Chapter 1

Introduction and Basic Principles

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Introduction

Managing patients on a labor and delivery suite can be a daunting task for any provider. It is an intimidating place to learn, where the clinical situation is constantly changing and more blood is being lost in a shorter amount of time than nearly anywhere else in the hospital. The care team is charged with taking care of two patients at the same time and must take into account how the care of one affects the other. Add to this the fact that you are dealing with all the expectations that nine months of pregnancy brings to the new parents, and that decisions must often be made quickly to ensure the best outcome when emergencies arise, and you have the modern labor and delivery ward.

Too often in obstetric training, the management of laboring patients is learned by being thrust onto labor and delivery without the benefit of adequate preparation for what will be encountered. While there is much that can only be learned by actually doing, such as cervical exams and deliveries, it is imperative to understand certain basic principles of labor and delivery management up front. This book is intended to provide a simple, structured overview of how to manage laboring and postpartum patients and function on a labor and delivery unit. While senior physicians and nurses must continue to teach and mentor junior staff, residents, and students how to perform obstetric exams and procedures, this book will provide a solid framework and background to work from.

The following is a concise set of general principles and information about labor and delivery that every provider should know.

General Principles

1. **Understand the basics.** The goal of this text is to help you to know the basic concepts you will need to manage laboring patients, as well as to recognize when problems occur. If you don't understand why a complication occurs, it is difficult to anticipate or correct it. You also need to know what medications, doses, and instruments to ask for during emergencies, because there are situations where even a short delay can make the difference between life and death. This knowledge is critical to responding to urgent situations in a calm and appropriate manner. While taking care of patients is a team

effort, junior or inexperienced staff may not know what you need in an emergency, and you must be very specific in terms of medication doses, instruments needed, and where to find them.

2. **Never be afraid to ask for help.** The best providers, when they are unsure of the proper course of action, will ask for another opinion. When, not if, a situation arises and you do not know what to do, think through the problem and have an idea of what you would like to do, and then ask for guidance. It is a sign of maturity, not weakness, to ask for help, and it will protect your patients.
3. **Do not make decisions without examining the patient.** When you first start to work on a labor and delivery ward, it is imperative to look at the patient before making decisions about management. As you progress and your clinical skills improve, you will have an idea of exactly what to do before you see the patient. But if there is ever a question in your mind about what action to take, then go and see the patient. This especially applies to the interpretation of fetal heart rate (FHR) tracings, which always look slightly different at the bedside, sometimes more reassuring, sometimes less.
4. **Communicate with your team.** Nothing you will learn from this book can help you if you don't work well with the rest of the care team. More than half of poor outcomes in obstetrics are related to breakdowns in communication and teamwork. Make it a point to know all of their names. At the beginning of every shift, be clear on who is the staff, charge nurse, anesthesia staff, etc. Keep them informed when you are expecting patients on labor and delivery, when you decide to admit a patient, and whenever you write an order or the plan of care changes. Doing these simple things will make your job of working on and managing a busy labor and delivery unit infinitely easier, and will keep your patients safe.
5. **Know where supplies are located.** If you are faced with an emergency, e.g., a postpartum hemorrhage, an eclamptic seizure, or fetal bradycardia, and everyone is busy with other patients, it is imperative that you know where to get the appropriate medications, instruments, or forceps in a timely manner. Remember that even if it isn't your role to go and get the medication, you may have to tell a new person where to find it.
6. **Practice with simulation when possible.** In the past, much of what you would do in labor and delivery was learned by the "see one, do one, teach one" method, but there are now simulators available for many procedures. You can practice performing a vaginal delivery, repairing vaginal lacerations, and even managing complications without any risk to actual patients. There is clear evidence that working with simulators can improve outcomes in real life. For an example and explanation of this, you can watch the TEDx talk "Why Doctors Should Play with Dolls," which can be seen at www.youtube.com/watch?v=rnuNft5sWUg.
7. **Assume the worst and hope for the best.** Whenever you evaluate a patient for a complaint, even one as simple as a headache, think of the worst thing it could be and work backward to the most benign. This will prevent you from missing the diagnosis of something uncommon but serious in favor of a more common and minor problem. An example of this is a headache in pregnancy. While it may be due to lack of sleep,

a migraine, or a simple cold, you should think of preeclampsia first and convince yourself that this is not the cause. It is usually an easy thing to rule out severe problems, but at least you will have considered them and not missed something that could have significant consequences for the patient.

An important part of this last basic concept is not to unnecessarily worry the patient. Do not tell every woman who has a headache, "I just want to make sure you don't have a tumor or bleeding in your head." You must consider everything to be thorough, but you do not need to mention the very serious but rare possibilities if you can rule them out.

Summary

By choosing to work on the labor and delivery unit, you assume an awesome responsibility. There is no greater reward or feeling than helping to bring life into the world, and no greater guilt than when things go poorly and you wonder if you could have done better. This book is written with the weight of this in mind. It will help you both to manage the normal, uncomplicated laboring patient, and to respond quickly and appropriately to common obstetric emergencies. Thank you for taking the time to prepare and do the best for your patients.

Chapter 2

Common Examinations and Procedures

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Introduction

Labor and delivery involve numerous examinations and procedures. While many of the examinations are learned only by actually performing them on patients, some basic instruction in how and when to perform the examinations and procedures is essential. You must understand not only what to do during an examination, but also when it is necessary and why you are doing it.

Brief Overview of Labor

Central to learning how to take care of laboring patients is understanding exactly what labor is. Labor is defined as regular uterine contractions that result in the progressive effacement (thinning) and dilation (opening) of the cervix. This is accompanied by the fetus moving down through the birth canal.

Effacement is usually described as a percentage. The cervix is approximately 4 cm long before labor, and this is said to be 0% effaced, or "long." If it shortens to 2 cm then it is described as 50% effaced. This is determined by digital exam, and it takes practice to become consistent. When the cervix is completely thinned out, it is said to be 100% or completely effaced.

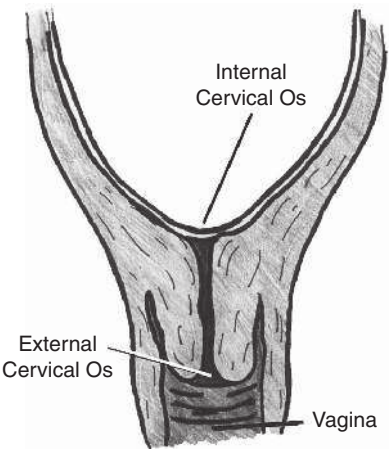

Figure 2.1 Internal and external cervical os.

Dilation of the cervix describes how open the internal cervical os is in centimeters, between 0 and 10 cm. It is important to note that in multiparous women the external os may be dilated 1–2 cm normally, but the internal os is usually closed until labor begins (Figure 2.1). At 10 cm, the cervix is completely dilated. Judging the degree of dilation is another skill that is learned through practice.

The term "station" is used to describe how far down in the pelvis the fetus is. When the leading fetal body part, most often the head, is at the level of the maternal ischial spines, which can be felt on digital exam, the fetus is said to be at zero station. Everything is relative to this landmark, and station is measured in centimeters with a range of 5 cm in either direction.

Fetal station is important because when certain interventions such as rupturing the amniotic membranes or applying forceps or vacuum devices can be performed safely is dependent on this (see Chapter 9, *Operative Vaginal Delivery*). A complete description of how to perform a cervical exam is found later in this chapter.

Labor is divided into three stages:

Stage 1 begins with regular uterine contractions and ends when the cervix is fully dilated (10 cm) and completely effaced (100%).

Stage 2 begins when the cervix is completely dilated and effaced and ends with delivery of the fetus. This is the stage when the woman will push to deliver the infant.

Stage 3 begins after the fetus is delivered and ends with delivery of the placenta.

Each of these stages, as well as their management, is discussed in detail in subsequent chapters.

Exams

Admission History and Physical Exam

When a woman is admitted to the labor and delivery unit, a thorough physical exam should be performed. While the physical exam of a pregnant patient is essentially the same as for a non-pregnant patient, there are some important differences, and some findings that would be abnormal outside of pregnancy. Going through the exam:

History

A thorough history should be taken, to include the following:

Patient's age, gravidity, and parity. The patient's current age should be recorded. Gravidity and parity require more of an explanation.

Gravidity. This is the total number of times the patient has been pregnant. This includes all pregnancies, even those that ended in a miscarriage or abortion. This is written as "G" in the chart. If a patient has been pregnant three times, she is a gravida 3, or G3. (Note: If a patient is pregnant with twins or other multiple gestations, this only counts as one pregnancy.)

Parity. This refers to the number of births a woman has had, and how far along she was when they occurred. It is written as four numbers, which take into account the following events:

- Full-term births (37 weeks and up)
- Preterm births (20–36 weeks gestation)
- Abortions (this includes spontaneous and elective abortions)
- Living children (this is the number of children currently living)

Note: One part of this nomenclature that is tricky is that, in a woman with twins who delivers, this only counts as one delivery. The following are two examples to demonstrate how to write gravidity and parity.

Example 2.1. A 25-year-old woman is currently pregnant, and this is her third pregnancy. She has had one previous full-term delivery and one spontaneous miscarriage. Her gravidity and parity would be written as G3P1011.

Example 2.2. A 25-year-old woman is currently pregnant, and this is her second pregnancy. She had twins at 35 weeks with the previous pregnancy. Her gravidity and parity would be written as G2P0102. (She has one preterm delivery and two living children.)

Gestational age. It is imperative that the gestational age is recorded accurately, as decisions about augmenting or attempting to stop labor are largely based on this.

When writing the gestational age in the chart, it is written as the number of weeks completed plus the number of days of the next week. For instance, if the patient has completed 34 weeks and 4 days of her pregnancy, this is written as "34^{+4} weeks." A full discussion of how to calculate and check the gestational age can be found in Chapter 4, *Management of the First Stage of Labor*.

Both the gestational age and the criteria it is based on should be recorded in the chart. If it is based on a sure last menstrual period (LMP) then the chart should say the patient is "__ weeks by sure LMP." If the patient had an ultrasound that agreed with the estimated date of delivery (EDD), then both the LMP and ultrasound, as well as the gestational age the ultrasound was performed at, should be listed. For example, a patient with an ultrasound done at 8 weeks' gestation that agreed with her EDD from her LMP would be recorded in the chart as "__ weeks by sure LMP and 8-week ultrasound." If a patient's EDD was changed based on an ultrasound performed at 8 weeks' gestation, then this should be written as "the patient is *n* weeks by 8-week ultrasound."

Chief complaint. Always list the reason that the patient has presented for evaluation.

The 4 OB questions. Every patient who shows up to labor and delivery should be asked the following four questions:

1. Are you having any **BLEEDING?**
2. Are you having any **CONTRACTIONS?** (include time of onset/frequency/intensity)
3. Do you feel like you broke your **WATER?** (include time/color of fluid)
4. Have you felt your baby **MOVING** today? (if not, then how long since the baby moved?)

Prenatal complications. All complications occurring during this pregnancy should be listed. Some of these may include gestational diabetes, Rh-negative status, group B streptococcus (GBS) status, preterm labor, etc.

Past medical history. All pertinent medical conditions should be listed. While this is no different than in non-pregnant patients, some common problems that have obstetric implications include diabetes, hypertension, asthma, thrombophilias, and thyroid disease.

Past surgical history. All previous surgeries must be recorded. Ask specifically regarding abdominal surgery, as this can make a cesarean delivery more difficult because of adhesions, and certain abdominal operations (such as a myomectomy) may mean that a vaginal delivery is contraindicated (see Chapter 10).

Past gynecologic history. Make a note of any history of abnormal Pap smears or sexually transmitted diseases. Especially important are HIV and herpes simplex virus (HSV), as they may require a cesarean delivery depending on the situation.

Past obstetric history. List all previous pregnancies as well as the year they occurred and what the outcomes were. Include the gestational age at delivery and the infant's birth weight and route of delivery (vaginal, cesarean, forceps, or vacuum). Also note any complications that occurred, such as shoulder dystocia or postpartum hemorrhage.

Social history. Ask about alcohol or tobacco use in pregnancy as well as illicit or recreational drugs.

Allergies. List all allergies a patient claims, as well as what reactions occurred with each.

Family history. Ask about a family history of diabetes, hypertension, preeclampsia, and cancer.

Medications. List all current medications being taken by the patient.

Prenatal laboratory results. Make a list of all prenatal laboratory results from the patient's chart in your history and physical. These will typically include the following:

- Hematocrit
- Hemoglobin
- Platelets
- Pap smear
- Rubella/varicella titers
- Hepatitis B surface antigen
- Blood type
- Antibody screen
- Gonorrhea/chlamydia cultures
- HIV

- GBS culture (see Chapter 4)
- Urinalysis and culture
- Genetic/cystic fibrosis screening results

An example outline and sample notes can be found in Appendix B, *Sample Notes and Orders*.

Physical Examination

Neurologic exam. The patient should be alert and oriented to person, place, and time. She may be in mild distress because of labor, but no focal neurologic deficits should be present.

Head, eyes, ears, nose, and throat (HEENT). A general inspection is done and any abnormalities noted. Make sure to note any significant facial edema, as this can be a sign of preeclampsia (see Chapter 14). Often, since you may not have seen the patient previously, it is easier to simply ask the woman or her partner if her face looks swollen.

Lungs. The lungs should be clear to auscultation, although at term there may be slightly decreased breath sounds noted in the bases of both lungs secondary to elevation of the hemi-diaphragm by the pregnancy.

Heart. A systolic ejection murmur is a normal finding, and nearly 95% of pregnant women will have one at term.

Abdomen. The abdomen will be gravid, which near term makes palpation of other abdominal organs essentially impossible. The fundal height should be determined and Leopold's maneuvers performed to assess both the position and estimated weight of the fetus. Both exams are explained later in this chapter.

Genitourinary. The perineum should be visually inspected for evidence of lesions, especially active herpes lesions, as these will preclude a vaginal delivery. A digital vaginal exam is performed and the cervix checked to determine dilation, effacement, fetal station, and what the presenting part of the fetus is (see *Cervical Exam* below). During the exam, the adequacy of the pelvis can also be examined by performing clinical pelvimetry, also explained later in this chapter. A rectal exam is not usually performed as part of the standard admission exam. If collecting a GBS culture then do this now with a rectal/vaginal swab.

Extremities. Examine the extremities for evidence of edema. Some edema, especially bilaterally in the lower extremities, is common and a normal finding during pregnancy. If unilateral edema is present, especially accompanied by pain, then the diagnosis of a deep venous thrombosis must be considered and additional studies pursued.

Other. Obviously, if the patient has specific complaints, such as flank pain or breast pain, then the physical examination should focus more attention on these areas.

Outline. A sample outline note of an admission physical exam can be found in Appendix B, *Sample Notes and Orders*.

Cervical Exam

Digital cervical exams are performed to assess a patient's labor progress and to help you decide when a woman needs to be admitted to the hospital. They are performed on

almost every woman who will be admitted to labor and delivery, and it takes practice to become consistent in your exams. When starting out, it is easiest to examine laboring patients who have an epidural in place, as they are generally less uncomfortable during the exam.

Indications

A cervical exam is indicated during the initial evaluation of a laboring patient, during labor to evaluate progression, and when evaluating fetal distress or a non-reassuring fetal heart rate tracing (see Chapter 3).

Contraindications

The most important contraindications to a cervical exam are vaginal bleeding and preterm premature rupture of membranes (PPROM).

Bleeding. If a patient presents with vaginal bleeding, then an ultrasound should be performed to determine the location of the placenta. If the placenta is overlying the cervical os, then a cervical exam can cause catastrophic hemorrhage and should not be performed. A transvaginal sonogram is done if the abdominal ultrasound is unclear as to exactly where the placenta is located.

Another possibility is a vasa previa, which occurs when the fetal blood vessels abnormally run through the membranes before inserting into the placenta. If the membranes rupture and the vessels are lacerated, then fetal hemorrhage may occur and, because of the small fetal blood volume, this can be life-threatening to the fetus in a very short time.

If you feel the patient has either of these problems, then additional evaluation and stabilization may be required. Interventions include monitoring both fetal and maternal vital signs and attempts to stabilize the patient and fetus while being prepared to effect delivery by an urgent cesarean section if indicated.

Premature preterm rupture of membranes (PPROM). This occurs when the membranes rupture before 37 weeks' gestation. The most recent American College of Obstetricians and Gynecologists (ACOG) Practice Bulletin on the topic recommends delivery at 34 weeks for all women with PPROM (ACOG 2016a). Because cervical exams can increase

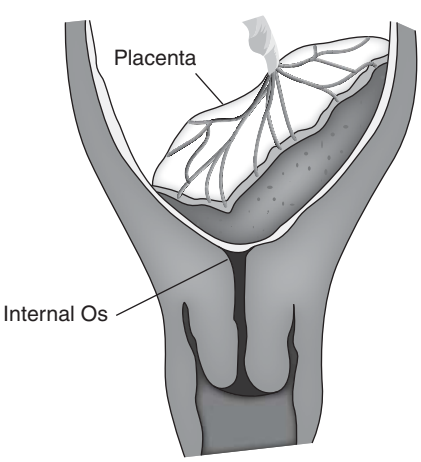

Figure 2.2 Placenta previa.

the chance of infection, a sterile speculum exam is performed in place of a cervical exam and the dilation and effacement of the cervix are determined visually. PPROM is discussed in more detail in Chapter 14.

Before Performing the Exam

1. Make sure there are no contraindications to the exam.
2. Ensure you have a chaperone standing by. (This is sometimes difficult on a busy labor and delivery unit, but is extremely important.)

Performing the Exam

The exam begins by informing the patient that you are going to check her cervix and explaining the indication. After this, position the patient for the exam. If stirrups are available for the feet, then assist the woman in placing her feet into them. If not, then have the patient place her heels together and let her legs fall outward. There are several components that should be evaluated during the exam and then recorded on the patient's chart. These include:

Cervical dilation. The cervix is normally closed prior to the onset of labor. Cervical dilation describes how dilated the internal cervical os is in centimeters, from 0 cm (closed) to 10 cm. It is important to recognize that the external os may be several centimeters dilated while the internal os is closed or 1 cm dilated. This is especially true for multiparous patients. Ten centimeters means the cervix is fully dilated, and the first stage of labor is complete.

Determining exactly how dilated the cervix is takes practice, and checking a laboring patient after a more senior provider and comparing your exam with theirs will help you to learn this skill. In general, if you can fit one finger into the internal os, the cervix is 1 cm dilated. If your two fingers on top of each other fit tightly into the internal os, this is 2 cm, and if you can insert two fingers side by side, this is 3 cm. (Obviously, these measurements will vary slightly depending on the size of the examiner's hands.) From this point, it becomes slightly more difficult and will take practice to become consistent.

Cervical effacement. Prior to the onset of labor, the cervix is approximately 4 cm long by digital exam. The cervix is usually referred to as being "long" in this case. As the cervix shortens with labor, the effacement is described as a percentage of the original length. So if the cervix shortens from 4 cm to 3 cm, it is said to be 25% effaced. When it is only 1 cm long, it is 75% effaced, and when it is completely thinned out it is "completely" effaced. This part of the exam also requires significant practice and will seem extremely subjective at first.

Fetal station. The fetal station usually refers to the leading bony part of the fetal head. (In the case of a frank breech presentation, it is the station of the fetal buttocks.) The reference point for this measurement is the ischial spines. When the fetal head is at the level of the ischial spines (Figure 2.3), this is referred to as "zero (0) station." The measurements then go for 5 cm on either side of this, with positive numbers as the fetus is further down into the birth canal and negative numbers when the fetal head is above the level of the ischial spines (Figure 2.4). When the fetus is at 0 station, the head is said to be "engaged."

- This measurement is important because, when the fetus is not engaged, and especially when the head is above –2 station, performing an amniotomy can result