

Intrapartum Ultrasound Assessment of Fetal Head Position, Tip The Scale: Natural or Instrumental Delivery?

G. ADAM¹, O. SIRBU¹, C. VOICU¹, D. ILIESCU¹,
STEFANIA TUDORACHE¹, N. CERNEA¹

¹Department of Obstetrics and Gynecology, University of Medicine and Pharmacy of Craiova

ABSTRACT: Objectives: The main objective of this study was to observe the behavior of the fetal head position during labor, when starting from occiput anterior or posterior position and also to determine their importance in labor management (if the starting fetal head position can be a strong argument in favour of vaginal or cesarean delivery). Methods: 187 patients in labor were included in this study, with gestational age over 37 weeks and estimated fetal weight over 2500 g, singleton pregnancy, cephalic presentation, empty urinary bladder. For these patients the ultrasound assessed parameters were: fetal head position at the beginning of labour and fetal head rotation during labour. Results: 89,18 percent of the patients starting from OTP (occiput transverse or posterior position) had a vaginal birth after an anterior rotation of the fetal head, and only 10,82 % presented persistent occiput posterior requiring cesarean section for delivery. Furthermore, considering only initial occiput posterior position, we observed an increased rate for cesarean section delivery (22,72%) by persistence of this position during labour. None of the patients starting with an anterior fetal head position rotated posteriorly. Conclusions: vaginal delivery in occiput anterior position was the most common result in both OTP and OP fetal head initial position. The main reason for cesarean delivery was persistent OP position. Patients with occiput posterior position were subsequent only to an initial posterior/transverse position.

KEYWORDS: Intrapartum ultrasound, occiput posterior, cesarean section, persistent OP

Introduction

The fetal head occiput posterior position, found in about 5% of deliveries, unlike the anterior varieties, involves different labor and delivery management. Due to a higher incidence of physical and psychological traumas, maternal and neonatal outcomes are worse-increased rates of Cesarean section (c-section), instrumental delivery, perinatal morbidity and maternal perineal lacerations and anal sphincter injury. Clinical examination in the assessment of fetal head position has been proved highly inaccurate by recent studies using ultrasound scanning during labor [1-4]. (Four studies conducted by Sherer [1,2], Akmal [4] and Kreiser [3] found significant differences between clinical and sonographic examination, varying widely from 30 to 52 percent).

The etiology of persistent occiput posterior position is highly controversial. In classical literature the majority of occiput posterior positions (about 90% of cases) is considered to be subsequent to a malrotation from an anterior or transverse position, rather than persistence of an initial OP (occiput posterior) [5].

Recent studies conducted by Garberg and Souka reported conflicting results regarding the occiput posterior position as a malrotation of an

initial occiput anterior/transverse position or persistence of an initial OP.

Whereas Gardberg found 62 percent of occiput posterior positions resulting from malrotations [6], contrariwise Souka reported 75 percent of OP as failure of rotation from an initial posterior position [7]. An explanation for the discordance in this findings could be the discordance of the examination time (while Souka evaluations were made after the occurrence of labor, Gardberg examined his patients before the onset of labor or in early spontaneous labor).

Methods

The study group included 187 patients in labor, with gestational age over 37 weeks and estimated fetal weight over 2500 g, singleton pregnancy, cephalic presentation, empty urinary bladder, active labour. The exclusion criteria were represented by antepartum caesarean section indications (maternal or fetal pathology). For the ultrasound measurements we used an ultrasound machine with 3,5-5 MHz probes which were introduced in an ultrasonographic gel covered glove. TPU (transperineal ultrasonography) followed immediately the clinical examinations, and were performed during maternal pushing. TPU scans were performed at different time intervals according

to the phases of labor: every hour until complete dilation (1st phase) and every 10 minutes after complete dilation (2nd phase). Clinical and TPU examination for the same patient were performed by different examiners.

Patients were informed of the experimental nature of the translabial scans and consented to the examination. The transducer was first positioned suprapubically (Fig.1) to identify the position of the occiput using head landmarks

(orbits, thalamus), afterwards the transducer was positioned translabially (Fig.2) in the transverse plane to assess the midline angle, formed between the cerebral midline (defined as the echogenic line interposed between the two cerebral hemispheres) and the antero-posterior axis of maternal pelvis. This angle decreases when the occiput rotates toward the pubic symphysis.



Fig.1, 2. Correct position of the transducer suprapubically (1) and translabially (2)

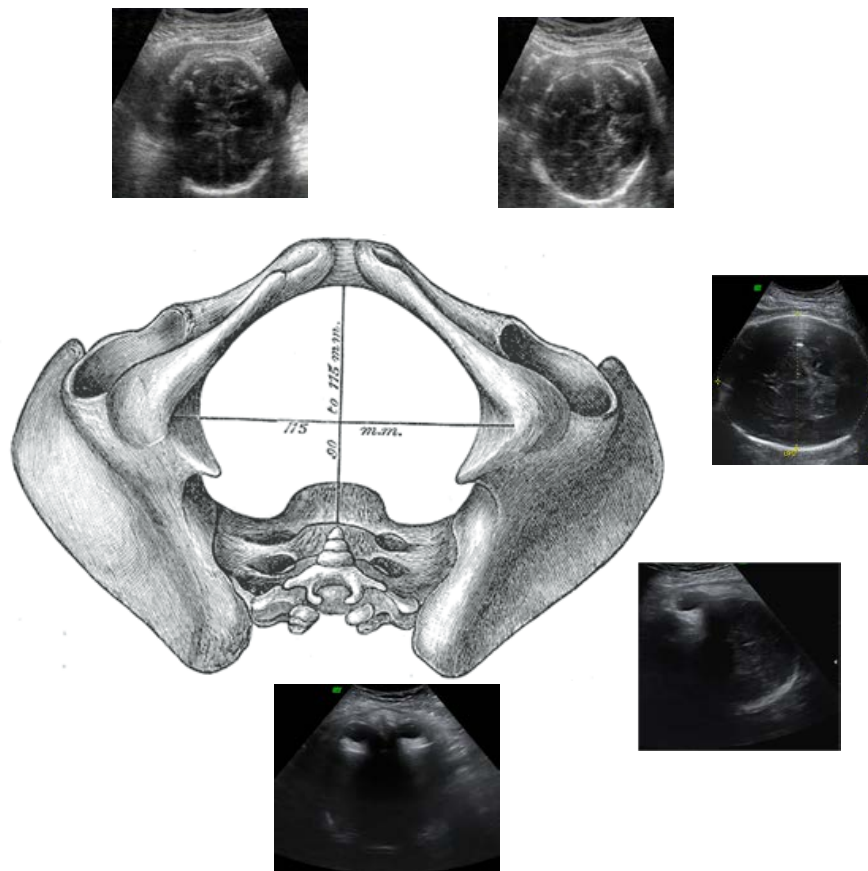


Fig.3. Different occiput positions

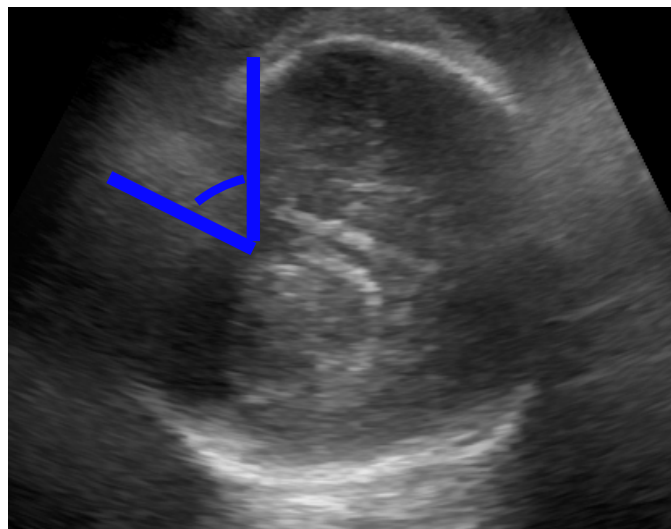


Fig.4. Ultrasound image of the midline angle/ rotation angle

Aside from the objectives of our study for every variety of fetal head position (Fig.3) we measured the fetal head progression parameters that can be assessed by TPU: progression angle (Fig.4), progression distance, head direction and head to perineum distance.

Results

From 187 patients included in this study, 19 had cesarean section delivery (10,16%). There

were 59 patients with initial posterior/transverse occiput position. In this group 89,18% had vaginal delivery and 10,81% had cesarean section (Fig.5). If we consider only the patients with occiput posterior position (10 cases) the percentage of surgical delivery doubles (22,72%) (Fig.5). Examining the 128 patients with initial occiput anterior fetal head revealed no posterior rotation in these cases.

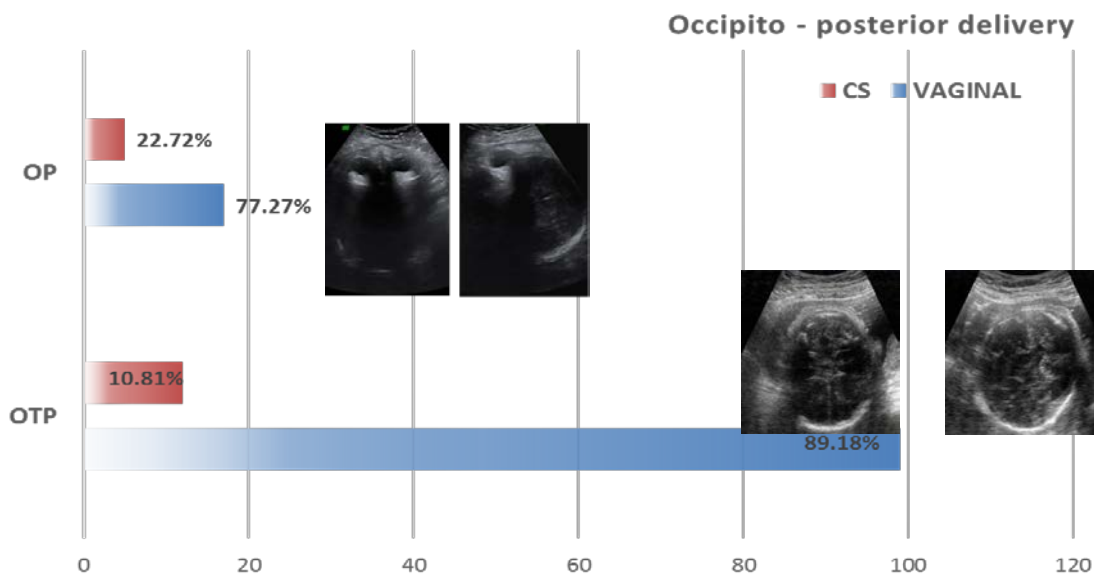


Fig.5. C-section and vaginal delivery percentage for occiput posterior/transverse positions

Analyzing the progression TPU parameters in the c-section cases with occiput posterior position (progression angle, progression distance, head direction and head to perineum distance) we noticed that all of them had good prognostic values for vaginal delivery, except the values of the head direction which were consistent with a poor progression of labor.

For patients with a favorable evolution of labor, evolution of PA and DA is parallel and consistent, while for patients with persistent posterior occiput a divergent and discordant evolution of the two parameters is observed in most cases (Fig.6).

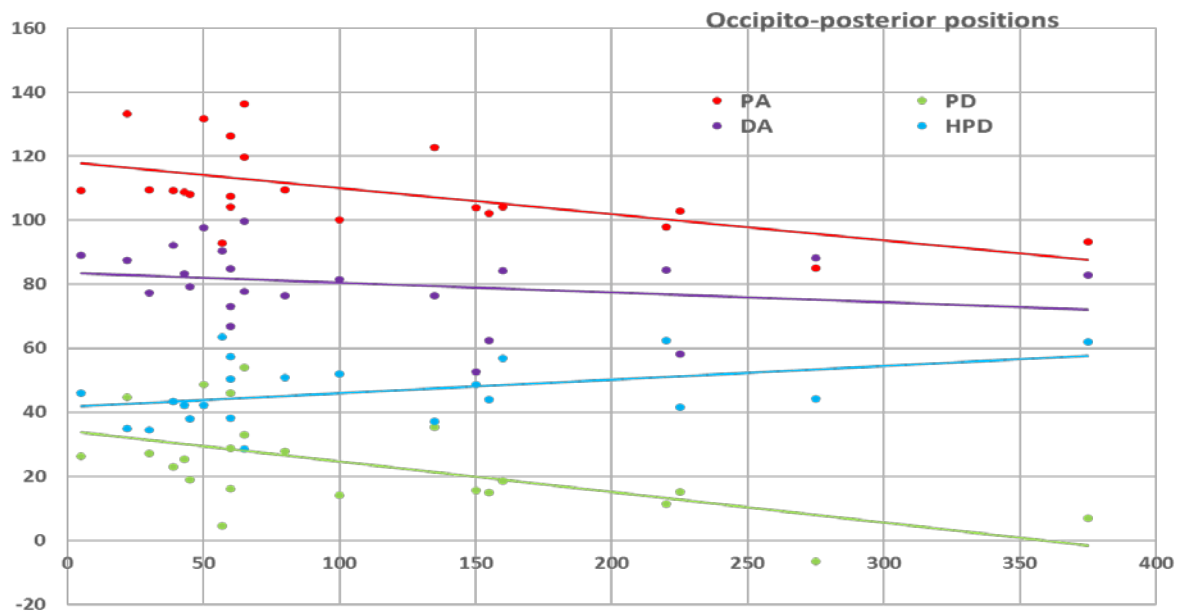


Fig.6. Graphic representation of other TPU parameters measured in labor for the patients presenting occiput posterior/transverse position

Discussions

The findings in our study are in contradiction with classical literature which states that almost 90% of occiput posterior positions are subsequent to a malrotation from an initial occiput anterior position [5], which is not found among any patients of our study. Further studies on larger groups of patients are needed because even recent studies using modern imaging technology found conflicting results.

The fact remains that the main reason for c-section delivery in our study was the lack of fetal head progression due to persistence of occiput posterior position, which was found only in patients with initial occiput posterior/transverse.

Despite significant progress in clinical obstetrics, the evaluation of fetal head position and strategies for predicting the method of delivery still remain a subject of controversy. TPU has been previously considered a useful tool for clinicians in this [8-13] and other [14-16] clinical dilemmas concerning labor and delivery management.

Ultrasound (US) imaging used in our study allowed for:

- a significantly more precise diagnosis,
- more security while waiting,
- a prompter decision for CS, depending on the head position

US assessment of the fetal head position in labor is feasible in a busy labor ward and useful in the prediction and diagnosis of difficult / prolonged labor.

Conclusions

It is clear from our study that most cases with posterior or transverse fetal skull position variety at labor onset resulted in vaginal births.

Regarding the indications for cesarean section, they were most commonly found in persistent posterior occiput position.

Patients with occiput posterior position were subsequent only to an initial posterior/transverse position, none of the patients included in our study presented rotation from an initial anterior position

US seems a proper solution to plan and monitor the labor, and as well to “guide” instrumental delivery, because: is available, we have small, compact, mobile machines, is safe, non-invasive and offers an immediate, and most important, objective result. It offers the possibility to record the data and is quick to learn and simple to use.

References

1. Sherer DM, Miodovnik M, Bradley KS et al. Intrapartum fetal head position I: comparison between transvaginal digital examination and transabdominal ultrasound assessment during the active stage of labor. *Ultrasound Obstet Gynecol* 2002; 19: 258-262.

2. Sherer DM, Miodovnik M, Bradley KS et al. Intrapartum fetal head position II: comparison between transvaginal digital examination and transabdominal ultrasound assessment during the second stage of labor. *Ultrasound Obstet Gynecol* 2002; 19: 264-268.
3. Kreiser D, Schiff E, Lipitz S et al: Determination of fetal occiput position by ultrasound during the second stage of labor. *J Matern Fetal Med* 2001; 10: 283-286.
4. Akmal S, Tsoi E, Kametas N et al Intrapartum sonography to determine the fetal head position. *J Matern Fetal Neonatal Med* 2002; 12: 172-177.
5. Cunningham F., Leveno K., Bloom S, Hauth J., Rouse D., Spong Catherine, Williams Obstetrics, 23rd edition, 2009, McGraw-Hill Professional, New York,
6. Gardberg M, Laakkonen E, Salevaara M. Intrapartum sonography and persistent occiput posterior position: a study of 408 deliveries. *Obstet Gynecol* 1998; 91: 746-749.
7. Souka AP, Haritos T, Basayiannis K, et al. Intrapartum ultrasound for the examination of the fetal head position in normal and obstructed labor. *J Matern Fetal Neonatal Med* 2003; 13: 59-63.
8. Lewin D, Sadoul G, Beuret T. Measuring the height of a cephalic presentation: an objective assessment of station. *Eur J Obstet Gynecol Reprod Biol* 1977; 7: 369-372.
9. Richey SD, Ramin KD, Roberts SW et al. The correlation between transperineal sonography and digital examination in the evaluation of the thirdtrimester cervix. *Obstet Gynecol* 1995; 85: 745-748.
10. Sherer DM, Abulafia O. Intrapartum assessment of fetal head engagement: comparison between transvaginal digital and transabdominal ultrasound determinations. *Ultrasound Obstet Gynecol* 2003; 21: 430-436.
11. Dietz HP, Lanzarone V. Measuring engagement of fetal head: validity and reproducibility of a new ultrasound technique. *Ultrasound Obstet Gynecol* 2005; 25: 165-168.
12. Heinrich W, Dudenhausen J, Fuchs I. et al. Intrapartum translabial ultrasound (ITU): sonographic landmark and correlation with successful vacuum extraction. *Ultrasound Obstet Gynecol* 2006; 28: 753-760.
13. Eggebo TM, Heien C, Okland I et al Ultrasound assessment of fetal head-perineum distance before induction of labor. *Ultrasound Obstet Gynecol* 2008; 32: 199-204.
14. Sakamoto H, Takagi K, Masaoka N et al. Clinical application of the perineal scan: prepartum screening for cord presentation. *Am J Obstet Gynecol* 1986; 155: 1041-1043.
15. Ziliani M, Azuaga A, Calderon F et al. Transperineal sonography in second trimester to term pregnancy and early labor. *J Ultrasound Med* 1991; 10: 481-485.
16. Weber TM, Hertzberg BS, Bowie JD. Transperineal US: alternative technique to improve visualization of the presenting part. *Radiology* 1991; 179: 747-750.

Corresponding Author: O. Sirbu, Department of Obstetrics and Gynecology, University of Medicine and Pharmacy of Craiova, Str. Petru Rares nr. 4, 200456, Craiova, Dolj, România, e-mail: ovidiusoc@yahoo.com