Academic Journal of
Pediatrics and Neonatology

Review Article
Volume 1 Issue 1 - February 2016

Acad J Ped Neonatol

Normal Pregnancy: A Clinical Review

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Submission: January 11, 2016; **Published:** February 01, 2016

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Abstract

First and foremost, pregnancy is not a disease; it is a "state of being". All mammals, humans included, are on this planet for one purpose and one purpose only, to procreate for the purpose of the continuance of the species. No religious arguments will be discussed in this paper as they are all irrelevant to the process of a normal human pregnancy. This paper is being written so it can be used as a quick review for physicians that may not do Obstetrics as their primary speciality. Many countries allow General Practitioners and Family Practitioners to manage pregnancies and deliver babies, as long as they have privileges to do this in the hospital. Usually however, non OB/GYN's will not be allowed to be the primary surgeon on a Caesarean Section due to lack of practice and hospital rules, but they will be allowed to be First Assistant.

Keywords: Estimated Date of Confinement; Morning Sickness; Last Menstrual Period; Parturition (birth); human Chorionic Gonadotropin; Prenatal Care; Obstetrical Physical Examinations; Term Pregnancy; Early Term Pregnancy; Full Term Pregnancy; Late Term Pregnancy; Post Term Pregnancy; Early Cervical Dilation; Braxton-Hicks Contractions; FirstTrimester; Second Trimester; Third Trimester

Abbreviations: EDC: Estimated Date of Confinement; LMP: Last Menstrual Period; hCG: human Chorionic Gonadotropin; SAb: Spontaneous Abortions; Ab: Elective Abortions; IVC: Inferior Vena Cava; GFR: Glomerular Filtration Rate; BMI: Body Mass Index; IUGR: Intra-Uterine Growth Retardation

Introduction

The average length of human gestation is 280 days, or 40 weeks, from the first day of the woman's last menstrual period. The medical term for the due date is known as the Estimated Date of Confinement (EDC). However, only about four per cent of women actually give birth on their EDC. The length of a human pregnancy can vary naturally by as much as five weeks, according to new research.

Pregnancy, also known as gravidity or gestation, is the time during which one or more babies develop inside a woman. A Multiple Pregnancy involves more than one child, such as with twins. Pregnancy can occur by sexual intercourse or assisted reproductive technology. It usually lasts around 40 weeks from the Last Menstrual Period (LMP) (a date the patient hopefully knows) and ends in childbirth. This is just over nine lunar months, where each month is about 29½ days. When measured from conception it is about 38 weeks (266 days). An embryo is the developing offspring during the first eight weeks following conception, after which, the term fetus is used until birth.Most of the time patients refer to the fetus as "baby". Symptoms of early pregnancy may include missed periods, tender breasts, nausea and vomiting, hunger, and frequent urination.Pregnancy may be confirmed with a urine pregnancy test, most commonly first by the patient at home and then in the doctors office by a series of blood tests. Both the urine and the blood tests detect the presence of a hormone called *Human Chorionic Gonadotropin* (hCG). This hormones produced by the placenta shortly after the embryo attaches to the uterine lining and builds up rapidly in your body in the first few days of pregnancy. It is this rapid shift in hormones that triggers most of your pregnancy symptoms.

Discussion

Pregnancy is typically divided into three trimesters. The first trimester is from week one through 12 and includes conception. Conception is when the sperm fertilizes the egg. The fertilized egg

then travels down the fallopian tube and attaches to the inside of the uterus, where it begins to form the fetus and placenta.The first trimester carries the highest risk of miscarriage (natural death of embryo or fetus). The second trimester is from week 13 through 28. Around the middle of the second trimester, movement of the fetus may be felt. At 28 weeks, more than 90% of babies can survive outside of the uterus if provided with high-quality medical care. The third trimester is from 29 weeks through approximately 40 weeksand ends with parturition (birth) [1].

Prenatal Care is one of the most important factors in improving pregnancy outcomes. Prenatal care may include taking extra folic acid, avoiding drugs and alcohol, regular exercise, blood tests and regular Obstetrical Physical Examinations. Obstetrical Physical Examinations are done on a schedule that each doctor gives his patient and these exams become more frequent as the EDC approaches. The reason for this is often times the patient needs closer monitoring for many reasons, such as: Early Cervical Dilation; Braxton-Hicks Contractions (false labor contractions); proteinuria, *hyperemesis gravidarum* [2] and any myriad of other issues that may concern the patient. Often times it is necessary to simply reassure the patient that whatever is happening may be a normal event but the doctor must make sure to check it is a harmless event and to not panic the patient.

Complications of pregnancy may include high blood pressure of pregnancy, gestational diabetes, iron-deficiency anemia, and *hyperemesis gravidarum* [2]. This however is not a paper where we will discuss all of the complications of pregnancy; we are simply covering the process of a normal pregnancy. Term Pregnancy is 37 to 41 weeks, with Early Term being 37 and 38 weeks, Full Term 39 and 40 weeks, and Late Term 41 weeks. After 41 weeks, it is known as Post Term. Delivery before 39 weeks by labor induction or Caesarean Section is not recommended unless required for other medical reasons. However, Labor Induction or Caesarean Section should be considered after 41 weeks as there may be a very low volume of amniotic fluid due to the usually large size of the baby. Confirm baby size and amniotic fluid volume by Ultrasound. Remember, a Post Term baby may be too large to deliver vaginally so a Caesarean Section may be your only option [1,3,4].

Similarly, the term parity (abbreviated as "para") is used for the number of times a female has given birth. Twins and other multiple births are counted as one pregnancy and birth. A woman who has never been pregnant is referred to as a nulligravida. A woman who is (or has been only) pregnant for the first time is referred to as a primigravida and a woman in subsequent pregnancies as a multigravida or as multiparous. Therefore, during a second pregnancy a woman would be described as *gravida 2, para 1*(often abbreviated as G2P1) and upon live delivery as *gravida 2, para 2* (G2P2). In-progress pregnancies, abortions, miscarriages and/or stillbirths account for parity values being less than the gravida number. Spontaneous Abortions (miscarriages) are referred to and reported as SAb. Elective Abortions are referred to as Ab. So in the above case, if this woman never had a miscarriage or an abortion, she would most correctly be recorded in the chart as G2/P2/SAb0/Ab0 [1]. In the case of twins, triplets, etc., gravida number and parity value are increased by one only. A woman who has never carried a pregnancy achieving more than 20 weeks of gestational age is referred to as nulliparous.

Other Symptoms and Discomforts of Pregnancy [1]

This is defined as certain conditions that result from pregnancy but do not significantly interfere with the activities of daily living or pose a threat to the health of the mother or baby. This is in contrast to pregnancy complications which will not be discussed in this paper. Sometimes a symptom that is considered a discomfort can be considered a complication when it is more severe. For example, nausea can be a discomfort (morning sickness), but if in combination with significant, uncontrollable or unrelenting vomiting, it causes a water-electrolyte imbalance; then it is a complication known as *hyperemesis gravidarum* [2].

Common symptoms and discomforts of a normal pregnancy include [1,3,4]:

i. Tiredness

ii. Constipation

iii. Pelvic girdle pain

iv. Back pain

v. Braxton Hicks Contractions.

   a. Occasional, irregular, and often painless contractions that occur several times per day.

   b. Late in the pregnancy can often be mistaken by the patient as labor pains

vi. Edema (swelling)

   a. Common complaint in advancing pregnancy.

   b. Caused by compression of the inferior vena cava (IVC) and pelvic veins by the uterus.

   c. This leads to increased hydrostatic pressure in lower extremities.

vii. Increased urinary frequency

   a. Common complaint referred by the patient. This is caused by increased intravascular volume, elevated GFR (glomerular filtration rate) and compression of the bladder by the expanding uterus.

viii. Urinary Tract Infection

ix. Varicose Veins [4]

   a. Common complaint caused by relaxation of the venous smooth muscle and increased intravascular pressure.

 How to cite this article: Obrowski S, Obrowski M, Starski K. Normal Pregnancy: A Clinical Review. Acad J Ped Neonatol. 2016; 1(1): 555554.

x. Hemorrhoids (piles, hemi's, roid's)

   a. Swollen veins at or inside the anal area.

   b. Caused by impaired venous return, straining associated with constipation, or increased intra-abdominal pressure in later pregnancy.

xi. Regurgitation, heartburn and nausea.

xii. *Striae gravidarum* [4]

   a. These are pregnancy-related stretch marks; unfortunately all advertised "cures" for stretch marks are worthless.

   b. The woman can get some relief from possible skin stretching pain by applying any good lotion.

xiii. *Linea nigra*[4]

   a. Latin for "black line"; this is a dark vertical line that appears on the abdomen during about three quarters of all pregnancies.

   b. The brownish streak is usually about a centimeter in width.

   c. The line runs vertically along the midline of the abdomen from the pubis to the umbilicus, but can also run from the pubis to the top of the abdomen.

   d. *Linea nigra* is due to increased melanocyte-stimulating hormone made by the placenta, which also causes melasma and darkened nipples.

   e. Fair-skinned women show this phenomenon less often than women with darker pigmentation.

   f. *Linea nigra* typically disappears within a few months after delivery and is harmless.

xiv. Breast Tenderness [1,4]

   a. Common during the first trimester

   b. More common in women who are pregnant at a young age.

Nutrition [1,4]

Nutrition during pregnancy is extremely important to ensure healthy growth of the fetus. Nutrition during pregnancy is different from the non-pregnant state. Many times however, women will come in and say "I'm eating for two!" This is absolutely not true and must be emphasized to the patient. It has been shown in many different research papers and books that there is an additional caloric requirement of about 500 calories, most of this near the end of the pregnancy [3].

The amount of healthy weight gain during a pregnancy varies. Weight gain is related to the weight of the baby, the placenta, extra circulatory fluid, larger tissues and fat and protein stores in the mother. Most needed weight gain occurs later in pregnancy. The Institute of Medicine recommends an overall pregnancy weight gain for those of normal weight (Body Mass Index {BMI} of 18.5-24.9), of 11.3 to 15.9 kg (25 to 35 pounds) having a singleton pregnancy. Women who are underweight (BMI of less than 18.5), should gain between 12.7 to 18 kg (28 to 40 pounds), while those who are overweight (BMI of 25 to 29.9) are advised to gain between 6.8 to 11.3 kg (15-25 pounds) and those who are obese (BMI>30) should gain between 5 to 9 kg (11 to 20 pounds).

During pregnancy, insufficient or excessive weight gain can compromise the health of the mother and fetus. The most effective intervention for weight gain in underweight women is not clear. Being or becoming overweight in pregnancy increases the risk of complications for mother and fetus, including Caesarean Section, Gestational Hypertension, Gestational Diabetes, Pre-eclampsia, Macrosomia, Intra-Uterine Growth Retardation (IUGR) and shoulder dystocia. Excessive weight gain can make losing weight after the pregnancy difficult.

Around 50% of women of childbearing age in developed countries like the United Kingdom and the United States are overweight or obese before pregnancy. Diet modification is the most effective way to reduce weight gain and associated risks in pregnancy. A diet that has foods with a low glycemic index may help prevent the onset of gestational diabetes. There are increased energy requirements and specific micronutrient requirements. Women benefit from education to encourage a balanced energy and protein intake during pregnancy. Some women may need professional medical advice if their diet is affected by medical conditions, food allergies or specific religious/ ethical beliefs.

Timing of Childbirth

In the ideal childbirth, labor begins on its own when a woman is "at term". Pregnancy is considered at term when gestation has lasted between 37 and 42 weeks [5]. Events before completion of 37 weeks are considered preterm. Preterm birth is associated with a range of complications and should be avoided if possible.

Sometimes if a woman's water breaks or she has contractions before 39 weeks, birth is unavoidable. If a spontaneous vaginal birth does not occur within 24 hours of the water breaking, then a Caesarean Section must be performed. This is due to the fact that after 24 hours there is no amniotic fluid protecting the baby and there is an increased chance of the baby getting an infection, which has either travelled up the vagina or is caused by meconium. However, a spontaneous birth after 37 weeks is considered term and is not associated with the same risks of a pre-term birth. Planned birth before 39 weeks by Caesarean Section or Labor Induction, although "at term", results in an increased risk of complications and is not recommended. This is from factors including underdeveloped lungs of newborns, infection due to underdeveloped immune system, feeding problems due to underdeveloped brain and jaundice from an underdeveloped

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liver. The secondary author of this paper has delivered over 750 babies and will under no circumstances do "Planned Births" for mothers with "Birthing Plans". Birthing plans are a nice fantasy for the mother to have but the doctor's ONLY concern is the safe and proper delivery of a healthy child.

Babies born between 39 and 41 weeks gestation have better outcomes than babies born either before or after this range. This special time period is called "full term" [1]. Whenever possible, waiting for labor to begin on its own in this time period is best for the health of the mother and baby. The decision to perform an induction or a Caesarean must be made after weighing the risks and benefits, but is safer after 39 weeks [5].

Childbirth (Labor and Delivery)

Childbirth, referred to as labor and delivery in the medical field, is the process whereby an infant is born. A woman is considered to be in labor when she begins experiencing regular uterine contractions, accompanied by changes of her cervix – primarily effacement and dilation. While childbirth is widely experienced as painful, some women do report painless labors, while others find that concentrating on the birth helps to quicken labor and lessen the sensations. Most births are successful vaginal births, but sometimes complications arise and a woman may undergo a Caesarean Section.

During the time immediately after birth, both the mother and the baby are hormonally cued to bond, the mother through the release of oxytocin, a hormone also released during breastfeeding. Studies show that skin-to-skin contact between a mother and her newborn immediately after birth is beneficial for both the mother and baby. A review done by the World Health Organization found that skin-to-skin contact between mothers and babies after birth reduces crying, improves mother-infant interaction, and helps mothers to breastfeed successfully. They recommend that neonates be allowed to bond with the mother during their first two hours after birth, the period that they tend to be more alert than in the following hours of early life [6].

Postnatal period

The postnatal period, also referred to as the puerperium, begins immediately after delivery and extends for about six weeks. During this period, the mother's body begins the return to pre-pregnancy conditions that includes changes in hormone levels and uterus size [6].

Conclusion

We have briefly discussed the "normal pregnancy" and have not delved into too much detail on how to perform the actual delivery, as this is not a paper on how to deliver a baby. If you are a physician of ANY type, you learned in medical school how to deliver a baby. If you don't remember, refer the patient to someone who does. The second author of this paper has delivered well over 750 babies, and there are still occasions when he will refer a patient to a high-risk OB/GYN. The most important factor is to allow nature to take its course; children have been born for many millennia without any intervention from doctors. What we as physicians can provide is the best knowledge, care and equipment for the mother and baby to achieve the one goal that we all have in any pregnancy: for the mother to go home with a healthy child. If you get into a pregnancy that is over your capabilities or you think she may need a high-risk pregnancy OB/GYN, do not hesitate to ask for help.

Human Studies

No human patients were used in the development and write-up of this paper. All information was obtained from personal experience of the authors, technical reports, research and obstetrics and gynecology textbooks.

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