

Uterine involution after term childbirth

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Summary:

Background: uterine involution is the process by which the postpartum uterus returning to its prepregnant state by the process of autolysis. The aim of the study is to follow the uterine involution sonographically during the first two weeks of puerperium and clinical correlation of several puerperal conditions was sought.

Patients and methods: One hundred full term women were delivered in one of Baghdad hospital during a six month period were followed by serial sonogram during the first two weeks of the puerperal period to show the normal process of uterine regression in relation to several condition. The rate of uterine involution were shown as percentage drop in uterine volume at day (7) and day (14) compared to day (1).

Results: 59 patient included in this project were delivered vaginally, and 41 patient delivered by emergency C/S.

The mean percentage drop in uterine volume in vaginal delivery was 39.9% at 7 days postpartum & 62.7% at 14 days postpartum and in those delivered by C/S was 27.9% at 7 days and 55.2% at 14 days postpartum.

24 patients had an abnormal offensive lochia and high vaginal swab was positive for the presence of pathogenic organisms is 46% and negative in 54% in the 7th postpartum day.

The mean percentage drop in uterine size was faster in women delivered infant less than 4 kg. (37% drop) compared to those delivered infant more than 4 kg. (26% drop) in the 1st 7 days postpartum regardless to the mode of delivery but the body weight loses its effect in the 14th day postpartum.

Conclusion: The uterine involution is faster in women delivered vaginally compared to those delivered by emergency C/S regardless to the weight of the newborn. The uterine involution is delayed in women delivered newborns weighing more than 4 kg., also the uterine involution is delayed in women who are their high vaginal swab show presence of pathogenic organism. No correlation was found between breast feeding & rate of uterine involution.

Key word: puerperal uterus, ultrasound, mode of delivery, lochia, foetal weight, type of infant feeding.

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Introduction:

The puerperal period is defined as the six weeks immediately following delivery. The physiological regression of the uterus was one of the first subjects studied when ultrasound was introduced into clinical obstetrics. The expected time of involution and the presence of normal variations are of critical importance in interpreting pathological condition.

Significant complication can occur, however, during the puerperium, a time usually considered one of resolution and repair after childbirth. Sonography has been employed to evaluate the puerperal uterus for identification of retained secundines in cases of puerperal haemorrhage, and in defining of abscesses, phlegmons and haematomas. (1) The purpose of this study is to show the normal process of uterine regression during the first two weeks of the puerperium, clinical correlation of several puerperal conditions was sought.

Materials and methods:

This study had been carried out in one of Baghdad hospital for a period of six months. Hundred term primiparous women who had presented in active

labour and delivered singleton pregnancy were followed by serial sonogram during the first two weeks of puerperium at first, seventh, and fourteenth day postpartum to evaluate the uterine involution and finding the correlation between the drop in uterine size in relation to mode of delivery, method of newborn feeding, weight of newborn & the presence of genital tract infection.

At the 7th postpartum day, high vaginal swab was done to those who complaint from offensive or abnormal colour lochia to detect an early genital infection.

Ultrasound: The ultrasonic examination was performed with an empty bladder in order to prevent distortion of the uterine anatomy.

A seimen sonoline SL ultrasound machine was used and both 3.5 MHZ sector and linear transducer were used.

The parameters used in our study were measured with electronic callipers including: the length, antero-posterior measurement taken from the sagittal section of the uterus, the transverse diameter of uterine body (width) taken from the transverse section, the uterine volume (cc) were assessed using Simpsons-method in which the volume is calculated

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by adding partial volumes (slices of equal height [h] but of varying diameter {d})

$$v = \frac{h}{4} \times (D_1^2 + D_2^2 + \dots + D_n^2) \pi = \frac{22}{7}$$

The largest endometrial cavity dimension was taken from the sagittal section.

Result:

59 women included in this project were delivered vaginally .the other 41 women delivered by emergency caesarean section.The mean percentage drop of uterine size is faster in vaginal delivery in comparison to caesarean section at 7 and 14 days post mortum as shown in fig(1).70 of women were breast feed their newborn, other 30 women were bottle feed their new born .

There is no difference in mean percentage drop of uterine size according to method of new born feeding (fig2).(t=1.083, at 7 days t=1.325 at 14 days, p value less than 0.01. 24 of women had an abnormal offensive lochia in the 7th post partum day bu all were afebrile and had no other complaint (fig. 3).High vaginal swab was performed to them and the presence of pathogenic oraganisms was shown in 46 %(11/24) and the negative smear for pathogenic organism was 54 %(13/24).There is significance difference in the mean percentage drop in uterine size in infected group at 7 days (t=2.7, p less than 0.05 and at 14 day post partum 9t= 3.94, p less than 0.05. The percentage drop of uterine size was 28.4%, 43.5% at 7 days and 14 days post partum in the infected group compared to 42.2% 63.6 at 7 and 14 days in non infected group.

30 of the newborns were delivered by c/s and their body weight were below 4 kg. the other 11 new - borns had body weight more than 4 kg. 51 newborns delivered vaginally and their body weight were less than 4 kg and 8 newborns had body weight more than 4 kg. By using one way analysis of variance (ANOVA). The mean percentage drop in uterine size was delayed in 1st 7 days in heavier newborns t=5.15,p less 0.01. But this correlation was not of significant at 2 weeks after delivery regardless to mode o delivery t=3.03, P LESS THAN 0.01(fig.4, fig 5)

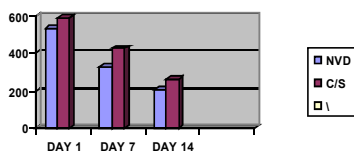


Fig.(1) :Drop in uterine size according to mode of delivery

NVD 531.5cc (day 1) 324.4cc(day 7) 204.2cc (day14)

C/S 593cc(day1) 425.8cc(day7) 262.6cc(day14)

Percentage drop in uterine size

NVD	39.9%	62.7%
CS	27.9%	55.2%

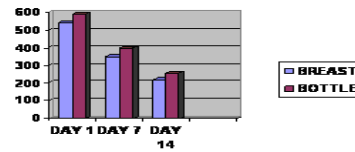


Fig.(2) Drop in uterine size according to mode of newborn feeding

Breast	451.6	352.2	216.2
Bottle	591.8	398.1	256

Percentage drop in uterine volume

Breast	36%	60.8%
Bottle	32.6%	56.9%

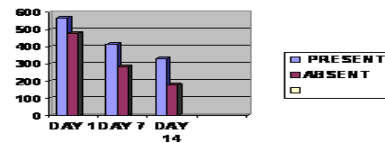


Fig. (3) : Drop in uterine size according to the presence of pathogenic organisms

Pathogene

Present	568.5	414.4	331.1
Absent	478.2	284.3	177.1

Percentage drop in uterine size

Present	28.4%	43.5%
Absent	42.2%	63.6%

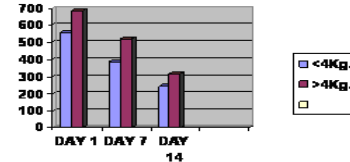


Fig. (4): Drop in uterine size in CS according to newborn weight

<4 kg	560	390.5	241.8
>4 kg	683	522	319.4

Percentage drop in uterine size

<4kg	32%	26.3%
>4kg	22.1%	43%

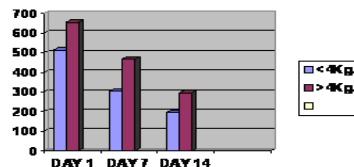


Fig.(5) : Drop in uterine size in NVD according to newborn weight

Uterine size (cc)

<4 kg	513.5	304.5	196.1
>4 kg	654.6	468.4	295.3

Percentage drop in uterine size

<4kg	41.8%	62%
>4kg	26%	50.5%

Discussion:

The uterus naturally regresses during the puerperium, with the most rapid involution occurring during the first week (2). In this study the degree of regression correlated significantly with the route of delivery, neonatal birth weight, & presence of positive vaginal smear for microorganism, but no significant correlation was found with type of infant feeding.

The uterus regains its usual non pregnant size within six weeks, going from 1000 gr. immediately postpartum to 100 gr. In pregnancy the muscle fibres eventually become ten times as long & five times as broad, those in resting organ. The stimulus is partly mechanical & partly hormonal (3).

Regeneration of the endometrium is complete by third week postpartum but regeneration of placental site not complete until 5-6 weeks (3).

Ultrasound is a valuable adjunct to the clinician in cases of potential puerperal morbidity.

To understand the normal involutional process of the uterus after delivery & the sonographic variations in tissue texture, anatomical clarity & incidental findings will critically assist in the identification of pathology. (4)

the mean percentage drop of uterine size in vaginal delivery is faster than caesarean delivery at 7 days (39.9% vs. 27.9%) & 14 days postpartum. (62.7% vs. 55.2%) (p<0.05)

this can be explained by the fact that vaginal delivery is normal process causing no iatrogenic injury to the myometrium while in caesarean section the uterine incision undergoes healing by regeneration of muscle fibre with little or no response (5).

J. Patrick (1989) found there were no difference between method of delivery and uterine involution, (6). He use the mean area of uterus in flat plane (cm.) while in our study the uterine volume is used & probably this is more accurate way for uterine measurement as it involves the entire uterine dimension.

Gonzalez-E. (1992), and Patrick (1989) found no significant difference appreciated in the uterine involution that depend on lactation & that is notice by Madrazo BL (1985) & Van Rees-D. (1981) (7,8,9). But according to human physiology, the oxytocic hormone or oxytocin which is octapeptide secreted by posterior pituitary is so named because of its ability to cause uterine muscle & myoepithelial breast duct cell contraction and these stimulate both labour and lactation, it released by complex neuroendocrine mechanisms, its action to enhance rhythmic uterine contraction during labour probably due to release of calcium ions in the myometrium, which bring about the smooth muscle contraction. Oxytocin released during milk letdown causes increased uterine contraction, hastens uterine involution, and thus decreases postpartum blood loss. (10)

In this study there is significant correlation between percentage drop of uterine size & neonatal weight during the first week postpartum so the higher the

weight, the slower rate of involution, but this correlation mostly noticed during the first week postpartum as the process of involution is rapid during this time, such observation had been made by Patrick (1989) (6)

High vaginal smear were performed for those patient who compliant of an abnormal colour or offensive lochia in 7th postpartum day. Vaginal colonization presumably results from contamination by rectal flora. Although maternal colonization is common, invasive disease in term neonate is rare (11). The study show that the presence of bacterial vaginosis is not an independent risk factor for postpartum infection such an observation had been made by (J.M. Pipe, E.R. Newton, 1995) (12).

Our aim from doing the vaginal smear is to detect any pathogen as early as possible and treat the condition before the occurrence of endometritis.

Infection is acquired from hospital personal in circumstance where scrupulous aseptic technique is not observed or from an endogenous source.

Cellulites resulting from vaginal or cervical laceration, may be the site of infection as if the endometrium particularly where endometritis occur in the zone of placental attachment.

Genital tract infection can occur when the conditions are most favourable for it in the first few days postpartum as the rapid dissemination of infection may occur from the area which is susceptible to organisms because its large vascular surface covered by cellular debris. (13)

Conclusion:

The uterus naturally regresses during the puerperium, with the most rapid involution occurring during the first week. Ultrasound is a valuable adjunct to the obstetrician in cases of potential puerperal morbidity by knowing the normal involutional process of the uterus after delivery as the sonographic variations in tissue texture, anatomical clarity and incidental findings will critically assist in the identification of pathology. Preventive ultrasonic examination in the puerperium before leaving the hospital can forestall postpartum complication.

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