" The Relation between Endometrial Volume by Three-Dimensional Ultrasound and Histopathology in Women with Postmenopausal Bleeding ""

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Alshimaa Mahmoud Elbakshishi

DEDICATION

*To my **father** who taught me the principles and patience.*

*To my **mother, my brothers and my sister** who gave me the smile during hard times.*

*To my **husband**, who gave me the care and support.*

To all who supported me and sacrificed for me.

Alshimaa Mahmoud

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ABBREVIATIONS

2D US : Two dimensional ultrasound

3D US : Three Dimensional ultrasound

3D-PDA : Three dimensional Power Doppler angiography

B.M.I. : Body Mass Index

CS : Cesarean Section

CT : Computed Tomography

D&C : Dilatation and Curettage

E.T. : Endometrial thickness

E.V. : Endometrial Volume

EMP : Endometrial Polyp

FC : Fractional curretage

FI : Flow index

FIGO : The International Federation of Gynecology and Obstetrics

H.R.T. : Hormonal replacement Therapy

HNPCC : Hereditary Non Polyposis Colorectal Cancer

I.U.D. : Intrauterine Device

MRI : Magnetic Resonance Imaging

NICE : National Institute of health and care excellence

PMB : Post Menopausal Bleeding

RI : Resistance Index

ROI : Region of interest

S.T.I : Sexually Transmitted infection

SIGN : Scottish Intercollegiate Guidelines Network

SIS : Saline infusion Sonography

TV US : Transvaginal Ultrasound

TVS **:** Transvaginal Ultrasound

UK **:** United Kingdom

UPSC **:** Uterine papillary serous Cancer

VFI **:** Vascular Flow Index

VI **:** Vascularization Index

VOCAL **:** Virtual Organ Computer-Aided analysis.

WHO **:** World Health Organization

ABSTRACT

Postmenopausal bleeding (PMB) accounts for 5% of all gynecologic office visits. PMB must always be investigated because many causes may be premalignant or malignant. The current study is designed to determine the relationship between endometrial volume as measured by three- dimensional ultrasound imaging and the histopathological findings in the endometrium in women with postmenopausal bleeding and endometrial thickness more than 6mm.

PATIENT AND METHODS: This study is a prospective study in which 100 patients were recruited from the outpatient gynecological clinic, Kasr El-Ainy Hospitals, Cairo University. All patients presented with postmenopausal bleeding between 50 and 67 years old with a mean of 55.94±4.77 years. The mean body weight was 90.28±16.24 Kg. and the mean height was 164.47±4.2 cm. mean BMI was 33.59±6.88. The mean duration of menopause was 5.29±4.45 years. For each patient, full history, general, abdominal and pelvic examinations were performed. Routine preoperative investigations were done. This was followed by doing Transvaginal sonography with 3D endometrial volume measurement using the Built-in VOCAL software.

***RESULTS*:** Examination of the D&C samples revealed hyperplasia of the endometrium in 77 patients, atrophic endometrium in 17 patients and endometrial carcinoma in 6 patients. Hyperplasia was of simple type in 56 patients and of the complex type in 21 patients. The mean endometrial thickness was 12.3 cm ±5.77, minimum 6 (maximum was 36 mm), the mean endometrial volume was 9.84 ±20.8 (minimum 1.58 and maximum 140.5 cm^3). The mean endometrial thickness in patients with endometrial carcinoma was 26.46±8.98 while in the non-malignant patient was 11.39 ± 4.00. This difference was significant statistically ($P<0.01$). The mean endometrial volume in the carcinoma group was 69.69±61.22 while in the non-tumorous patients it was 6.02 ± 3.63. This difference was also statistically significant ($P<0.01$).

CONCLUSION: Endometrial volume was significantly different when used to compare between atrophic endometrium, benign endometrial pathology (endometrial hyperplasia and endometrial atrophy), and endometrial carcinoma ($P < 0.001$). further studies are needed to determine the exact cutoff value in those patients.

KEYWORDS:

Postmenopausal, bleedeing, 3D Ultrasound, endometrial, volume, cancer.

INTRODUCTION

Postmenopausal bleeding (PMB) can be defined as uterine bleeding occurring at least one year after menopause. PMB is a common clinical problem in both general and hospital settings. The incidence of spontaneously occurring PMB in the general population can be as high as 10% immediately after menopause ***(Breijer et al., 2010).***

PMB is often caused by abnormalities of the endometrium, whether they are benign or malignant. Of postmenopausal women with vaginal bleeding, 10%–15% have endometrial carcinoma. In contrast, the prevalence of endometrial polyps in patients with PMB and an increased endometrial thickness measured with transvaginal sonography (TVS) is estimated to be around 40% ***(Clark et al., 2006)***. Endometrial cancer is the most common malignancy of the female genital tract in developed countries. Unlike other malignancies, endometrial cancer often presents at an early stage when there is a possibility of curative treatment by hysterectomy. Survival decreases with increased staging and lower histological differentiation, thus accurate and timely diagnosis is important and should preferably be carried out by a safe, simple and minimally invasive method ***(Maklad et al., 2013, Cho et al., 2013).***

Fractional curettage (FC) was traditionally the method of choice for investigating patients with postmenopausal bleeding. However, in approximately 60% of the FC procedures less than half of the uterine cavity is curetted. Another drawback of FC is that this procedure is performed under general anesthesia in an inpatient setting ***(Breijer et al., 2010)***. Dilatation and Curettage (D&C) is now considered to be outdated practice and is replaced by less invasive outpatient evaluation using endometrial biopsy devices and outpatient hysteroscopy guided biopsies ***(Epstein et al., 2001)***.

Sensitivity of TVS endometrial thickness measurement in women with PMB is still controversial. Future research should aim at achieving a higher accuracy of the

diagnostic strategy applied. Such higher accuracy might be achieved by incorporation of patient's characteristics (e.g., age, presence of diabetes, Body Mass Index (BMI), presence of hypertension) in the diagnostic work-up ***(Timmermans et al., 2008)***.

Volume estimation is more reliably obtained using three-dimensional ultrasound (3D US), which overcomes some of the major limitations of conventional 2D US. With 3D US, a volume of a region of interest (ROI) can be acquired and stored for further analysis by virtual navigation, multiplanar display, surface rendering, or tomographic ultrasound imaging. Another ability of 3D US is volume calculation by using Virtual Organ Computer-aided Analysis (VOCAL) even in irregularly shaped structures; this technique has been demonstrated to be more accurate than 2D volume estimation. Recently, a new sonographic diagnostic tool, 3D power Doppler angiography (3D-PDA), has been developed. This technique allows the estimation of endometrial volume and a more objective assessment of endometrial vascularization. Several studies have confirmed that this technique is reproducible among different observers ***(Maklad et al, 2013)***.