بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

MONA MAGHRABY

INTRODUCTION

The World Health Organization (WHO) defines normal birth as spontaneous in onset, low-risk at the start of labor and remaining so throughout labor and delivery. The infant is born spontaneously in the vertex position between 37 and 42 completed weeks of pregnancy. After birth, mother and infant are in good condition ***(World Health Organization, 2010).***

Spontaneous vaginal delivery without obstetric intervention is the favorable outcome for most pregnancies. However, some women fail to progress in the second stage of labor and so require operative delivery. Management options include primary Cesarean section, instrumental delivery (forceps or vacuum) ***(Grobman et al., 2018).***

In the vertex presentation, the vertex is flexed such that the chin rests on the fetal chest, allowing the suboccipito-bregmatic diameter of approximately 9.5 cm to be the widest diameter through the maternal pelvis. This is the smallest of the diameters to negotiate the maternal pelvis ***(Kilpatrick et al., 2012).***

The arrest of labor progression is the leading cause of obstetric intervention including cesarean delivery and instrumental vaginal delivery. In the attempt to decrease the incidence of primary cesarean delivery the classical definition of abnormal labor course has been revised recently and a longer duration of the second stage has been declared as acceptable

before diagnosing a labor arrest (up to 4 hours or more in nulliparous and to 3 hours or more in multiparous) ***(Caughey et al., 2014).***

Some authors however have challenged this new statement claiming that based on the available evidence, a second stage of labor beyond 3 hours is unsafe for the unborn infant ***(Leveno et al., 2016).***

Deflexed cephalic presentations are an important cause of obstructed labor and account for 1/3cesarian deliveries as the result of labor arrest. Three varieties of deflexed cephalic malpresentation traditionally are described according to the degree of head extension including sincipit, brow, face ***(Boyle et al., 2013).***

In some of these cases such as brow presentation the achievement of vaginal delivery is not possible because the mean fetal head presenting diameter (mento-occipital diameter) is 13 cm which is larger than the widest diameter of birth canal (obstetric conjugate=11cm) ***(Cunningham et al., 2016).***

The diagnosis traditionally is based on digital examination during labor, although the use of ultrasound to support clinical diagnosis has been reported recently ***(Ghi et al., 2016).***

- 2D trans abdominal ultrasound will be done during first stage of labor. If fetal position is occiput anterior or

transverse and presentation is vertex two dimensional sagittal pictures of the fetal head and upper spine will be taken

- Measurement of the angle formed by a line tangential to the occiput bone and a line tangential to the first vertebral body at the cervical spine (occiput-spine angle) will be performed to quantify the degree of fetal head deflection in respect to the trunk.

- This study aims to find the relationship between (occiput-spine angle) and the coarse and type of delivery.

AIM OF THE WORK

The aim of this study was to quantify the degree of fetal head deflexion via the use of ultrasonography during the first stage of labor and to determine whether a parameter derived from ultrasound examination (the occiput-spine angle) has a relationship with the course and outcome of labor. To decrease hazards of obstructed labor which carry risk on both mother and fetus.

Chapter 1
NORMAL LABOR

Labor is a physiologic process during which the products of conception (i.e. the fetus, membranes, umbilical cord, and placenta) are expelled outside of the uterus after fetal viability. Labor is achieved with changes in the biochemical connective tissue and with gradual effacement and dilatation of the uterine cervix as a result of rhythmic uterine contractions of sufficient frequency, intensity, and duration ***(Norwitz et al., 2003)***.

Boz et al. (2019) examined the labor progression of 1,162 nulliparas who presented in spontaneous labor and constructed a labor curve that was markedly different from Friedman's: The average interval to progress from 4-10 cm of cervical dilatation was 5.5 hours compared with 2.5 hours of Friedman's labor curve.

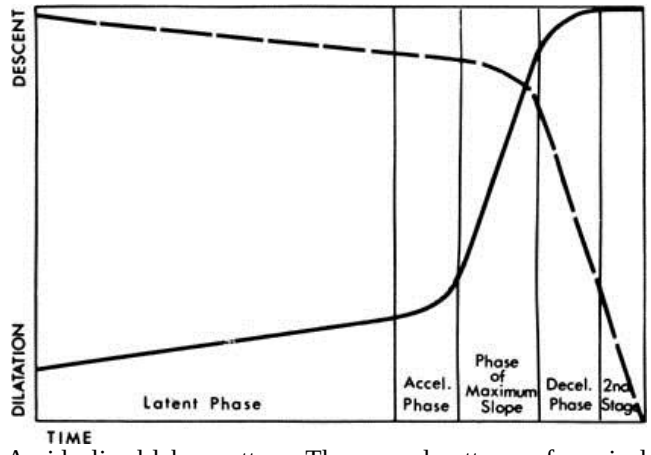

Figure (1-1): An idealized labor pattern. The normal patterns of cervical dilation (solid line) and descent (broken line) as they are traced against elapsed time in labor. The distinctive phases of the first stage are shown. The active phase comprises the interval from the onset of the acceleration phase to the beginning of the second stage.

Stages of labor:

Obstetricians have divided labor into 3 stages that delineate milestones in a continuous process ***(Alfirevic et al., 2006)***.

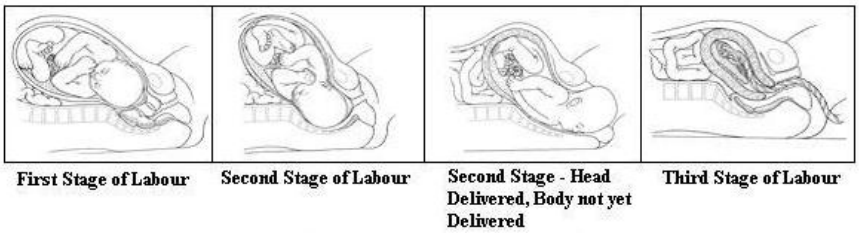

Figure (1-2): Stages of labour ***(Alfirevic et al., 2006).***

First stage of labor:

The first stage begins with regular uterine contractions and ends with complete cervical dilatation at 10 cm. Friedman subdivided the first stage into an early latent phase and an active phase. The latent phase begins with mild, regular uterine contractions that soften and shorten the cervix. The contractions become progressively more rhythmic and stronger. This is followed by the active phase of labor, which usually begins at about 3-4 cm of cervical dilation and is characterized by rapid cervical dilation and descent of the presenting fetal part. The first stage of labor ends with complete cervical dilation at 10 cm ***(Subramaniam et al., 2019).***

Characteristics of the average cervical dilatation curve are known as the Friedman labor curve, and a series of

definitions of labor protraction and arrest were subsequently established ***(Subramaniam et al., 2019).***

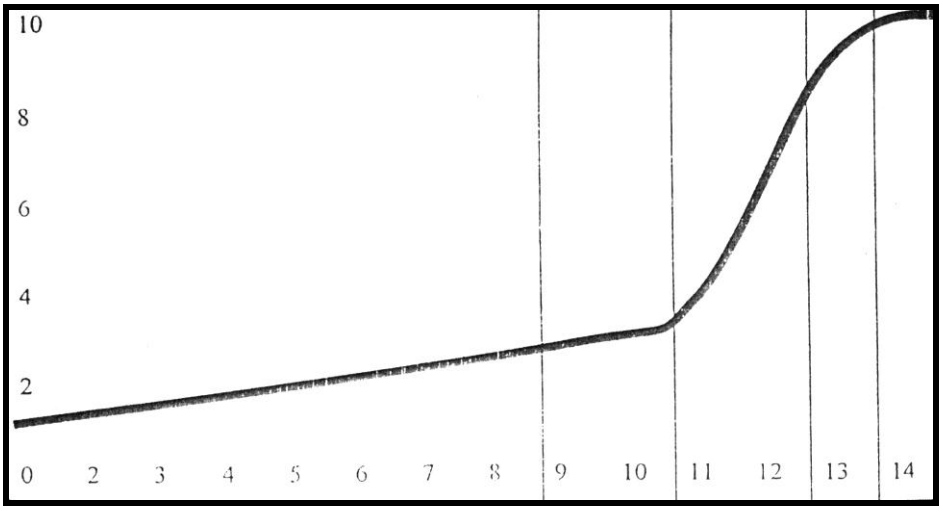

Figure (1-3): Composite of the average cervical dilatation curve

However, subsequent data of modern obstetric population suggest that the rate of cervical dilatation is slower and the progression of labor may be significantly different from that suggested by the Friedman labor curve ***(Boz et al., 2019).***

In the active phase of the first stage of labor, the average rate of cervical dilatation is 1.8 cm/hour in the multipara and 1.4cm/hour in the primigravida ***(Ehsanipoor and Satin, 2019).***

Second stage of labor:

The second stage begins with complete cervical dilatation and ends with the delivery of the fetus.

American College of Obstetricians and Gynecologists (ACOG) (2003) has suggested that a prolonged second stage of labor should be considered when the second stage of labor exceeds 3 hours if regional anesthesia is administered or 2 hours in the absence of regional anesthesia for nulliparas. In multiparous women, such a diagnosis can be made if the second stage of labor exceeds 2 hours with regional anesthesia or one hour without it.

Cheng et al. (2004) examined perinatal outcomes associated with a prolonged second stage of labor and revealed increased risks of operative deliveries and maternal morbidities.

Maternal risk factors associated with a prolonged second stage include nulliparity, increasing maternal weight and/or weight gain, use of regional anesthesia, fetal occiput in a posterior or transverse position, and increased fetal birthweight ***(Senécal et al., 2005)***.

Third stage of labor:

The third stage of labor is defined by the time period between the delivery of the fetus and the delivery of the placenta and fetal membranes. During this period, uterine contraction decreases basal blood flow, which results in thickening and reduction in the surface area of the myometrium underlying the placenta with subsequent detachment of the placenta. Although delivery of the placenta often requires less

than 10 minutes, the duration of the third stage of labor may last as long as 30 minutes ***(Nkwabong et al., 2017)***.

Norwitz et al. (2003) compared active and expectant management of the third stage. Active management shortens the duration of the third stage and is superior to expectant management with respect to blood loss/risk of postpartum hemorrhage; however, active management is associated with an increased risk of unpleasant side effects like cord avulsion. The third stage of labor is considered prolonged after 30 minutes, and active intervention, such as manual extraction of the placenta, is commonly considered.

Mechanism of labor:

The ability of the fetus to successfully negotiate the pelvis during labor involves changes in position of its head during its passage in labor. The mechanisms of labor, also known as the cardinal movements, are described in relation to a vertex presentation, as is the case in 95% of all pregnancies. Although labor and delivery occurs in a continuous fashion, the cardinal movements are described as 7 discrete sequences ***(Norwitz et al., 2003)***.

Descent:

The downward passage of the presenting part through the pelvis. This occurs intermittently with contractions. The rate is greatest during the second stage of labor ***(East et al., 2007)***.

Engagement:

The widest diameter of the presenting part (with a well-flexed head, where the largest transverse diameter of the fetal occiput is the biparietal diameter) enters the maternal pelvis to a level below the plane of the pelvic inlet. On the pelvic examination, the presenting part is at 0 station, or at the level of the maternal ischial spines ***(Parer and Ikeda, 2007)***.

Flexion:

As the fetal vertex descents, it encounters resistance from the bony pelvis or the soft tissues of the pelvic floor, resulting in passive flexion of the fetal occiput. The chin is brought into contact with the fetal thorax, and the presenting diameter changes from occipitofrontal (11 cm) to suboccipitobregmatic (9.5 cm) for optimal passage through the pelvis ***(Norwitz et al., 2003)***.

Internal rotation:

As the head descends, the presenting part, usually in the transverse position, is rotated about 45° to Anteroposterior (AP) position under the symphysis. Internal rotation brings the AP diameter of the head in line with the AP diameter of the pelvic outlet ***(Norwitz et al., 2003)***.

Extension:

With further descent and full flexion of the head, the base of the occiput comes in contact with the inferior margin of the pubic symphysis. Upward resistance from the pelvic floor and the downward forces from the uterine contractions cause the occiput to extend and rotate around the symphysis. This is followed by the delivery of the fetal head ***(Norwitz et al., 2003)***.

Restitution and external rotation:

When the fetal head is free of resistance, it untwists about 45° left or right, returning to its original anatomic position in relation to the body ***(Norwitz et al., 2003)***.

Expulsion:

After the fetal head is delivered, further descent brings the anterior shoulder to the level of the pubic symphysis. The anterior shoulder is then rotated under the symphysis, followed by the posterior shoulder and the rest of the fetus ***(Norwitz et al., 2003).***

Table (1-1): Labor progress in different stages of labor:

Indication	Nullipara	Multipara
Prolonged latent phase	>20 h	>14 h
Average second stage	50 min	20 min
Prolonged second stage without (with) epidural	>2 h (>3 h)	>1 h (>2 h)
Protracted dilation	< 1.2 cm/h	< 1.5 cm/h
Protracted descent	< 1 cm/h	< 2 cm/h
Arrest of dilation*	>2 h	>2 h
Arrest of descent*	>2 h	>1 h
Prolonged third stage	>30 min	>30 min

Abnormal labor progression in the active phase of first stage of labor was defined as cervical dilation < 1.2 cm/hour in nulliparas and < 1.5 cm/hour in multiparas. No appreciable change in cervical dilation in the presence of adequate uterine contraction > 2 hours was considered as labor arrest ***(Cheng et al., 2004).***

Carlhäll et al. (2019) have identified several maternal factors that are associated with the length of labor. Increasing maternal age was associated with a prolonged second stage but not first stage of labor.

Although, nulliparity is associated with a longer labor compared to multiparas, increasing parity does not further shorten the duration of labor ***(Vahratian et al., 2006)***.

In one large retrospective study of the length of labor, specifically with respect to race and/or ethnicity, it was observed that there is no significant differences in the length of the first stage of labor among different racial/ethnic groups.