vaginal bleeding, abdominal pain and vaginal discharge were the commonest complaints at presentation (Table 2).

Both examination under anesthesia and ultrasound examination identified cervical masses in 99% of the cases (Table 3).

At ultrasound majority of the masses 78% were found to be of mixed echo pattern (Table 4).

77% of the patients were found to have upper 2/3 of the vagina involved at ultrasound while only 64% were found to be involved by clinical staging. In 25% the vagina was not involved at all at examination under anaesthesia while only 16% were not involved at ultrasound (Table 5).

On examination under anaesthesia 76% of the cases were found to have parametrial involvement while only 26% were found to
be involved by ultrasonography. In 27% of the cases it could not be possible to tell if the parametrium was involved or not. (Table 6).

During examination under anaesthesia 30% of the patients had involvement of the pelvic wall but there was free space between the mass and the pelvic wall. In 50% of the patients there was no free space. And in 20% of the patients the pelvic wall was not involved (Table 7).

Involvement of the pelvic wall could not be determined in 80% of the cases by ultrasonography. In only 9% the pelvic wall was involved and in 11% the pelvic was not involved (Table 8).

Extension beyond the pelvis was looked for by both examination under anesthesia and ultrasound. 15% patients were found to have infiltration into the bladder by ultrasonography while only 1% was found to have bladder involvement by examination under anaesthesia. Rectal involvement was demonstrated in 4% by examination under anaesthesia while none was demonstrated by ultrasonography (Table 9).

Ultrasonography was able to show evidence of hydronephrosis and in 38% of the patients hydronephrosis was demonstrated (Table 10).
In all the cases evidence of lymphadenopathy either pelvic or para-aortic was not demonstrated.

Also distant metastasis to the liver or spleen was not demonstrated.

Figures 3 and 4 show staging by examination under anesthesia and by ultrasonography respectively. By examination under anaesthesia 14% were staged as stage IB, 27% as stage IIB, 46% as stage IIIB and 1% as stage IVB. While by ultrasonography 15% were staged as IB 23% as IIB, 29% as IIIB and 15% as IVB.

By comparison more patients 46% were staged by examination under anaesthesia as stage IIIB while only 29% were stage by ultrasound as IIIB. And more patients 15% were staged by ultrasound as stage IV while only 4% were staged as stage IV by examination under anesthesia (Figure 5).

On comparing the two stages 29% of the patients were staged lower by ultrasonography than by examination under anesthesia. 46% of the cases were staged the same by both examinations and 24% were staged higher by ultrasound than by examination under anesthesia. (Table 12).

The statistical differences between the two examinations were calculated by their ability to detect parametrial involvement
(Table 13) and it was found that the difference is statistically significant with a predictive value of 59.7%.
FIG. 1

AGE DISTRIBUTION

AGE GROUP IN YEARS

FREQUENCY

21-30  31-40  41-50  51-60  61-70  71-80
FIG. 2

DISTRIBUTION OF PARITY
## CLINICAL SYMPTOMS

<table>
<thead>
<tr>
<th>CLINICAL SYMPTOMS</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal bleeding</td>
<td>87</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>49</td>
</tr>
<tr>
<td>Vaginal discharge</td>
<td>40</td>
</tr>
<tr>
<td>Backache</td>
<td>8</td>
</tr>
<tr>
<td>Dysperunia</td>
<td>7</td>
</tr>
<tr>
<td>Abdominal Mess</td>
<td>3</td>
</tr>
<tr>
<td>Incontinence of urine</td>
<td>3</td>
</tr>
<tr>
<td>Palpitations</td>
<td>2</td>
</tr>
<tr>
<td>Weight Loss</td>
<td>1</td>
</tr>
</tbody>
</table>
TABLE 3

FINDINGS AT EXAMINATION UNDER ANAESTHESIA AND ULTRASOUND EXAMINATION

<table>
<thead>
<tr>
<th>MASS IN THE CERVIX</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination under Anaesthesia</td>
<td>99</td>
</tr>
<tr>
<td>Ultrasound examination</td>
<td>99</td>
</tr>
</tbody>
</table>
**TABLE 1**

**ECHO CHARACTERISTICS OF THE MASS AT ULTRASONOGRAPHY**

<table>
<thead>
<tr>
<th>ECHOPATTERN</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoechoic</td>
<td>14</td>
</tr>
<tr>
<td>Hypoechoic</td>
<td>7</td>
</tr>
<tr>
<td>Mixed echo</td>
<td>78</td>
</tr>
<tr>
<td>Examination under anaesthesia</td>
<td>Upper 2/3</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Ultrasound examination</td>
<td>77</td>
</tr>
</tbody>
</table>

**TABLE 5**

**EXTENSION INTO THE VAGINA**

ExamINATION UNDE R ANAESTHESIA
## TABLE 6

**PARAMETRICAL INVOLVEMENT**

<table>
<thead>
<tr>
<th>Examination under anaesthesia</th>
<th>Parametrium involved</th>
<th>Parametrium not involved</th>
<th>Can't tell if involved or not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination under anaesthesia</td>
<td>76</td>
<td>24</td>
<td>0</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>26</td>
<td>47</td>
<td>2</td>
</tr>
</tbody>
</table>
### TABLE 7

**Involvement of the pelvic wall by examination under anaesthesia**

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free space between mass and pelvic wall</td>
<td>30</td>
</tr>
<tr>
<td>No free space</td>
<td>50</td>
</tr>
<tr>
<td>Pelvic wall not involved</td>
<td>20</td>
</tr>
</tbody>
</table>

### TABLE 8

**Involvement of the pelvic wall by ultrasonography**

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelvic wall involved</td>
<td>9</td>
</tr>
<tr>
<td>Pelvic wall not involved</td>
<td>11</td>
</tr>
<tr>
<td>Can't tell if pelvic wall is involved</td>
<td>80</td>
</tr>
</tbody>
</table>
Table 9: Extension beyond the true pelvis

<table>
<thead>
<tr>
<th>Examination under anesthesia</th>
<th>Involvement of bladder</th>
<th>Involvement of rectum</th>
<th>Neither bladder or rectum involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>0</td>
<td>85</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 10

Evidence of hydronephrosis as demonstrated by ultrasonography

<table>
<thead>
<tr>
<th></th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>38</td>
</tr>
<tr>
<td>Absent</td>
<td>62</td>
</tr>
</tbody>
</table>
Other co-existing lesions found at ultrasonography

<table>
<thead>
<tr>
<th>LESION</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adnexal (ovarian cysts)</td>
<td>6</td>
</tr>
<tr>
<td>Cysts in the kidney</td>
<td>1</td>
</tr>
<tr>
<td>Ascites</td>
<td>1</td>
</tr>
<tr>
<td>Pleural effusion</td>
<td>1</td>
</tr>
<tr>
<td>Uterine fibroids</td>
<td>1</td>
</tr>
</tbody>
</table>
FIG 3: STAGING OF CERVICAL CANCER BY EXAMINATION UNDER ANAESTHESIA

1 CASE WAS NOT STAGED BY CLINICAL FINDINGS.
FIG 4: STAGING OF CERVICAL CANCER BY ULTRASOUND FINDINGS

FREQUENCY

IB IIA IIB IIIA IIIB IV
15 17 23 1 29 16
CANCER STAGE
FIG 5: COMPARATIVE STAGING OF CERVICAL CANCER BY ULTRASOUND AND AT E.U.A.

1 CASE WAS NOT STAGED BY CLINICAL FINDINGS
<table>
<thead>
<tr>
<th>CLINICAL STAGING AS COMPARED TO ULTRASOUND STAGING</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Staging by ultrasound</td>
<td>29</td>
</tr>
<tr>
<td>Same staging</td>
<td>46</td>
</tr>
<tr>
<td>Higher staging by ultrasound</td>
<td>24</td>
</tr>
</tbody>
</table>
### DETECTION OF PARAMETRICAL INVOLVEMENT BY ULTRASOUND AS COMPARED TO PARAMETRICAL INVOLVEMENT BY EXAMINATION UNDER ANESTHESIA

<table>
<thead>
<tr>
<th></th>
<th>BY ULTRASONOGRAPHY</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YES</td>
<td>NO</td>
<td>TOTAL</td>
</tr>
<tr>
<td>YES</td>
<td>24</td>
<td>28</td>
<td>52</td>
</tr>
<tr>
<td>NO</td>
<td>1</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>TOTAL</td>
<td>25</td>
<td>47</td>
<td>72</td>
</tr>
</tbody>
</table>

- **Sensitivity**: $\frac{25}{52} = 0.46$
- **Specificity**: $\frac{19}{20} = 0.95$
- **Predictive value**: $\frac{43}{72} = 0.97$

$= 59.7\%$
ILLUSTRATION 1

Normal Pelvic Scan

Transverse Scan
ILLUSTRATION 2

Carcinoma of the cervix stage 1b.

The mass is only confined to the cervix.
Carcinoma of the cervix stage II.

The mass is involving the upper 2/3 of the vagina.
ILLUSTRATION 4

Carcinoma of the cervix Stage IIIb.

The mass has involved the upper part of the vagina and there is bilateral hydronephrosis.
Illustration 5

Carcinoma of the cervix stage IVb.

There is infiltration of the bladder by tumour.
Carcinoma of the cervix with cor existing Right adhexal cyst.
DISCUSSION

Carcinoma of the cervix is the commonest female malignancy at the Kenyatta National Hospital (10, 13). The age at presentation is younger than that seen in the western countries. (14, 15).

In this study the predominant age group was 31 - 40 years with a mean age of 45 years. The oldest patient was 80 years while the youngest was 24 years old.

The early age at presentation is much younger in Kenya as compared to the western countries because in Kenya women marry quite young and therefore the age at first coitus is low. Very few patients were above 70 years and this is because few patients are in this age group in Kenya. Most patients die at an earlier age. Majority of the patients 68% were premenopausal. Unlike in the western countries where majority are postmenopausal.

Cancer of the cervix was found to be common in multiparous patients. 79% were found to be para 5 and above. 54% of the patients were found to have a parity of between 5 and 8. The mean parity was 6.8. This is similar to other studies done in Kenya (15).

Out of the 100 patients examined only one had been referred due to a positive pap smear. The others had presented with symptoms of the disease. The commonest presenting symptoms were vaginal bleeding, abdominal pain and
vaginal discharge (Table 3). Other presenting symptoms were backache, dysperunia, abdominal mass, incontinence of urine, palpitations and weight loss. Majority of the patients presented with a combination of symptoms.

Staging of the cancer of the cervix is mainly determined by the spread of the tumour. This is done using the FIGO classification (Table 1). Stage I the tumour is confined to the cervix. In Stage II the tumour has extended beyond the cervix but not extending into the pelvic wall; it involves the upper 2/3 of vagina and its divided into stage IIa and IIb depending on if the parametrium is involved or not. In Stage III the tumour has extended into the pelvic wall; it involves even the lower 1/3 of the vagina and there is evidence of hydronephrosis or non-functioning kidney. And it's divided into IIIa and IIIb where in IIIa there is no extension into the pelvic wall and IIIb there is extension into the pelvic wall and/or evidence of hydronephrosis or non-functioning kidney. Stage IV is extension of the tumour beyond the true pelvis, involving the bladder or rectal mucosa. And its divided in IVa and IVb depending on if it has spread to adjacent organs or to distant organs.

In this study the staging was done by both examination under anaesthesia and by ultrasonography. Both methods were found to be equally sensitive in demonstrating a mass in the cervix (Table 3). Ultrasound showed that the cervical masses were of different echogenicity. Majority of the masses 78% were of mixed echopattern where the mass was hypoechoic with multiple calcifications within it; referred to as the gun shot sign.
under anaesthesia than by ultrasonography. Distortion or absence of the vaginal stripe at ultrasound indicated that the vagina was involved. This was not usually accurate especially in cases where the cervical masses were large and extending into the vagina it would appear as if the vagina was involved at ultrasound while actually the vaginal walls might not have been involved.

Parametrial involvement was better demonstrated by examination under anaesthesia than by ultrasonography. On ultrasound it is not easy to tell if the cervical mass extended into the parametrium or not as the structures anterior and posterior to the cervix are superimposed onto each other in an ultrasound scan.

Pelvic wall involvement was also better assessed by examination under anaesthesia than by ultrasound. On clinical examination it is possible to determine if the tumour is separate from the pelvic wall or if there is no free space between the pelvic wall and the tumour. While as on ultrasound it is not possible to determine this. In majority of the patients 80% it was not possible to determine if the pelvic wall was involved or not, by ultrasonography.

Ultrasound is accurate in detection of hydronephrosis. 38% of the patients were found to have hydronephrosis by ultrasound. It is not possible to tell if the patient has hydronephrosis by examination under anaesthesia.

Ultrasonography is more accurate in determining bladder infiltration by tumour than examination under anaesthesia. When the bladder is full its outline is clearly seen on ultrasound. And if there is a break in the wall or the tumour extends into the bladder then it can be easily demonstrated 15% of the patients were found to have bladder infiltration by ultrasonography while only 1%
was found to have bladder involvement by examination under anaesthesia. Cystoscopy was not done during examination under anaesthesia and this contributed to the few bladder lesions seen.

On the other hand rectal involvement is better picked by examination under anaesthesia (rectal examination); but it is not possible to detect rectal involvement by ultrasonography, due to the gas in the rectum. It is not possible to demonstrate the rectum on a transabdomenal ultrasound probe.

Ultrasonography is good in the staging of advanced cervical carcinoma that is stage III and IV because it's accurate in demonstrating hydronephrosis and bladder infiltration. But it's not very accurate in staging I, II and IIIa where the kidneys or bladder are not involved. This is because it's not good in determining vaginal, parametrial and pelvic wall involvement. This compares well to what is documented in the literature that ultrasonography is good for staging of advanced cancer of the cervix and not for early carcinoma (9, 16).

In the study lymph node enlargement was not demonstrable this could have been due to presence of gas in the abdomen obscuring para-aortic nodes and also because transabdomenal ultrasonography is not a good mode of demonstrating lymph node involvement; especially if the lymph nodes were small less than 2cm in diameter.

Distant metastasis was also not demonstrated. This could have been that in all the cases examined non had metastasis to the liver big enough to be picked by ultrasound.
Only 46% of the cases were staged the same by both methods. 29% of the cases were staged lower by ultrasound than by clinical staging and this is because parametrial and pelvic wall involvement was not well assessed by ultrasonography. In a high percentage (80%) it was not possible to determine if the pelvic wall was involved or not. Ultrasonography was found to have a sensitivity of 0.46 (Table 13) in detection of parametrial involvement; and a specificity of 0.95. The predictive value is 59.7%. From this we can conclude that ultrasonography is not a good method of determining parametrial involvement.

24% of the patients were staged higher by ultrasonography than by clinical examination under anesthesia. This is because ultrasound is able to determine evidence of hydronephrosis and bladder infiltration. 3 patients who were staged clinically as stage Ib were found to have hydronephrosis on ultrasound and this changed their stage to IIIb. 12 patients who were staged as IIIb clinically were found to have bladder infiltration on ultrasound and this changed their stage to IV.

It was found that majority of the patients with carcinoma of the cervix at Kenyatta National Hospital present with advanced disease. 85% of the patients had stage II and above and at these stages the disease is inoperable and the management is radiotherapy and the prognosis is poor. This is because medical services are not readily available to a large proportion of the Kenyan population. So they can not have routine pap smears done to be able to detect the disease early. Whereas in the west medical services are readily available to majority of the patients.
Although ultrasound does not provide an accurate stage of early carcinoma of the cervix especially stage I and II, it plays an important role in advanced carcinoma where it demonstrates hydonephrosis and bladder wall involvement. This helps to determine those patients who will benefit from radiotherapy and those who will get only palliative treatment. Radiotherapy is not of much use in the late stage IVB where the bladder is infiltrated and the patient has developed fistule between the vagina and the bladder.

Ultrasonography is also useful in giving addtional information not related to the tumour; especially where other pathologies co-exist for example six patients were found to have ovarian cysts in addition to the carcinoma of the cervix. (Table 11).

The differential diagnosis of a mass in the cervix would include a cervical polyp, cervical fibroid and carcinosarcoma uteri especially as seen by ultrasonography, and biopsy and histology are important in confirming the diagnosis of carcinoma of the cervix. Other tumours in the bladder for example carcinoma of the bladder or metastasis from rectal carcinoma can also mimic carcinoma of the cervix with bladder involvement.
CONCLUSION

Ultrasonography plays a major role in the management of patients with carcinoma of the cervix.

It is a vital modality for staging advanced carcinoma of the cervix especially in very sick patients who are anaemic and can't be put under general anesthesia. Ultrasonography would be of great value if used in addition to examination under anesthesia in the staging of carcinoma of the cervix. It can be used in place of intravenous urography in determining the state of the kidneys as it does not require any contrast media or ionising radiation and is also much cheaper.
1. Ultrasonography should be performed on all patients admitted for clinical staging of carcinoma of the cervix

This is to improve on the staging as clinical staging even in the best of hands has a 25% error (15).
REFERENCES


16. SABBACHA E. RUDY. Diagnostic ultrasound applied to obstetrics and


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APPENDIX

DATA SHEET FOR ULTRASOUND FINDINGS

NAME

PATIENT NUMBER

AGE

PARITY

SONOGRAPHIC FINDINGS

A. Changes seen the cervix.
   (i) Mass 1. Yes
       2. No
   (ii) Size of the mass.
   (iii) Echocharacteristics of the mass.
       1. Hypoechoic
       2. Hyperechoic
       3. Mixed echo

B. Changes seen within the pelvis.
   (i) Break of cervical wall
       1. Yes
       2. No
   (ii) Extension into the vagina
       1. Upper 2/3
       2. Whole of the vagina
       3. None
   (iii) Involvement of the bladder wall.

58
1. Yes
2. No

(iv) Involvement of the parametria but no involvement of the pelvic wall.
1. Yes
2. No

(v) Involvement of the pelvic wall
1. Yes
2. No

(vi) Involvement of pelvic nodes
1. Yes
2. No

Evidence of Hydronephrosis
1. Yes
2. No

Distant metastasis

(i) Liver
1. Yes
2. No

(ii) Paraortic lymph nodes
1. Yes
2. No

(iii) Kidney
1. Yes
2. No
E. Sonographic Staging.

1. Ia
2. Ib
3. Ila
4. Ilb
5. IIIa
6. IIIb.
7. IV
DATA SHEET FOR CLINICAL FINDINGS

NAMES

IN PATIENT NUMBER

AGE

PARITY

A. SYMPTOMS

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>PV bleeding</td>
<td></td>
</tr>
<tr>
<td>(b)</td>
<td>Abdomenal paid</td>
<td></td>
</tr>
<tr>
<td>(c)</td>
<td>Dysperunia</td>
<td></td>
</tr>
<tr>
<td>(d)</td>
<td>Others------------------------(specify)</td>
<td></td>
</tr>
</tbody>
</table>

B. Clinical pelvic examination under Anaesthesia.

(i) Mass in the cervix.
   1. Yes
   2. No

(ii) Involvement of the vagina.
   1. upper 2/3
   2. lower 1/2

(iii) Parametrial involvement.
   1. Yes
   2. No

(iv) Involvement of the pelvic wall.
   1. Free-space between the tumour and pelvic wall.
2. No free space between the pelvic wall and the tumour.

(v) Involvement of the renal system.
1. presence of hydronephrosis
2. presence of non-functioning kidney
3. neither 1 or 2.

(vi) Extension beyond the true pelvis.
1. Involvement of bladder mucosa.
2. Involvement of rectum
3. Neither bladder nor rectum is involved.

(vii) Spread to distant organs.
1. liver
2. spleen
3. kidneys
4. lungs
5. none of the above

C. Clinical Stage.
1. Ia
2. Ib
3. IIA
4. IIB
5. IIIa
6. IIIa
7. IVa
8. IVb