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Role of transvaginal sonography in the evaluation of post-menopausal bleeding

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Abstract
Introduction: Genital tract bleeding in the post-menopausal period is an alarming symptom. The probable causes are attributed to uterine, cervical and adnexal causes apart from the drug related or bleeding diathesis. The evaluation of these patients by transvaginal scanning helps the radiologist to diagnose with confidence.
Aim: To ascertain the etiological factors for post-menopausal bleeding by transvaginal ultrasound and to analyze the incidence of benign and malignant causes.
Materials and Methods: 180 patients referred for transvaginal scanning with complaints of post-menopausal bleeding were studied over a period of 12 months at our institute. All data were recorded and analysed.
Results: After applying inclusion criteria 50 patients who underwent transvaginal sonography with their results analysed, 23 patients (46%) had cervical lesions. 24 patients (48%) had endometrial lesions as a cause of their bleeding. Only three patients (6%) had ovarian mass contributing to their bleeding. The benign causes of post-menopausal bleeding are attributed to 28% and malignant causes to 72% as per our study.
Conclusion: Transvaginal ultrasound is the modality of choice for detection of benign and malignant lesions of cervix, ovaries and endometrium. Though complimentary, trans abdominal sonography is necessary to evaluate the paraaortic nodal involvement and liver metastases.

Keywords: Trans Vaginal Sonography (TVS), Post-Menopausal Bleeding (PMB).

1. Introduction
Post-menopausal bleeding is one of the commonest symptoms of female genital tract pathology. Bronz L, *et al*. suggested that abnormal post-menopausal vaginal bleeding is the most common reason for women to undergo an interventional gynecological procedure [1]. Endometrial measurements by transvaginal scanning in women with post-menopausal bleeding is used to discriminate between pathological and normal endometrium. Transvaginal sonography is used also to assess cervix, Uterine myometrium, ovaries and adnexal tissues. It has the potential to significantly improve the management of gynecological malignancy through early detection, staging of gynecological tumors and monitoring their response to therapy. Here in this study, we have evaluated patients with menopausal bleeding to ascertain the etiological factors and to assess the incidence of benign and malignant lesions in relation to their site of origin either cervix, endometrium, adnexal region or ovary.

2. Materials and Methods
A total of 180 patients referred for transvaginal sonography with history of first episode of bleeding in the post-menopausal period after the age of 45 years were studied at our institute in central Tamil Nadu. Transabdominal sonography was also done to evaluate for lymph nodal lesions and other visceral involvement. The study was carried between March 2008 to February 2009 over a period of 12 months. The inclusion criteria included only patients who had bleeding with one year gap since menopause. The exclusion criteria were unmarried women, patients who were already diagnosed carcinoma of genital organs and discontinued treatment, patients with extensive multi organ metastases at initial presentation and patients with hormone replacement therapy in the Post-menopausal period. After applying exclusion criteria, only 50 patients were finally included in our study. The Histopathological correlation was done through Dilatation and curettage as well as through post-surgical specimen.

Statistical Analysis

Statistical analysis was done by applying descriptive statistics. The categorical data is expressed in the manner of percentage and presented by tables.

Results

Of the 50 patients who underwent transvaginal sonography with their results analysed, 23 patients (46%) had cervical lesions of which 21 cases [91%] were picked up by both transabdominal and transvaginal study and 2 cases [9%] were only picked up by transvaginal study as the lesions were less than 2 cm.

24 patients (48%) had endometrial lesions as a cause of their bleeding. All cases were picked up by transvaginal sonography.

Only three patients (6%) had ovarian mass contributing to their bleeding.

There is bi-modal distribution with regards to onset of bleed since menopause with cases predominating within 5 years and the trend is on the higher side after about 16 years beyond menopause. [Fig -1]

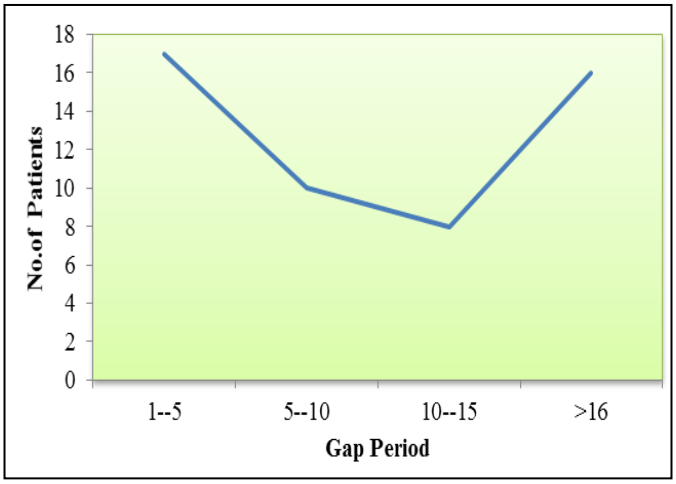

Fig 1: Onset of Bleed Since Menopause

The occurrence of post-menopausal bleeding due to endometrial cause predominated in the early post-menopausal period and cervical causes dominate in the late menopausal period. [Fig -2].

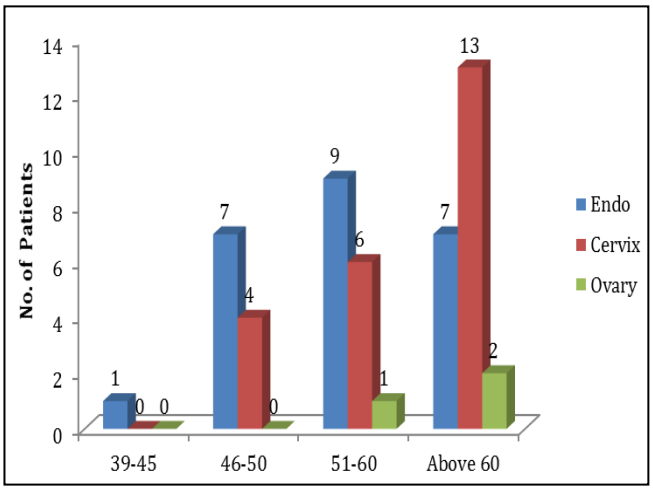

Fig 2: Age wise cause distribution

Nulliparity patients presented only with endometrial causes and multiparity patients present almost equally with endometrial and cervical causes in our study. [Fig -3]

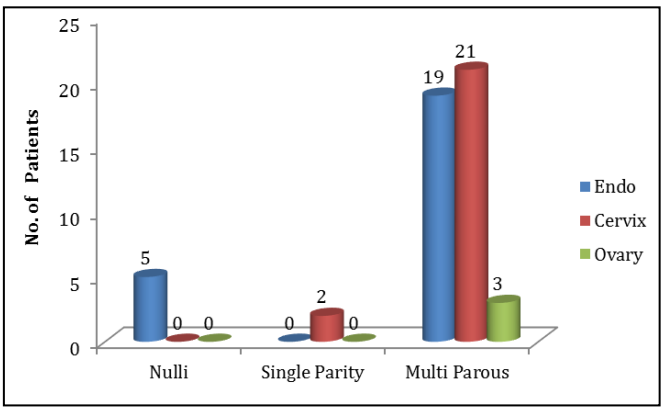

Fig 3: Parity wise cause of bleed

The pathological causes of post-menopausal bleeding are attributed to 9 cases of atrophic endometrium (18%), 2 cases of endometrial polyp (4%), 3 cases of endometrial hyperplasia (6%), 10 cases of endometrial carcinoma (20%), 23 cases of cervical cancer (46%) and 3 cases of ovarian malignancy (6%) as per our study. [Fig - 4 and 4a]

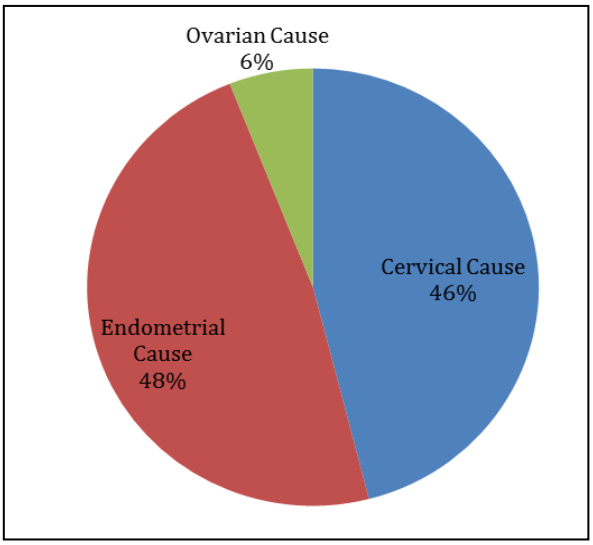

Fig 4: Causes of post-menopausal bleeding

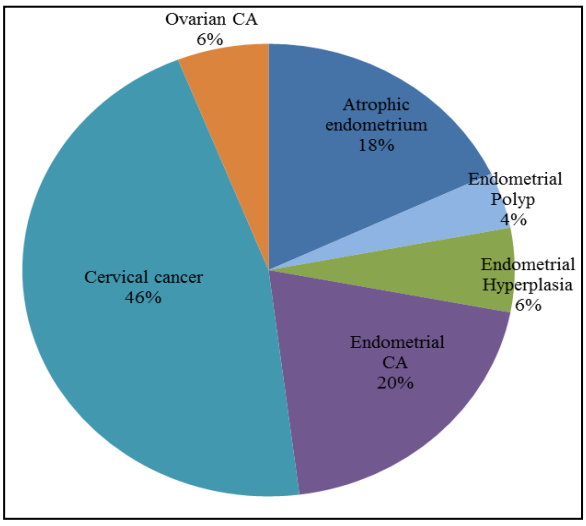

Fig 4a: Types Pathological Causes

Distribution of benign and malignant endometrial pathology with respect to age shown in Fig 5. The endometrial

morphology, thickness and its correlative pathology are given in Fig 6 and Fig 7. The histopathological results of the malignant causes are given in Fig 8.

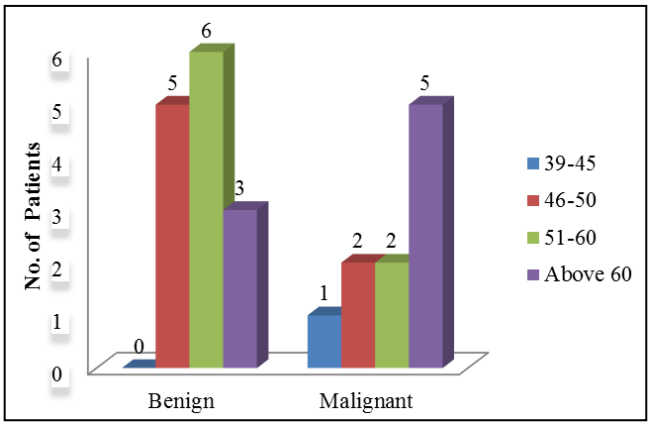

Fig 5: Endometrial pathology

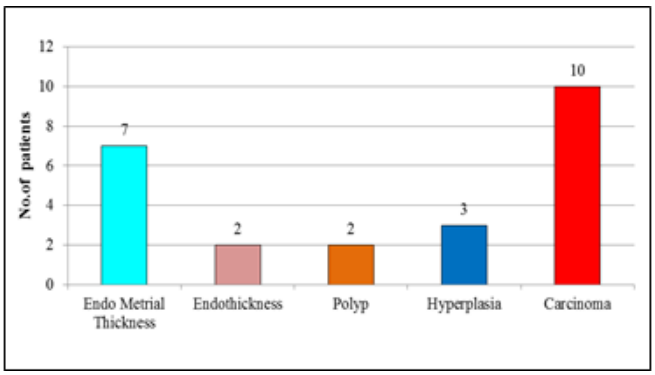

Fig 6: Endometrial thickness and pathology

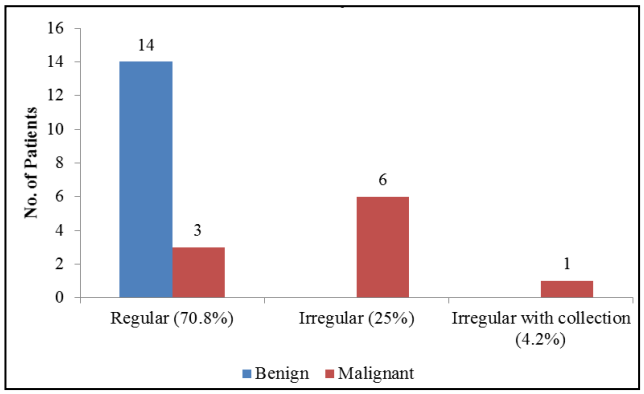

Fig 7: Regular versus irregular endometrium by tvs study

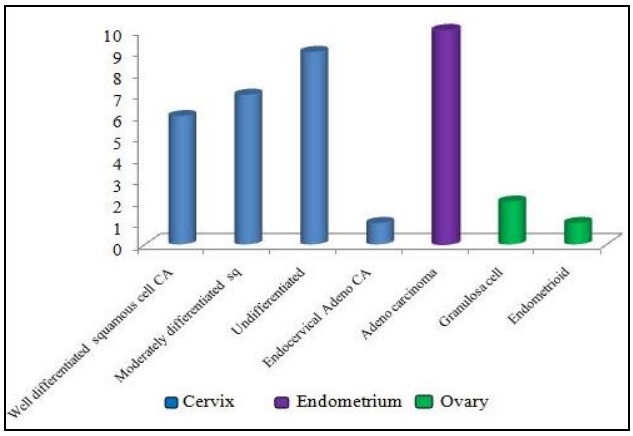

Fig 8: Histopathological resultsa

Discussion

Menopause is defined as the permanent cessation of menstruation due to loss of ovarian follicular function and hence lack of ovarian hormones. Clinically menopause is diagnosed retrospectively after 12 months of amenorrhea.

The endometrium atrophies in menopause and becomes thinned out in the absence of epithelial stimulation by estrogen. This appears in ultrasound as a pencil line echogenecity, which represent the thickness of tissues between two sides of the atrophic endometrium and is not more than 4 mm in thickness. Endometrial measurements by transvaginal scanning in women with post-menopausal bleeding are used to discriminate between pathological and normal endometrium.

The cervix gets atrophied along with uterus. When enlarged, transvaginal sonography detects lesion confined within the cervix. If the size of the lesion is more than 3.5 cm, cross sectional imaging helps to assess the spread to the myometrium.

The ovary lacks follicle after menopause and consists of non-specific solid echoes and is decreased in size. Ovarian volume shows progressive decrease and remains as 3 ml in the post-menopausal period. In evaluating ovarian lesion in the post-menopausal period, the grey scale observation of solid or cystic mass, areas of solid components in the cystic mass, thickness of the wall, septations, vascularity and internal echoes are taken into consideration.

Cohen I. *et al.* using a single layer endometrial thickness greater than 2.5 mm by transvaginal ultrasound detected 87.5% of women with abnormal pathologic endometrium [2].

Our study results correlated well with a Mumbai study that showed endometrial cause predominate in the early post-menopausal period and cervical causes predominate in the late Post-menopausal period [3].

In our study, it has been observed that even though carcinoma of cervix predominated in multiparous women, there were many cases of endometrial carcinoma as against nulliparous women who had only endometrial carcinoma.

It is also seen in our study that multiparous women had significantly higher incidence of benign endometrial conditions as cause for PMB (72%) as against nulliparous women who had less incidence of bleeding due to benign causes (16.6%). Multiparous women had endometrial carcinoma [28%] and nulliparous women had an incidence of 83.4% of endometrial carcinoma.

Analyzing the occurrence according to clear span of three phases, the prevalence of PMB in the third phase is more compared to other two phases. Phase I of 6-12 months (6%), phase II of 12-24 months (6%) and Phase III of more than 24 months (88%). This trend seen in our study is similar to that of the study conducted by Veena *et al.* [3]. From the graph obtained from our data, it is seen that there is bi modal distribution with cases predominating within 5 years and the trend is on the higher side after about 16 years beyond menopause.

Taking into consideration the endometrial thickness as less than 5 mm is due to atrophic endometrium [4, 5], transvaginal study turned to be sensitive in 78% of cases since there were two cases with 7 mm thickness who had also atrophic endometrium causing PMB. Among the other benign causes, polyps (14.2%) and endometrial hyperplasia (21.5%) contributed for PMB. The endometrial thickness in these cases ranged from 6-32 mm and hence the thickness criteria alone for endometrial pathology by transvaginal sonography will not be useful [6].

Regular endometrium outline favors benign pathology but our study showed 3 cases of regular endometrium which turned out to be malignant as adenocarcinoma. The sensitivity to diagnose

benign lesions with regular endometrium is 82% and false negative for malignancy in 18% [7].

Transvaginal sonography sensitivity to diagnose malignancy with irregular endometrium increases, if associated with endometrial cavity collection as noted in tamoxifen induced endometrial carcinoma.

Earlier studies [8, 9] showed cumulative effect of tamoxifen induces metaplasia leading to adenocarcinoma of endometrium. The effect also corresponded to the duration of intake of tamoxifen (as part of therapy in estrogen receptor positive case of carcinoma breast). The same was noted in our study wherein two patients had developed tamoxifen induced PMB after five years of drug intake with development of adenocarcinoma of endometrium.

As the endometrial thickness is increased in polyp, endometrial hyperplasia and endometrial carcinoma, the Doppler diagnostic criteria of resistive index and pulsatility index could not be demonstrated as useful, as cases with hyperplasia, polyp and carcinoma had similar flow pattern. Hence it is considered that transvaginal sonography can be used as a screening tool for ruling out endometrial pathology based on the thickness and partially echogenecity criteria [7].

Cervical causes of post-menopausal bleeding a per histopathological examination ranged from well differentiated squamous cell carcinoma to poorly differentiated squamous cell carcinoma and in one case it was endocervical adenocarcinoma.

Our study showed three cases with ovarian cause for PMB. Among these, two cases had ovarian lesions with wall thickness measuring 4 mm. The lesions were filled with high level internal echoes and did not show after shadowing or solid components. The endometrial thickness was 10mm. Both the lesions were turned out to be granulosa cell tumors [10, 11]. One case had bilateral thick walled [4mm] ovarian mass lesion with predominant solid component. The endometrial thickness measured 24 mm. This lesion was reported histopathologic ally as endometroid carcinoma. Colour Doppler demonstrated minimal flow within the wall in all three cases and could not distinguish between benign and malignant nature of the lesion in our study.

Conclusion

Transvaginal sonography as a preliminary examination is able to detect and locate the site of lesion as a cause for PMB. The transvaginal sonography is accurate in detecting cervical lesion of size less than 2 cm. In cases of endometrial pathology, the thickness criteria alone does not rule out malignant nature or confirm benignity. Hence, all cases have to be correlated with histopathological results. Parity does not give adequate protection from endometrial carcinoma. Malignant causes of post-menopausal bleeding are almost three times more common than the benign causes. Patients with breast carcinoma on Tamoxifen need to be evaluated as early as six months to rule out early malignant changes, because cumulative effect of tamoxifen induced metaplasia leading to adenocarcinoma of endometrium. Patients with regular endometrium are also not uncommon to have adenocarcinoma of endometrium. Though ovarian lesions are able to be detected by trans abdominal sonography itself, Transvaginal sonography contributed in assessing the wall thickness, septations, internal contents and blood flow with better resolution, however could not distinguish between benign and malignant nature of the lesion in our study

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