Postpartum Ultrasound

Review Article

Introduction

Postpartum period usually includes **six subsequent weeks** during which normal pregnancy involution occurs and the uterus returns to the nonpregnant state.

The involution of the uterus, as a main characteristic of the puerperium was previously assessed by palpation of the fundal height.

Since, the introduction of ultrasound (USG) in clinical practice by Ian Donald et al (2) in 1958 the uterus became one of the first organs to be examined. (3-7) However, few studies have focused on USG investigations during the puerperium and results of published studies are not unambiguous. (1-16)
In published studies concerning the involution process, **the length**, (4,6-9,11,12,14) **width**, (8,9,12) **anteroposterior diameter**, (3-7,11-13,16) area, (9) **thickness of the uterine wall** (10) and **volume of the uterus and the uterine cavity**, (15) have been used as a measure of uterine involution.

Majority of the studies described **pathological conditions** without knowledge about normal findings, (4,5,8) they were restricted to the **early puerperium** and designs were **cross-sectional**. (3-7,12) A few studies concerning uterine cavity during normal puerperium have been published. (13-16)

Normal Puerperium

A description of normal ultrasound changes of the uterus and uterine cavity during puerperium is a prerequisite for ultrasound diagnosis of pathological conditions

Normal Puerperium

In the **early and middle puerperium (in the first 2 weeks)** the **transabdominal** approach is to be recommended.

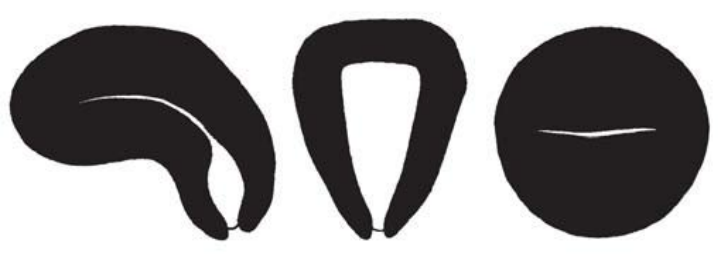
A relatively short focal length of the vaginal probe limits its use during the early postpartum period, when the uterus is too large and lies near the abdominal wall.
In contrast, during **the late postpartum period (> 2 weeks)** a high frequency **transvaginal** probe, which better distinguishes minor details, should be used. At that time, the uterus is considerably decreased in size and it lies in the true pelvis.
We can differentiate three typical ultrasound images during normal puerperium: In the **early, middle and late puerperium.**

Normal Puerperium

The postpartum uterus should be examined in three standard sections: sagittal, transverse and coronal.

Urinary bladder should be moderately filled.

Gentle compression with the probe should be used in order to avoid uterine distortion.



01

Early Puerperium

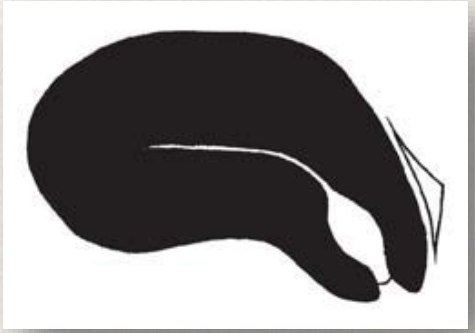
There are two physiological lifesaving processes occurring soon after placenta delivery:

1. Myotamponade (compression of the vessels by myometrial contraction).

2. Thrombotamponade (enhanced blood clotting activity).

The appearance of ultrasound finding in the early postpartum period reflects these physiological changes.

Early Puerperium



The uterus has an angulated form.
It lies in a **slightly retroflexed position** and **arches over the sacral promontory**.

This angulated form of the early puerperal uterus is typical only in early puerperium and it is **artificial**.

An extremely great degree of uterine deformability is caused by a **heavy uterine corpus**, a hypotonic lower uterine segment and **supine position** of the examined woman.

Early Puerperium

Lifesaving uterine contraction approaches anterior and posterior uterine walls and just a **virtual cavity appears**.

The uterine cavity is empty and **decidua appears as a thin white line** from the fundus to the level of the internal cervical os.

Sometimes, this line can be **irregular and thicker**, which probably depends on the amount of **retained decidua**.

Early Puerperium

The separation of the placenta and membranes generally occurs in the **spongy layer**; however the level varies. In 1931, Williams wrote concerning the line of separation of the placenta and membranes: 'While separation generally occurs in the spongy layer, **the line is very irregular so that in places a thick layer of decidua is retained, in others only a few layers of cells remain**, while in still others **the muscularis is practically bare**.

Early Puerperium

The variation in sonographic appearance of the cavity could be seen as a demonstration of these physiological variations in retained decidua. **The white thin line** seen on ultrasound might possibly represent cases in which only **the basal decidual** layer is retained or if the muscularis is practically bare.

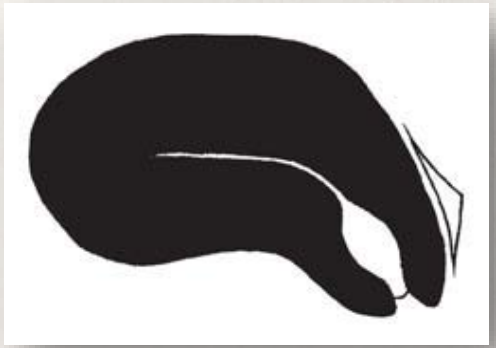
Whereas the **thicker and more irregular lines** might represent cases with retention of more amount of **spongy decidual layer and perhaps fragments of membranes**.

Early Puerperium

Fluid or echogenic mass is not common finding in the cavity in the early postpartum period

Small echogenic or echolucent dots in the cavity are harmless physiological findings

A heterogeneous mass with fluid and solid components can be seen in the cervical area.



This finding has no clinical significance and the mass is usually expelled spontaneously. It probably reflects a collection of blood, blood clots and parts of membranes.

Early Puerperium

On the posterior wall of the uterus the prominent uterine vascular channels are regularly seen

They usually disappear during the 2nd and 3rd postpartum weeks as a result of involution process, which decreases both the size and the amount of uterine vessels.

Gas in the cavity is not common finding in the early postpartum period although it can be occasionally seen.

Wachsberg detected gas in 19% of normal population during the early postpartum period.

02

Middle Puerperium

Middle Puerperium

In the middle part of the puerperium (1-2 weeks postpartum):

the uterus is diminished,

the shape of the uterus is oval.

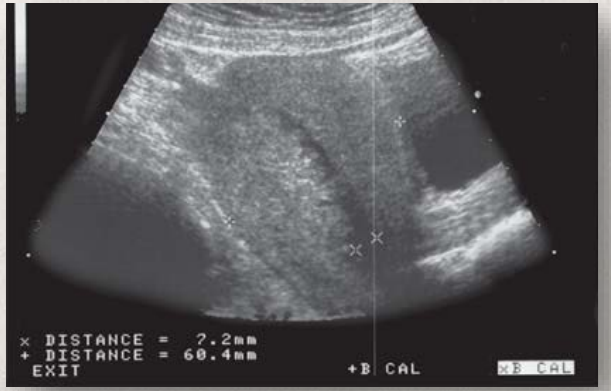
It rotates along its internal cervical os toward an anteflexed position probably due to forming a firm isthmus.

The vascular channels are not so prominent.

Middle Puerperium

Either **pure fluid** or **mixed echo with fluid and solid components** can be seen in the whole cavity not only in the cervical area.

This finding reflects a normal healing process of the placental site inside uterine cavity, necrotic changes of retained decidua and an abundant shedding of lochia.



03

Late Puerperium

Late Puerperium

During late puerperium (>2 weeks postpartum), the uterus is considerably diminished.

It lies in an **anteflexed position in 88%** of cases.

In 12 % of cases the uterus has a retroflexed position corresponding well to normal prevalence of retroversion of the uterus in general Population.

Late Puerperium

The uterine cavity is again empty.

Decidua and necrotic vessel ends are exfoliated, the placental site is recovered and a new endometrium is regenerated from the basal layer of the decidua adjacent to the myometrium. **Ultrasonically the cavity in the late puerperium appears as a thin white line**.

This corresponds to an inactive endometrium and reflects the hypoestrogenic state of the puerperium (**'the physiologic menopause'**).

Late Puerperium

In 1953, Sharman performed endometrium biopsies and identified fully restored endometrium from the 16th postpartum day.

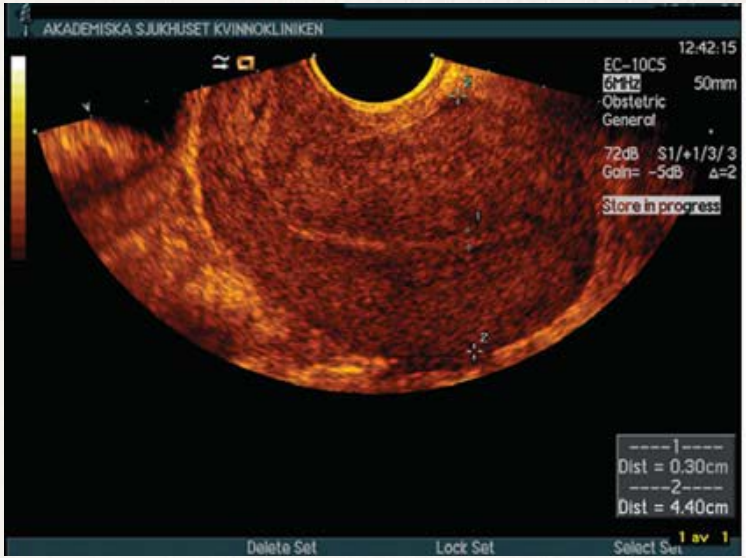
In contrast, a study published in 1986 by Oppenheimer showed that duration of puerperal lochia may be up to 60 days in 13% of women.

Similarly in a recently published study, on the duration of postpartum bleeding among 477 breastfeeding women, it was reported that the median duration of lochia was 27 days with a range from 5 to 90 days.

Only 15% of the women reported that their lochia had stopped within two weeks postpartum.

They also pointed to the fact that bleeding associated with the postpartum healing process commonly stops and starts again.
So, the normal physiological time span for the placental site to recover is probably 4 to 6 weeks and not two weeks as previously considered.

Late Puerperium



Transvaginal ultrasound image of the uterus on day 28 postpartum shows a retroverted uterus on day 28 postpartum.

Transvaginal ultrasound image of the uterus on day 28 postpartum shows a small amount of fluid with echogenic foci in the cavity (white arrow)

Three stages of Puerperium