

Point-of-care ultrasound for obstetric care

The use of ultrasound in obstetric care has grown steadily since the 1950s, to the point where it is now a major part of managing pregnancy and helping to ensure a safe and healthy delivery for mother and baby.

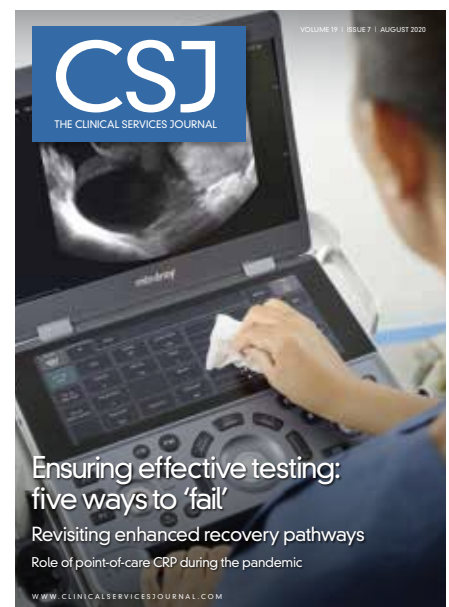
Most pregnant women in the UK first experience ultrasound at their routine booking scan at 12-14 weeks for preliminary checks, a nuchal translucency test and to estimate a due date, and then again for an anomaly scan at 18-20 weeks to screen for abnormalities and monitor the baby's growth. However, recent regional and national initiatives – notably the Saving Babies' Lives care bundle¹ – advise more scans in later pregnancy for high-risk patients. In addition, ultrasound is now seen as an essential tool for every labour ward in the country.

Traditionally, the majority of antenatal scans would have been performed by a sonographer on a large, cart-based system. However, in recent years, the technology behind easy-to-use, compact point-of-care ultrasound systems has advanced rapidly, giving excellent image quality and added flexibility to perform ultrasound wherever it

is needed – whether that's in an outpatients clinic, a community hub, or the busy labour ward setting. This article looks at the role of these smaller, portable ultrasound systems in the highly regulated and litigious speciality of obstetrics, and discusses how their use is set to escalate in the next few years.

Screening those at risk

The rise in ultrasound scans throughout pregnancy can be largely attributed to a better recognition of the importance of careful monitoring of women who can be categorised as high risk. This includes those with a greater chance of having small babies due to smoking or excessive alcohol intake, and women with a previous history of difficult pregnancies or labour, as well as teenage mothers who are more likely to have premature births and smaller babies.² In these cases, there are rigorous UK guidelines that recommend best practice scanning



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protocols for checking the growth of affected babies more frequently.

Clinical implications of obesity in pregnant women

At the other end of the scale, women with gestational diabetes or those who are obese need additional ultrasound scans because they are in danger of having large babies. Recent data suggests that 29% of women in the UK are obese,³ and these figures are certainly reflected in obstetric departments across the country, which commonly see mothers with BMIs in the 40s and 50s or more.

Obesity carries with it a far greater risk of pregnancy complications overall, including miscarriage and stillbirth, gestational diabetes, raised blood pressure and pre-eclampsia, blood clots and post-partum haemorrhage (PPH), prolonged labour and a higher chance of needing instrumental delivery.⁴ No wonder then that there are now clinics for these high-risk patients and additional ultrasound scans to size and ►

check the position of babies, where simple abdominal palpation is less conclusive, and the Royal College of Obstetrics and Gynaecology recommends elective induction of labour at term for severely obese women.⁵

Ultrasound-guided regional anaesthesia and pain control

Larger patients also present challenges for anaesthetists; carrying out IV and epidural insertions in very obese women is more problematic. If access can be evaluated by ultrasound before a woman is in the throes of active labour – at around 36-38 weeks – then it raises the success rate for these procedures should they be required once she is on the labour ward, for example, by knowing whether the epidural depth required is going to be 5 cm or 10 cm.

Five to 10 years ago, it wasn't essential for anaesthetists to be trained in neuraxial ultrasound techniques, but the need for these skills has increased with the ever-larger number of obese patients. If an obese woman has not had her back scanned prior to being in labour, anaesthetists will often carry out a quick landmark scan at the bedside before inserting the epidural, to improve the chances of success on the first attempt.⁶

High-risk anaesthetic patients also include women with a history of back or disc surgery, and ultrasound is useful in these

cases to explore the anatomy and assess the location of any scarring or metalwork that might impact on an epidural. In addition, ultrasound guidance can be used to place TAP blocks for pain control following a general anaesthetic for caesarean sections, as they have been shown to reduce the requirement for opioids post-op.

Scanning in the third trimester

A significant proportion of the increase in ultrasound scans – monitoring growth or checking for viability when there is reduced fetal movement – can be attributed to the Saving Babies' Lives care bundle, first drawn up in 2015 and updated in 2019, that aims to halve the rate of stillbirths in the UK by 2025. The first iteration of these guidelines resulted in a 35% increased referral rate for ultrasound examination from mothers reporting reduced fetal movements. The rate of stillbirths has reduced since then, with the second report in 2019⁷ recommending that growth scans continue after 36 weeks gestation, in the hope that ultrasound monitoring will help to spot babies who are growing normally until that point, but then do not grow as anticipated in the last few weeks.⁸

For most low-risk women their last scan is at 20 weeks, long before a baby settles into position for delivery, but studies have shown that universal scanning at 36 weeks

could also help to identify the 3-4% of babies that are breeched. It is difficult to reliably confirm a breech presentation by abdominal palpation alone; research shows that this method is less than 70% accurate and approximately 20% of babies born in a breech position were not suspected. Planned caesarean delivery at term for breeched babies reduces the risk of perinatal morbidity and mortality. While better detection through ultrasound screening will increase the number of caesareans, it will also decrease the stress and complication of emergency sections.

The 36+ weeks scan premise is not yet an NHS pathway but is currently dictated by local decisions to resource and fund the huge increase in growth scans that it would create. The rise in quality and imaging capabilities of hand-carried ultrasound systems in the last few decades means that they could play an increasingly important role in easing this demand, perhaps sited away from the main central hospitals in community hubs. This model of care would be excellent for patients; a move towards continuity of care is encouraging rotation of midwives between the community and the labour ward. This would make teaching ultrasound skills and competency easier to manage, but would be hard to cost.

An essential tool in the labour ward

At present, a significant number of breeched presentations are first picked up as women are scanned on arrival to the labour ward as part of the admission assessment process, but presentation – cephalic or breech, face up or face down – is only the tip of the ultrasound iceberg in this setting. If a woman does go into labour before her due date, ultrasound will often be used instead of heart rate monitoring to check the baby throughout labour, as this is more reliable at picking up signs of distress in very premature babies.

Examining the angle of progression and descent of the baby is also key for assessing slow and challenging labour, as information regarding the position of the baby is crucial to planning if and what instruments are to be used to aid vaginal delivery, or to decide to deliver the baby via caesarean section. While the use of ultrasound to guide instrumental deliveries is not mandatory, it is certainly recommended practice for most obstetricians now; however experienced the clinician, these are complicated procedures and medicolegally it's a minefield if positioning is not accurate in the first place.

For multiple babies too, ultrasound guidance is now considered to be the only safe way to manage vaginal delivery, by following the position of the babies and their progression through the birth canal. Most labour wards are equipped with the more compact, hand-carried, bedside ultrasound systems for these



The new Mindray MX7 compact ultrasound system



situations, because they boot up in seconds and are easy-to-use and move around in the tight spaces of delivery rooms.

All in all, transabdominal and transvaginal ultrasound are now essential skills for the labour ward and an integral part of training for doctors specialising in obstetrics. Current trainees are much more adept in performing ultrasound at an earlier stage of their training than was the norm 15-20 years ago and, in some trusts, midwives are also now trained in basic level competencies to carry out dating and growth scans, and to look at placental location and position when women are first admitted in labour.

Changing practices for changing times

The care plans described above are adhered to consistently across the country, however, new models of service delivery are being explored that would move some ultrasound procedures out of hospital and into the community, particularly in rural regions. Satellite clinics led by midwife-sonographers – or visited by sonographers – could be held to carry out simple checks, but they would depend on the right equipment, adequate training and strict auditing; compact, easy-to-use portable systems would be particularly suitable for this setting.

This idea also fits with the repercussions of future outbreaks like the current COVID-19 pandemic, where there is an increased drive to decrease footfall in acute hospitals. Bookings for anomaly and growth scans are already stretched and do not always occur within the ideal timeframe, partly because of the thorough cleaning protocols now required between patients. If some of the simpler, routine and non-urgent ultrasound checks could be carried out remotely, with closer involvement of the

community midwives, this could allow for greater continuity of care and would release hospital resources for more complex and high-risk patients.

Summary

There are clear clinical benefits for ultrasound scans in obstetrics and their use has grown significantly over the last three decades, far beyond the domain of routine scanning carried out by sonographers on huge, unwieldy, cart-based machines. Point-of-care ultrasound systems are now ubiquitous in labour wards, and offer excellent image quality with the added advantages of flexibility and portability for virtually all obstetric settings. Initiatives like Saving Babies' Lives are fuelling the demand for more scans, and the capabilities of these compact, hand-carried instruments are ideal for meeting the current, ever-growing needs of antenatal monitoring and management of women in labour.

References

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