

A Focus on Intrapartum POCUS (Point of Care Ultra-Sound)

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Whilst Point of Care Ultrasound in obstetrics, with imaging and clinical interpretation at the bedside has been utilised for obstetric cardio-respiratory and surgical emergencies [1], more recently there has been an increased impetus and focus on incorporating POCUS in the contemporary management of women in labour [2].

As assisted vaginal birth rates fall worldwide there has been a concomitant rise in caesarean section delivery rates [3], with obstetric practice in some centres almost at the point of conceding that if the baby can't be pushed out spontaneously then it must be cut out!

This acceptance, apart from a lack of choice for the mother, is not without consequences particularly if caesarean section is performed in the second stage of labour, where not only is the likelihood of morbidity for the mother and baby increased but there are potentially serious "down the stream" consequences for both in subsequent pregnancies predominantly in terms of scar rupture, abnormal placentation and poorer perinatal outcomes [4].

While spontaneous vaginal birth still remains as the desired outcome for most mothers and their attendants, the option of an operative vaginal birth may need to be considered where assistance is required in the second stage of labour due to failed fetal progress with maternal expulsive efforts and/or suspected fetal distress.

Selecting the most appropriate mode of delivery at full dilatation of the cervix requires accurate and discerning clinical assessment of

the patient and her fetus, along with informative and cooperative decision making by the attendants with an accommodating respect for the patient's preference.

Selection of the appropriate instrument to effect delivery is a complicated decision based on the accoucheur's preference, presence of caput and moulding of the fetal skull and an accurate clinical assessment of the fetal position (Occiput anterior, transverse, posterior) and fetal descent (in relation to ischial spines) which has found to be lacking and inaccurate in 25 -30% of cases [5].

In general, forceps are more likely to be associated with successful vaginal delivery (risk ratio, 0.58; 95% confidence interval ,0.39 – 0.88) than ventouse/vacuum with less fetal morbidity in mid or low mid-cavity application, but the patient needs to be informed in the decision making discussion that there is greater maternal morbidity in terms of perineal and anal sphincter injury with the use of forceps.(odds ratio, 1.83; 95% confidence interval 1.32 – 2.55) compared to ventouse/vacuum [3].

Ultrasound assessment of fetal position (per transabdominal ultrasound) has shown to be more accurate than clinical assessment and similarly with ultrasound assessment of fetal descent (per transperineal ultrasound), using the combination of Angle of Progression of the fetal head (>120 degrees), Head Perineal Distance (< 40 mm) and Head Direction (upwards) [6].

A discerning clinician might now choose to use a combination of clinical and point of care ultrasound (POCUS) imaging, particularly in situations where there is doubt of the clinical findings which is often seen in dystocia with occiput posterior position with its often associated deflexion, caput and moulding of the fetal head which in turn might negate the ventouse/vacuum as the instrument of choice.

The added advantages of using POCUS, apart from its alacrity of application and patient acceptance, are that the patient and her attendants have a visual assessment of fetal progress in the second stage, which will serve to reinforce the clinical management offered to the patient [7], and a prediction of the likely success of operative vaginal delivery [8].

This information may in turn determine where the delivery may be safely performed eg in labour ward suite if the accoucheur is confident of the clinical and ultrasound findings or if there is doubt, in theatre, as a trial of operative delivery ready to proceed to caesarean section if there is failed instrumental application or failed descent with traction.

In the case of successful operative vaginal delivery anticipation of potential complications of shoulder dystocia and post-partum haemorrhage may be addressed by cooperative decision making and good communication between attendants and the patient thereby reducing maternal and fetal morbidity.

With unsuccessful operative vaginal delivery the performance of caesarean section in the semi-lithotomy (Whitmore) position (to aid in abdominal delivery of the fetal head with “push” from below) and/or the application of the fetal pillow (in the case of failed traction), will serve to reduce the morbidity of caesarean section performed at full dilatation and/or with fetal head impaction [9].

With the confidence and experience gained in using POCUS in the management of the second stage of labour there has been an extension of its use in the management of delay, late in the first stage of labour (dystocia) [10].

Most cases of dystocia at this stage of labour are due to deflexion of the presenting fetal head. This may be detected by transabdominal ultrasound determination of the Occipito Spinal Angle (OSA) in the case of Occiput anterior and transverse positions, with an angle of < 125 degrees being indicative of deflexion and possible obstructed labour, which may be addressed by attention to maternal hydration and distress, maternal positioning, the use of epidural analgesia and judicious intravenous syntocinon augmentation.

Similarly, in the case of Occiput posterior position the determination of the Chin Chest Angle (CCA) of > 33 degrees would confirm deflexion and the possibility of obstructed labour with similar assistance required to address the situation along with consideration of manual rotation of the fetal head to the Occiput anterior position [11].

Before POCUS can become an accepted adjunct in the contemporary management of labour further focussed studies are required although the recent work of Skinner et al. [12] in assessing 16 studies involving 2848 women undergoing attempted operative birth bears testimony to the increasing use of POCUS in intrapartum management and the efforts being expended to make this an evidence based practice.

POCUS, once it is accepted as a legitimate intrapartum management tool, may also serve to address the previously commented reduced opportunities of operative vaginal delivery being offered as a delivery option to women. This is as a result of a complex mix of fear of litigation and more importantly, a vanishing cohort of experienced obstetricians to teach these skills, with a reluctance in particular to support the safe practice of rotational forceps delivery [13].

POCUS with its potential to provide accurate information to the accoucheur of fetal position, deflexion, fetal descent, and predicted success will enhance the ability of obstetricians to learn, teach and perform operative vaginal delivery safely and restore this option to their armamentarium in order to be able to provide a safe delivery choice for their patients.

There is also the added potential that as POCUS skills can be easily attained by midwives to assist with the management of labour and delivery in conjunction with their medical colleagues using relatively unsophisticated and economical 2-D ultrasound equipment, then this may serve to address some of the pressing staffing issues currently being experienced by obstetricians and midwives in obstetric practice [14].

The authors continue with their scientific appraisal of the use of POCUS in a midwifery led rural obstetric service [15] along with providing tuition of the required techniques to midwives and obstetricians at 6 monthly workshops convened by the Australian Institute of Ultrasound, Broadbeach Waters, Queensland and concomitantly, with teaching the requisite skills of operative vaginal delivery at annual RANZCOG Birth Master Class Workshops [16].

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