Original Research Article

Transabdominal and transvaginal ultrasonography in uterine masses

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Abstract

The present study was undertaken to evaluate the role of trans-abdominal and transvaginal ultrasonography in the diagnosis of uterine mass. To evaluate the accuracy of trans-abdominal sonography (TAS) and trans vaginal ultrasonography (TVS) for the diagnosis of uterine mass. A total of 81 cases were evaluated. Majority of uterine masses were leiomyomas (56.79%). In the present study TAS&TVS detected leiomyoma 42 and 44; Endometrial carcinoma 2 and 3; Endometrial polyp 3 and 5; Molar pregnancy 12 and 12; invasive Mole 4 and 4; Carcinoma cervix 5and 5 cases respectively. In present study the number of Benign mass was67 (82.72%) and Malignant mass14 (17.28%). The incidence of uterine mass was highest in parous woman (60.5%).The sensitivity and accuracy of both TAS & TVS in the diagnosis of molar pregnancy was 100%. Overall, TVS is found to be superior to TAS in the diagnosis of uterine mass.

Keywords: uterine masses, trans abdominal sonography (TAS), trans vaginal sonography (TVS).

1. Introduction

Ultrasonography is the primary modality of imaging for evaluating gynaecological abnormalities. Ultrasonography provides information about the presence of pelvic mass determining the site of origin and relationship to other pelvic organs. Ultrasonography can evaluate morphological character of the mass along with associated ascites or adenopathy or other features suggesting malignancy. Diagnostic sensitivity and specificity of ultrasonography have increased with use of high frequency transvaginal transducer which provides better image resolution. Some of the relative advantages of ultrasonography are lack of ionising radiation, non-invasive nature of procedure, visualization of multiple plane of section, cost effectiveness, wide availability. Lack of ionising radiation makes ultrasonography preferable in some group of patients like pregnant woman, paediatric patient and woman planning to conceive.

TAS and TVS can have complimentary role. TAS by providing panoramic view helps evaluation of whole lesion and its relationship with other organ. TVS having better resolution provide better morphological character of lesion. The advantage of TAS is that it visualises the entire pelvis & give a global view. The limitations of TAS are examination of obese patients, patients who can't fill bladder or woman with retroverted uterus in whom fundus may be located beyond the focal zone of the transducer. The transvaginal ultrasonography uses high frequency transducer and probe is nearer to the organ under evaluation and therefore less attenuation by superficial tissue producing higher resolution image. The major limitation of TVS is limited field of vision (FOV). TVS is always preferred in suspected lesion of endometrium. The present study is undertaken to evaluate the role of transabdominal and transvaginal ultrasonography in the diagnosis of uterine mass. The objective of the study is to determine the accuracy of the transabdominal and transvaginal ultrasonography in the diagnosis of uterine mass.

2. Material and Methods

2.1 Study design

With the aim to evaluate the accuracy of transabdominal and transvaginal ultrasonography of 81patients who presented with clinical suspicion of pelvic mass, was taken for a period of one year from January 2010 - 2011 December. This prospective study was carried out in the department of Radiodiagnosis, Assam Medical College and Hospital, Dibrugarh. Tha inclusion criterion was patients with clinically suspected pelvic mass, and the exclusion criterion was paediatric patients, patients <15 years and unmarried patients.

Transabdominal and transvaginal ultrasound was done with 3.5 MHz and 6.5 MHz transducer respectively; in

seimens Acuson Anteres real time scanner. Based on ultrasound a provisional diagnosis was made. Sonographic diagnosis was compared with final diagnosis made on surgery or histo-pathological study. Uterine masses were found in various age groups (15 to >60 years). Highest incidence was found between 31-40 years (46.91%). The incidence of uterine mass was high in parous woman and constituted 49 (60.5%). Maximum number of uterine masses were found in the upper lower income group (37.04%). Table 1 shows the different cases encountered in our study.

2.2 Ultrasound findings

Ultrasonographic picture depend on a number of variables like relative composition of fibrous tissue and smooth muscle;type of degeneration (figure 1), presence of calcification (figure 1), oedema etc. Echogenicity varies from hypoechoic (figure 2) to echogenic, homogeneous to heterogeneous.

Figure 1 A: Subserosal leiomyoma indenting bladder on TAS shows calcification causing posterior acoustic shadowing

Figure 1B: Anterior wall subserosal leiomyoma with degeneration of same patient on TVS showing posterior acoustic shadowing

Table: 1 Uterine Masses encountered

Diagnosis	Number (n)	Percentage (%)
Leiomyoma	46	56.79
Endometrial Carcinoma	5	6.17
Endometrial Polyp	7	8.64
Molar Pregnancy	12	14.81
Invasive Mole	4	4.94
Carcinoma Cervix	5	6.17
Others	2	2.47
Total	**81**	**100.00**

Figure 2A: Small anterior wall leiomyoma on TAS

Figure 2 B: TVS of same patient shows multiple leiomyoma both anterior and posterior wall of uterus, largest noted in posterior wall.
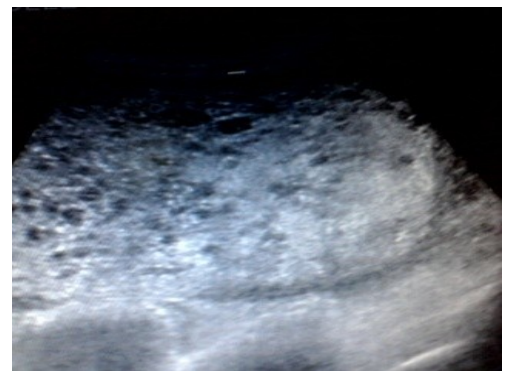

Figure 3 (A): Molar pregnancies on TAS shows multiple cystic spaces

Figure 3(B): TVS shows multiple cystic spaces in same patient, 21 year old with 16 weeks amenorrhoea

(TAS-Trans abdominal sonography; TVS-Trans vaginal Sonography)

The classical sonographic picture of molar pregnancy is enlarged uterus with a central heterogeneous echogenic mass in the uterine cavity. The mass contain multiple echogenic cysts of varying size which represents the hydropic villi (Figure 3 A and B). The cystic spaces vary from few millimeters to 2-3cm.
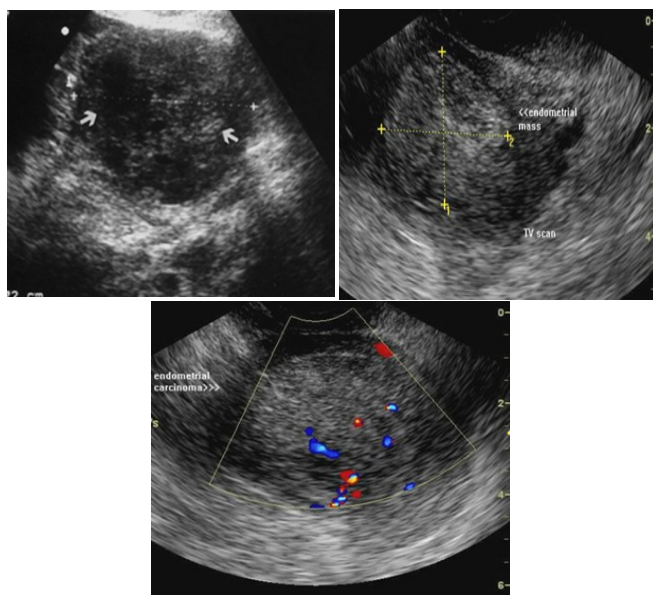
Figure 4: Endometrial carcinoma TAS & TVS shows highly vascular heterogenous mass lesion in endometrium, 55year old with vaginal bleeding

Endometrial carcinoma is one of the most common gynaecological malignancies. Median age of occurrence is 63 years while greater than 90% of women are older than 50 years [1]. A thickened endometrium with heterogeneous echotexture with poorly defined margins is considered cancer on ultrasound, until proved otherwise (Figure 4). It is suggested that low impedence blood flow in colour doppler study can be associated with malignancy [3-6]. In ultrasound endometrial polyp may be seen as nonspecific echogenic endometrial thickening which may be focal or diffuse. They may also appear as focal round echogenic mass within the endometrial cavity.

Figure 5: A 35 years old lady presented with recurrent vaginal bleeding for last 2 years

(A) Uterine polyp TAS shows a large mixed echogenic hypoechoic SOL within the endometrial cavity.
(B) Same patient on TVS shows feeding vessels with arterial pulse.
(C) Uterine polyp with feeding vessels on TAS.
(D) Uterine polyp on TVS

Colour Doppler shows a feeding artery in the pedicle of the polyp (pedicle sign) (Figure 5). Cystic spaces which represent dilated glands may be seen within the polyp and is considered characteristic feature [2].

Sonographically invasive mole (figure 6), choriocarcinoma may appear similar [7].

Figure 6: (A) Invasive mole TAS showing enlarged uterus with multiple hypo echoic cystic spaces.

Figure 6: (B) invasive mole same patient in TVS cystic spaces with invasion in to the myometrium

A 24 year old woman presented with amenorrhoea followed by bleeding PV since one year for which she had undergone D &E for several times
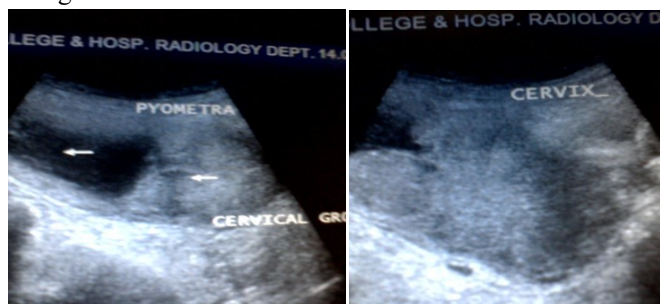

Figure 7: A 46 year woman presented with bleeding PV with pelvic pain
ca- cervix. PV- per vagina; **ca**-carcinoma

Cervical carcinoma on ultrasound commonly appears as heterogeneous hypoechoic, isoechoic mass. It may occlude the endocervical canal and hydro pyometra (Figure 7) may result most of the cases mass is isoechoic resulting in cervical enlargement which may be the only finding.

3. Results and Observations

Among the 81 patients, the incidence of uterine mass was higher in parous woman and constituted 49 (60.5 %). The

diagnoses of the cases encountered are shown in table -1. Comparative analysis is shown in Table -2.

Out of 81 cases, 67(82.72%) were benign and 14(17.28%) were malignant. Sonographic pattern of leiomyoma was hypoechoic in 26 (56.52%), hyperechoic 7(15.22%) and mixed echoic 13(28.26%).

Comparing the sonographic diagnosis of leiomyoma in TVS, the specificity was 91.40%, sensitivity was 95.60%, positive predictive value (PPV) was 93.60%, negative predictive value (NPV) was 94.10%, accuracy being 93.80%

On transabdominal (TA) scan the specificity was 87.50 %, sensitivity was 93.50 %, PPV 87.80 %, NPV 90.60 % and accuracy was 86.40%.Findings in endometrial carcinoma is shown in table 3. Endometrial polyp showed an accuracy of 96.20% on TVS, and 93.80 % on trans abdominal study. sensitivity being 71.40% and specificity being 98.60 % on TVS; on TA sensitivity 42.80 %, Specificity 98.60%, accuracy 93.80%. Invasive mole, molar pregnancy and carcinoma cervix showed a sensitivity, specificity and accuracy of 100% respectively.

Table 2: Diagnosis of the cases

Uterine Mass	Trans-abdominal Sonography (n)	Trans-Vaginal Sonography (n)	Final Diagnosis (n)
Leiomyoma	42	44	46
Endometrial Carcinoma	2	3	5
Endometrial Polyp	3	5	7
Molar Pregnancy	12	12	12
Invasive Mole	4	4	4
Carcinoma Cervix	5	5	5

Table 3: Findings in endometrial carcinoma

Sonographic Diagnosis	Final Diagnosis		PPV	NPV	Sensitivity	Specificity	Accuracy
	Positive	Negative					
	Number (n)		Percentage (%)				
TVS Diagnosis:							
◆ Positive	3	1	75.00	97.00	60.00	98.70	96.20
◆ Negative	2	75					
TAS Diagnosis:							
◆ Positive	2	1	66.67	96.10	40.00	98.70	95.00
◆ Negative	3	75					

4. Discussion

The present study was done to evaluate TAS and TVS in detection of various uterine masses. The most common uterine mass in the present study was leiomyoma. There was no case of uterine mass below 19 years in the present study. Hypoechoic pattern was the commonest encountered. Common sonographic picture was enlargement of the uterus with nodular architecture. Most cases had multiple myomas, however in few cases we missed the presence of multiple leiomyomas.

The size of ranged from 3-10 cms. The different types of degeneration like hyaline, fatty, myxomatous cannot be differentiated by ultrasonography except calcified degeneration. Different types of calcification within a leiomyoma was studied by Hassani(1970)[8]. Leiomyomas are common during pregnancy. We found five such cases (Figure 8). CuEzeetal[9] 2013 in their study found woman with myoma co-existing with pregnancy were12.3%. In the final diagnosis numbers of leiomyomas were 46. TAS and TVS diagnosed 42 and 44 cases of leiomyomas respectively; and incorrectly identified 7 and 3 cases of leiomyomas respectively. the final diagnosis of the 7 incorrectly diagnosed

cases by TAS were 3 cases of endometrial polyp,3 cases of endometrial carcinoma and 1 case of endometrial hyperplasia. The other 3 cases incorrectly diagnosed as leiomyomas on TVS were finally diagnosed as endometrial polyp (2 cases) and endometrial hyperplasia (1 case) after histopathological examination. This happened because the ultrasonographic picture simulated submucosal leiomyomas.

Figure 8: A 32 weeks pregnant lady presented with pain abdomen

In the present study sensitivity of TVS was 60% which is similar to other studies done by Kanat-Pektas[12] and Showkat M.S.[13] Endometrial thickness is considered to be indicator of benign and malignant endometrium. Endometrial thickness greater than 5mm is considered abnormal The results of the systematic study & meta-analysis done by Breijer M *et al*[10] 2013 do not justify the use of endometrial thickness as a screening test for endometrial carcinoma and atypical endometrial hyperplasia in asymptomatic postmenopausal women not using HRT.

In a recent study by Chandavarkar U [11] 2013 found that a sizeable proportion of woman with endometrial carcinoma have endometrial echo complex (EEC) ≤4mm. An EEC ≤ 4mm does not completely rule out endometrial cancer and cannot supplant histologic evaluation. One case of carcinoma cervix collection of fluid in uterine cavity (pyometra) (Figure 7) was detected and uterus was bulky. In carcinoma cervix performing a transvaginal ultrasonography is fraught with danger of vaginal bleeding.

5. Summary and Conclusion

Transabdominal and Transvaginal ultrasonography was performed in eighty one (81) women clinically suspected uterine mass. The study was conducted in the Department of Radiodiagnosis for one year. The objective of the study was to determine the accuracy of TAS & TVS in the diagnosis of uterine masses. In the study final diagnosis was made from surgical intervention or histopathological examination or follow up. Results of present study show TVS is superior to TAS in diagnosing endometrial carcinoma and endometrial polyp. Ultrasonography is the primary imaging modality for evaluation of uterine mass. It is widely available and cost effective. In the present study it was found that both TAS & TVS have high sensitivity & accuracy in the diagnosis of leiomyoma. TVS is superior to TAS in the diagnosis of submucous leiomyoma. It was found that TAS & TVS has high sensitivity in the diagnosis of mole & molar pregnancy of 2nd trimester. Sensitivity of TAS & TVS in the diagnosis of molar pregnancy of first trimester cannot be commented from the present study. The result of present study shows that TVS is superior to TAS in the diagnosis of endometrial polyp & endometrial carcinoma. The result of present study shows that the sensitivity of TAS & TVS in the diagnosis of carcinoma cervix in advance stage is high. The sensitivity of ultrasonography in diagnosing carcinoma cervix of early stage needs to be evaluated. Overall TVS is found to be superior to TAS in the diagnosis of uterine mass.

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