

SONOGRAPHIC MEASUREMENTS OF UTERUS AND ITS CORRELATION WITH DIFFERENT PARAMETERS IN PAROUS AND NULLIPAROUS WOMEN

Dr. Ajay M. Parmar^{1*}, Dr. D P. Agarwal², Dr. Nipa Hathila³, Dr. T. C. Singel⁴

1. Assistant Professor, Department Of Anatomy, 2. Associate Professor, Department of Radio-diagnosis, 3. Assistant Professor, Department of Radio-diagnosis, 4. Professors, Department Of Anatomy, Pacific Medical College and Hospital, Udaipur.

*Email id of corresponding author- drajay9118@gmail.com

Received: 04/07/2016

Revised: 06/08/2016

Accepted: 18/08/2016

ABSTRACT

Aim: To determine normal standards of uterine dimensions by using ultrasonography and to find out correlation between size of uterus with age, height, weight and body surface area of parous and nulliparous women. **Material and methods:** This study consists 80 women (40 parous & 40 nulliparous) had sonography because of abdominal and /or pelvic problem unrelated to uterus. The uterine dimensions are measured and correlated with age, height, weight, body surface area in parous and nulliparous women.

Results: The result shows that the uterine length increases in 21 to 40 age group and decrease in 41 to 60 age group women. The uterine length increase with increase in the body weight, height, and body surface area in both parous and nulliparous women. The size of uterus are more in parous than nulliparous women. **Conclusion:** on the basis of the present study, it was concluded that the uterine length increase in 21 to 40 age group and decrease in 41 to 60 age group women. Positive correlation between uterine length and age, body weight, height, surface area is seen in parous but not in nulliparous women. The uterine length was less in nulliparous than that in parous women with corresponding age, body weight, body height, and body surface area.

Key words: Uterus, ultra sonography, uterine length, height, weight, body surface area.

INTRODUCTION:

The human uterus is a pear-shaped muscular organ composed of two anatomic region: the cervix and the corpus. normal standards of uterine dimensions are 7.6x4.5x3.

Non pregnant uterine size varies with age, number of pregnancies and patient endocrinological status, normal adult uterus measures approximately 7.2-9.0cm long, 4.5-6.0cm wide and 2.05-3.5 deep(1).

Uterine size has been found to be parity related and not age related(2). After menopause, uterine sizes decrease due to reduction of ovarian hormone.

Pelvic ultrasound is safe, non-invasive, and accurate method to investigate pathology and physiological changes of the female reproductive system(3).

Correlation between normal uterus measurements with age, height, weight, body surface area in both parous and nulliparous women by imaging method is very much important for radiologist. With this information patient will be helpful in management and treatment of uterine problems.

In order to establish our standards and to provide additional data to the literature on this subject, the purpose of our study is to investigate normal uterine measurements in healthy parous and nulliparous women. until now there is no work on correlation between uterine dimensions and age, height, weight, and body surface area in parous and nulliparous women.

The aim of this study to determine normal standards of uterine dimensions by using ultrasonography and to find out correlation between size of uterus with age, height, weight and body surface area of parous and nulliparous women.

MATERIAL AND METHOD:

This work was carried out after getting the permission from institutional ethical committee. The written informed consent of patient was taken.

Random sample of eighty women in Udaipur, Rajasthan, including rural and city areas were evaluated prospectively at radiology department of pacific medical college, Udaipur, Rajasthan from 1/4/2016 to 30/6/2016.

According to the parity, eighty (80) women separated in two groups; parous (40) and nulliparous (40).

Inclusion and exclusion criteria

Inclusion- healthy parous and nulliparous women.

Exclusion- pregnant women, women in menstrual cycle, pathological uterus.

Parity, age, height, weight, BSA determined for each woman. The body surface area (BSA) was calculated with the help of mosteller formula (4).

Uterine measurements are carried out by using high resolution ultrasonography machine.

1. Uterine length; from fundus to base of cervix (fig. A)
2. Uterine width; maximum transverse diameter of uterus
3. Uterine wall thickness
 - 3a. Anterior wall thickness;
 - 3b. Posterior wall thickness;
 - 3c. Total thickness;

Data were statistically analyzed and Pearson's correlation coefficient (r) was used to measure the strength of the association between two variables.

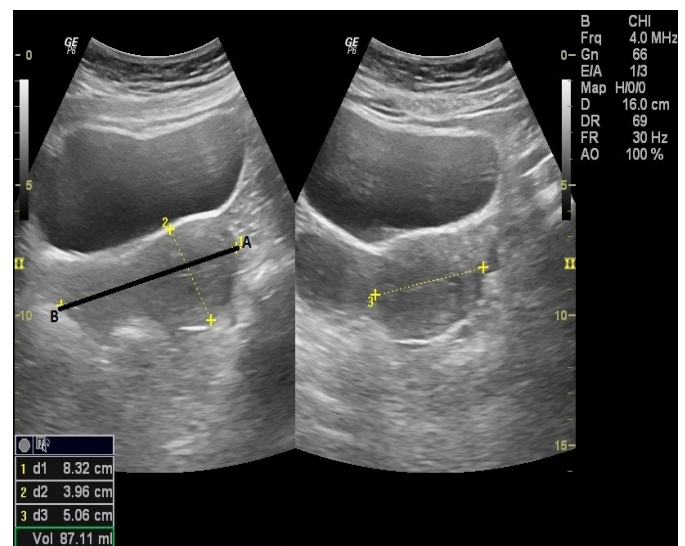


Fig-A- uterine length measured on sagittal section between funds (A) to base of cervix (B).

RESULTS:

The size of uterus in parous women is 9.07x5.19x4.14 and in nulliparous women are 7.10x4.52x3.27.

Table 1a shows that mean uterus length increase with increase in age 21 to 40 and decrease in 41 to 60 age group in parous women.

table 1b shows that mean uterus length increase with increase in age from 16 to 35 year age group in nulliparous women. The F ratio for parous women 9.81 is significant and for nulliparous women 0.64 is not significant.

Table 2a and 2b shows that mean uterus length increase with body height in both parous and nulliparous women. The F ratio for nulliparous women 0.32 is not significant and for parous women 12.57 is significant.

Table 3a and 3b shows that mean uterus length increase with weight in both parous and nulliparous women. The F ratio for nulliparous women 0.20 is not significant and for parous women 11.50 is significant. For all weight groups, the uterine height is more in parous than that in nulliparous women.

Table 4a and 4b shows that mean uterus length increase in both parous and nulliparous women with increase in body surface area. The F ratio for nulliparous women 0.05 is not significant and for parous women 14.40 is highly significant.

Table 1a- comparison of uterine length in different age group in parous women.

Age	N	Mean(cm)± S.D.	F ratio
21-30	10	8.15±1.19	F=9.81
31-40	10	9.02±1.06	P=0.03*
41-50	10	8.96±1.02	
51-60	10	8.15±1.43	
S.D.= standard deviation; N= number of subjects; * significant			

Table 1b- comparison of uterine length in different age group in nulliparous women.

Age	N	Mean(cm)±S.D.	F ratio
16-20	10	6.75±1.23	F=0.64
21-25	10	7.32±0.78	P=0.42*
26-30	10	7.38±0.80	
31-35	10	7.42±1.03	
S.D.= standard deviation; N= number of subjects; *not significant			

Table 2a- comparison of uterine length with height in parous women.

Height(cm)	N	Mean(cm)±S.D.	F ratio
146-150	7	7.25±1.34	F= 12.57 P=0.01*
151-155	11	8.50±0.55	
156-160	8	8.67±0.81	
161-165	6	8.72±1.29	
166-170	8	9.45±0.91	
S.D.= standard deviation; N= number of subjects; * significant			

Table 2b- comparison of uterine length with height in nulliparous women.

Height(cm)	N	Mean(cm)±S.D.	F ratio
146-150	10	7.01±0.55	F=0.32 P=0.57*
151-155	8	7.04±1.01	
156-160	8	7.10±1.18	
161-165	7	7.20±0.91	
166-170	7	7.48±1.12	
S.D.= standard deviation; N= number of subjects; *not significant			

Table 3a- comparison of uterine length with body weight in parous women.

Weight(kg)	N	Mean(cm)±S.D.	F ratio
31-40	7	7.35±1.25	F=11.50
41-50	10	8.02±1.34	P=0.02*
51-60	13	8.63±1.05	
61-70	10	9.06±0.86	
S.D.= standard deviation; N= number of subjects; * significant			

Table 3b- comparison of uterine length with body weight in nulliparous women.

Weight(kg)	N	Mean(cm)±S.D.	F ratio
31-40	8	6.91±0.60	F=0.20
41-50	14	7.06±1.00	P=0.65*
51-60	10	7.08±1.14	
61-70	8	7.45±1.05	
S.D.= standard deviation; N= number of subjects; *not significant			

Table 4a- comparison of uterine length with body surface area in parous women.

Body surface area(m ²)	N	Mean(cm)±S.D.	F ratio
1.21-1.30	7	7.35±1.25	F=14.40
1.31-1.40	7	8.44±1.45	
1.41-1.50	8	8.90±0.94	
1.51-1.60	7	8.94±0.80	P=0.001*
1.61-1.70	11	8.98±1.28	
S.D.= standard deviation; N= number of subjects; *highly significant			

Table 4b- comparison of uterine length with body surface area in nulliparous women.

Body surface area(m ²)	N	Mean(cm)±S.D.	F ratio
1.21-1.30	8	6.93±0.84	F=0.05
1.31-1.40	7	7.02±1.14	
1.41-1.50	7	7.08±0.76	
1.51-1.60	9	7.27±0.90	P=0.8*
1.61-1.70	9	7.62±1.23	
S.D.= standard deviation; N= number of subjects; *not significant			

DISCUSSION:

The size of uterus varies in different individual. Uterine size was assessed by using transabdominal ultrasound. Our objective in the present study was to define normal limits of uterine dimensions in parous and nulliparous women.

Becker and colleagues reported transvaginally obtained normal ranges in uterine dimensions and calculated uterine weight based on examination of 839 patients with apparently normal uteruses and of 85 patients before planned hysterectomy(5). Saxton and co-workers tested the validity of the transvaginal sonographic measurements. In their study they compared uterine and ovarian dimensions obtained preoperatively by ultrasound with measurements taken after hysterectomy (6).

The previous study by Piironen and Kaiholathat uterine size in adulthood is parity-related (2) and that, within the same parity group of women, there is no age-related effect on uterine size(7). The difference in uterine size (including all three measured parameters) between premenopausal women with one or more deliveries and nulliparous was consistent: the statistical mean of uterine length obtained in the group of

multiparas was $9.2 \text{ cm} \pm 0.8$ (SO) compared to $7.3 \text{ cm} \pm 0.8$ (SO) of nulliparas. According to our findings, there is also a significant change in uterine size between primiparas and multiparas. In present study mean uterine height in nulliparous $7.10\text{cm} \pm 1.05$ and $9.07\text{cm} \pm 1.22$ parous women.

The previous study by Moawia Gamersddin, found that there is a significant reduction in all uterine measurements except the cervical length with increasing both age and period since menopause(8).

In present study there is also significant reduction in all uterine measurements in age from 41 to 60 years age group women.

CONCLUSION:

In the present study, an attempt has been made to determine the normal range of the uterine dimensions and to correlate length with body height, body weight, and body surface area in parous and nulliparous women.

The uterine dimensions were measured by ultrasound in 40 parous and 40 nulliparous women.

On the basis of the present study following conclusion were drawn:

- The size of uterus in parous women is $9.07 \times 5.19 \times 4.14$ and in nulliparous women are $7.10 \times 4.52 \times 3.27$.
- The uterine length increase with increase in age in from 21 to 40 years and decrease in 41 to 60 years age in parous women, it increases with increase in all age group in nulliparous women.
- Positive correlation between uterine length and age, body weight, height, surface area is seen in parous but not in nulliparous women.
- The uterine length increase with increase in body height, body weight, and body surface area.

- The uterine length is less in nulliparous than that in parous women with the corresponding age, body height, and body weight and body surface area.

REFERENCES:

1. <http://www.drapplebaum.com> Accessed on 1/7/2016
2. Piironen O, Studies in diagnostic ultrasound. Size of the non-pregnant uterus in women of child-bearing age and uterine growth and foetal development in the first half of normal pregnancy, *Acta Obstet Gynecol Scand*, Suppl. 1975; 46:1-60.
3. Bridges NA, Cooke A, Healy MJR, Hindmarsh PC, Brook CGD. Growth of the uterus. *Arch Dis Child* 1996; 75: 330-331.
4. Mosteller, R. D. "Simplified calculation of body-surface area." *The New England journal of medicine* 317.17 (1987): 1098.
5. Becker, R., Entezami, M., Hese, S., Vollert, W., Loy, V. and Weitzel, H. K. (1994). *Gynakologische Sonographie II. Normalwerte der standardisierten Uterusbiometrie. Ultraschall Klin. Prax.*, 8, 241-7.
6. Saxton, D.W., Farquhar, C.M., Rae, T., Beard, R.W., Anderson, M.C. and Wadsworth, J. (1990). Accuracy of ultrasound measurements of female pelvic organs. *Br. J. Obstet. Gynaecol.*, 87, 659-99
7. Piironen, O. (1975). Studies in diagnostic ultrasound: size of the non-pregnant uterus in women of child-bearing age. Uterine growth and foetal development in the first half of normal pregnancy. *Acta Obstet. Gynecol. Scand.* (Suppl.), 46, 22-53
8. Moawia Gamersddin, Maha Haj Ali, Mohamed yousef, Sonographic size of uterus in postmenopausal Sudanese women. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*; Volume 6, Issue 2 (Mar.- Apr. 2013), PP 65-67.