# SONOPARTOGRAM VERSUS TRADITIONAL PARTOGRAM IN THE ACTIVE PHASE OF FIRST STAGE OF LABOR AND CORRELATION TO OUTCOME Tarek Abd El Zaher Karkour, Tamer Mamdouh Abd El Dayem, Tamer Mohammed Abd El Aziz Ibrahim Hassan, Jailan Moniem Ahmed El Baradei Department of Obstetrics and Gynecology, Faculty of Medicine, Alexandria University

### Introduction

Worldwide, the gold standard method to monitor the labor progress is by using vaginal examination. Digital vaginal examination (DVE) is considered subjective, as it depends mainly on the experience of the examiner and is affected by the circumstances of the examination .WHO recommended the usage of partogram as a response to high level of fetal and maternal morbidity and mortality rates because of slow labor progress.

Trans-perineal ultrasonography (TPUS) has been investigated to be a complementary tool to manage labor. Studies have shown great reliability of TPUS for evaluation of cervical dilatation, position of the fetal head and its station.

Authors have found that the usage of TPUS alone when DVE is not a preferable method as in conditions of premature rupture of the amniotic membranes or in preterm labor. TPUS has proved to be better accepted and convenient to laboring mothers than DVE.

Correlation of the provided sono-partorgam data in the study to the fetal outcome helps to reduce fetal morbidity and mortality. The Apgar score enables a convenient method to report the condition of the newborn baby immediately after delivery and can evaluate how the response to resuscitation will be if it is needed.

# Aim of the Work

The primary aim of this work was to describe the usage of ultra-sonographic methods to assess progress of labor like fetal head descent, rotation and cervical dilatation.

The secondary aim was to:

- 1-Describe a new tool to monitor labor progress (sono-partogram) and to compare this tool to the traditional partogram in the active phase of the first stage of labor.
- 2-To correlate sonopartogram with the outcome of labor whether normal vaginal delivery or cesarean section delivery, and also with the outcome of the fetus.

# **Patients and Methods**

Patients: This study was conducted on 200 pregnant females; 100 primigravidae and 100 multiparae admitted to El Shatby Hospital in the active phase of the first stage of labor.

Methods: Cases were admitted after confirmation of the onset of the active phase of first stage of labor, we continued to follow up the progress of the first stage of labor by digital vaginal examination (VE) every two hours and represent the measurements on the traditional partogram: 1-Cervical dilatation, 2-Head descent, 3-Uterine contractions. Cases underwent follow-up by ultra-sonographic evaluation every 2 hours

#### (A): Trans-perineal Ultrasound was used to measure:

1-Head-Perineum distance: The shortest distance from the lowermost bony limit of the fetal skull to the transducer at the perineum is the HPD.

- 2-Fetal head station: The infrapubic line (an imaginary line originating from the caudal end of the symphysis pubis, perpendicular to its long axis, extending to the dorsal part of the birth canal) was found to be 3 cm above the plane of the ischial spines and this is used to estimate the fetal head station.
- 3-Angle of head descent: The angle of descent is the angle between the long axis of the symphysis pubis and a line drawn from the lower border of the symphysis pubis tangent on the lowermost bony part of the fetal head.
- 4-Fetal head rotation: Trans-perineal Ultrasound is used to detect fetal head rotation, during and in between contractions.

#### (B): Trans-vaginal ultrasound was used to assess

#### 1- Cervical dilatation:

By inserting the probe gently into the vagina, and measuring the distance between the anterior and posterior cervical lips.

### Results

Table 1: Validity (AUC, sensitivity, specificity) for US sonopartogram; Head-Perineal-Distance (HPD), Angle of descent (AoD), Station and Cervical dilatation at admission to predict Cesarean section delivery from normal delivery

US sonopartogram	AUC	Р	95% C.I	Cut of <sup>#</sup>	Sensitivi ty
HPD (mm)	0.865	< 0.001*	0.775-0.956	>56	79.3
AoD (angle)	0.916	< 0.001*	0.857-0.975	≤110 >110	86.2 85.4
Station	0.948	< 0.001*	0.911-0.985	≤-2	93.1
Cervical dilatation (cm)	0.897	< 0.001*	0.844-0.950	≤5	86.2

#### Table 2: Validity (AUC, sensitivity, specificity) for U/S sonopartogram; Head-Perineal-Distance (HPD), Angle of descent (AoD), Station and Cervical dilatation at admission to predict Apgar score of the fetus

US sonopartogram	AUC	Р	95% C.I	Cut off <sup>#</sup>	Sensitivit y	Specificit y	PPV	NPV
HPD (mm)	0.845	< 0.001*	0.732-0.959	>57	72.7	92.1	34.8	98.3
AoD (angle)	0.924	< 0.001*	0.863-0.985	≤110	90.9	78.8	20.0	99.3
				>110	78.8	90.9	99.3	20.0
Station	0.920	< 0.001*	0.850-0.990	≤-2	90.9	82.0	22.7	99.4
Cervical dilatation (cm)	0.901	< 0.001*	0.826-0.976	≤5	90.9	76.7	18.5	99.3



40 50

100-Specificity

60

Figure 2: ROC curve for cervical dilatation U/S sonopartogram and cervical dilatation Pervaginal (PV) partogram at admission to predict: A) mode of delivery and B) Apgar score of the fetus.

### Conclusion

The Intrapartum US is a simple method that permits objective measurements of labor progression and gives more systematic foundation to assess labor. The comparison between per-vaginal examination and US results showed that US sonopartogram is superior in prediction of delivery outcome and the neonatal condition.

The majority of laboring females concluded that the US is less upsetting and favored it over per-vaginal examination for assessments of labor.

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100-Specificit

PPV

65.7

50.0

97.3

61.4

46.3

93.0

85.4

86.2

90.1

83.0

NPV

96.4

97.3

50.0

98.7

97.3

