

What Do Obstetricians Really Think about Ultrasound in the Delivery Room?

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ABSTRACT: **Background:** In recent years, the role of intrapartum sonography has expanded in childbirth management, in subjective clinical situations such as arrested deliveries, or prior to instrumental deliveries.

Objectives: To assess the current use of intrapartum ultrasound by obstetricians in Israel.

Methods: An anonymous questionnaire was completed by 79 obstetricians in second- and third-level hospitals in Israel. The results were analyzed according to main subspecialty (sonography, delivery), experience and gender.

Results: A questionnaire was completed by 56 senior obstetricians and 23 interns with an average experience of 14.3 and 2.4 years, respectively. All obstetricians performed ultrasound examinations in the delivery room for basic indications such as fetal presentation during twin delivery and to rule out placenta previa. Sonographers consistently reported advanced indications as compared to senior members of delivery teams and interns in the assessment of prolonged first (52% vs. 14% vs. 14%) and second stage of labor (88% vs. 52% vs. 62%) and in assessment of fetal head station (60% vs. 30% vs. 22%), head progression during descent (48% vs. 23% vs. 11%), diagnosis of head position (88% vs. 68% vs. 60%), spine direction (92% vs. 59% vs. 53%) and asynclitism (41% vs. 20% vs. 29%).

Conclusions: Ultrasound is currently used by all physicians in the delivery room for basic indications. However, obstetric teams report a low use of advanced intrapartum ultrasound and prefer to rely on their clinical experience. Advanced intrapartum sonographic imaging should be an integral part of obstetric qualifications. A steep learning curve, along with high reproducibility, suggests that ultrasound devices will become a common tool in labor and delivery management.

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a significant level of sonographic specialization. Advanced uses of intrapartum sonography have emerged in assessment by head station and direction with regard to labor progression. These sonographic parameters were recently reported by our group and others to predict complicated deliveries [1,2]. The purpose of this study was to assess the current uses of intrapartum ultrasound in delivery rooms in Israel.

PATIENTS AND METHODS

The study was carried out in eight second- and third-level hospitals in Israel after approval of the local ethics and research committees. In all hospitals the delivery ward is equipped with an ultrasound machine. Obstetricians, members of the ultrasound units, delivery teams and obstetric interns were asked to complete an anonymous questionnaire on their opinion and use of intrapartum ultrasound. The results were analyzed with regard to subspecialty (sonographers, delivery teams), experience and gender.

RESULTS

The demographic characteristics of the 79 obstetricians who completed the questionnaire are shown in Table 1. All obstetricians reported using ultrasound in the delivery room in 96% of the cases for basic indications such as fetal presentation, twin delivery and placental location.

In cases suspect for fetal macrosomia, senior obstetricians reported performing sonographic estimation of fetal weight (EFW) or measurement of the abdominal circumference (AC) in 63% and 59% respectively. Interns, however, used these indications in only 42% and 45% respectively, and stated that they preferred to rely on clinical skills for the assessment of a suspected macrosomic fetus [Figure 1].

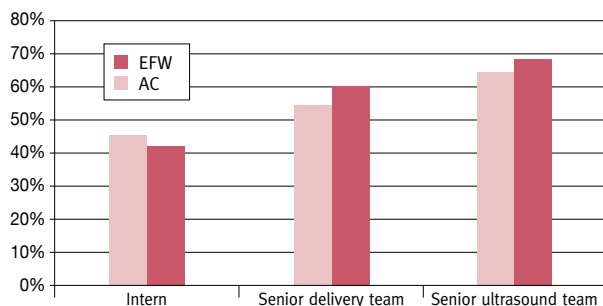
With regard to advanced indications, when asked whether ultrasound should be used for the assessment of prolonged second stage, there were no significant differences between senior obstetricians and interns (69% and 62%, respectively). However, when asked to report on their practical use, sonographers consistently reported a significantly increased use of intrapartum sonography compared to senior members of delivery teams and interns [Table 2A, Figure 2]. The most commonly used indications for sonogra-

The use of intrapartum ultrasound has been widely reported in recent years. Basic uses of ultrasound during labor and delivery have included identification of fetal heartbeat, determination of fetal presentation, placental location, assistance in twin delivery, and external version. These tasks do not require

Table 1. Demographic characteristics of the study group

Senior	n=56
Obstetrician	n=29
Sonographer	n=27
Age (years)	range 33–73, mean 49, median 49
Experience (years)	range 1–40, mean 14.3, median 13.5
Male	68%
Female	32%
Interns	n=23
Age	range 27–38, mean 32.5, median 33
Experience (years)	range 0.5–6, mean 2.4, median 2
Male	48%
Female	52%
Females	n=30
Age	range 28–64, mean 39.3, median 36.5
Experience (years)	range 0.5–30, mean 6.4, median 3.5
Senior obstetrician	11
Senior sonographer	9
Intern	10
Males	n=49
Age (years)	range 27–73, mean 47.9, median 49
Experience (years)	range 1–40, mean 13.7, median 12
Senior obstetrician	20
Senior sonographer	18
Intern	11

Figure 1. Comparison between senior and intern use of intrapartum sonographic application of EFW and AC for the assessment of fetal macrosomia



US = sonographer, OB = obstetrician, EFW = estimation of fetal weight, AC = abdominal circumference

phy reported by all groups was the diagnosis of occiput posterior (OP) position and spine direction. Those who stated not using intrapartum ultrasound in the assessment of a prolonged second stage mentioned a preference to rely on clinical experience with sonographic imaging for obstetric decision making.

When analyzing the results according to the gender of obstetricians, there were no significant differences with regard to the use of ultrasound for EFW and AC. However, males reported using intrapartum ultrasound more often than females [Table 2B].

DISCUSSION

The overall operative delivery in Israel is estimated to be 32% (22% cesarean section and 10% instrumental delivery). Accurate diagnosis of the fetal head position and station is

Table 2. Analysis of results according to obstetrician characteristics
A. By experience

	Senior ultrasound team	Senior delivery team	Intern
EFW	42%	59%	68%
AC	45%	54%	64%
Head station	60%	30%	22%
Head progression	48%	23%	11%
Occiput posterior	88%	68%	60%
Spine direction	92%	59%	53%
Asynclitism	41%	20%	29%

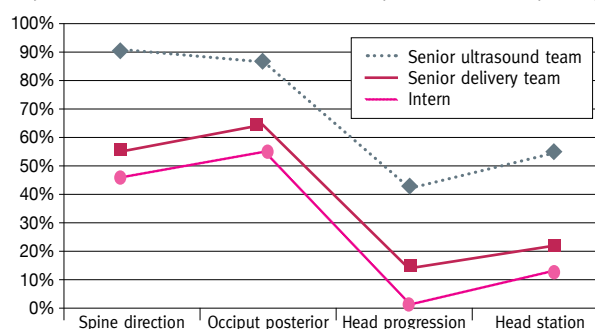
EFW = estimation of fetal weight, AC = abdominal circumference

B. By gender

	Male	Female
EFW	53%	65%
AC	49%	65%
Head station	49%	22%
Head progression	31%	19%
Occiput posterior	80%	61%
Spine direction	79%	54%
Asynclitism	34%	22%

EFW = estimation of fetal weight, AC = abdominal circumference

Figure 2. Use of intrapartum ultrasound in various applications in case of prolonged second stage in function of experience and subspecialty



US = sonographer, OB = obstetrician

fundamental during the second stage of labor to select the safest mode of delivery. Unfortunately, the diagnostic accuracy of vaginal digital examination, especially in the OP position and in the presence of caput succedaneum, is quite poor.

Akmal et al. [3,4] reported a digital examination failure rate of 26% in determining fetal position. Dupuis and colleagues [5] reported only 70% agreement between digital examination and ultrasound, and Chou and co-authors [6] reported a higher accuracy for trans-abdominal ultrasound than for digital examination in detecting OP positions (92% vs. 72%, respectively). Assessment of the fetal spine position is important for predicting the possibility of an OP to rotate to an occiput anterior position.

Blasi et al. [7] showed that in OP positions during the second stage of labor, when the fetal spine was posterior, the head would probably not rotate to an anterior position during delivery.

Indeed, our study has shown that ultrasound assessment of head fetal position by determining the locations of the orbits and spine (trans-abdominal ultrasound, digital examination) are used frequently. This finding is probably related to the feasibility of imaging the fetal orbits and the fetal vertebra by trans-abdominal approach as well as to the well-known clinical consequences of misdiagnosis of posterior position. It should be noted, however, that interns who lack the clinical experience required to determine a fetal head position resorted to using this application in only 60% of second-stage arrested labor.

According to Malvasi et al. [8,9], sonographic diagnosis of fetal head asynclitism is feasible due to failure to demonstrate either a classic biparietal diameter axial plane or the two fetal orbits. In a study comparing intrapartum ultrasound to digital examination, they found digital pelvic examination to be inferior to ultrasound in the diagnosis of transverse positions. Early diagnosis of a transverse position allows optimal timing and technique for the operative delivery. However, this more complicated imaging was reported to be used quite rarely in our study, even by the sonographers (40%).

Digital assessment of fetal head station and progression are reported to be challenging measures as well. Dupuis et al. [10] reported a 12% error rate in the assessment of fetal head engagement using a birth simulator even when performed by experienced attending obstetricians. The maternal and fetal consequences of a misdiagnosis of engaged fetal head and a mid-pelvis operative delivery are well known.

Sonographic assessments of fetal head station and progression measured as angle of progression [7,11], head perineum distance [12], and head symphysis distance [13] have been shown to be predictive of a spontaneous vaginal delivery, an instrumental delivery or a cesarean delivery. All methods were reported to have low inter- and intra-observer variability and high reproducibility [14]. Despite these promising reports, in our study group the vast majority of delivery team members reported not using these objective ultrasound measurements of head progression in labor. A possible explanation could be the trans-perineal probe used to produce the measurements, an approach not regularly used in obstetric ultrasound and therefore less known and requiring practice and training.

Recently, our group reported the pubic angle to be predictive of an instrumental delivery in women with prolonged second stage [15]. This parameter may aid in assessment of the maternal pelvis prior to an instrumental delivery and provide better insight regarding the fetal-pelvic relationship.

Although dealing on a daily basis with the limitations of digital vaginal examination, delivery team members in our study reported that they preferred to rely on their clinical experience than on imaging obtained by ultrasound. Similar

results, reported by interns with limited clinical experience, along with the well-known limitations of digital examination, raise the question whether ultrasound scanning for obtaining objective information during labor is not used during labor due to the lack of the requisite sonographic skills.

We believe that basic as well as use of advanced intrapartum ultrasound should be an integral part of obstetric qualifications. A steep learning curve, along with high reproducibility, suggests that this available technology will become a customary tool in labor and delivery management.

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