Cervical Length Measurement – A Pictorial Review

G Coleman[1], JP Mayes[2]

1. Lecturer in Diagnostic Imaging – University of Derby and Ultrasound Clinical Specialist – NUH Email: g.coleman@derby.ac.uk
2. Lecturer in Diagnostic Imaging – University of Derby and Advanced Practitioner - NUH

Introduction

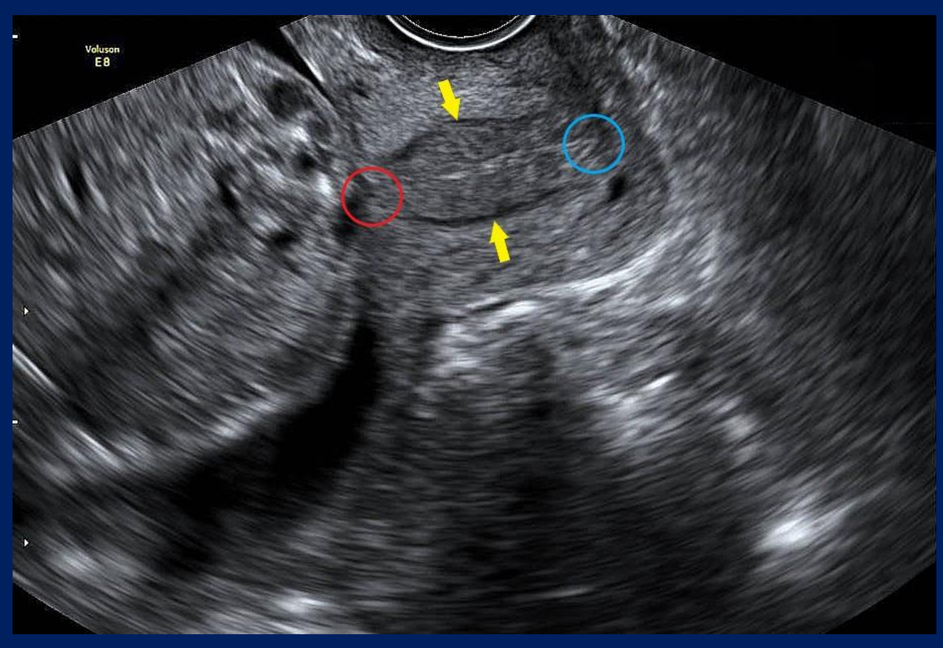
Preterm birth is one of the main causes of neonatal morbidity and mortality.[1] Surveillance of the cervical length is seen as a useful prediction tool for assessing women at high risk of premature delivery.[2] The main risk factors are identified as including previous preterm delivery, multiple gestation, previous cervical surgery or biopsy such as LLETZ or cone biopsy connective tissue disorder such as Ehlers Danlos syndrome. The transvaginal (TV) technique is seen as the gold standard due to the ability for standardisation of the technique, reproducibility and increased resolution whilst visualising the entire cervix.[3] The measurement can also be performed transabdominally or transperineally.

Technique

Standardisation of technique enables reproducibility of the cervical length measurement. The following basic points should be considered:

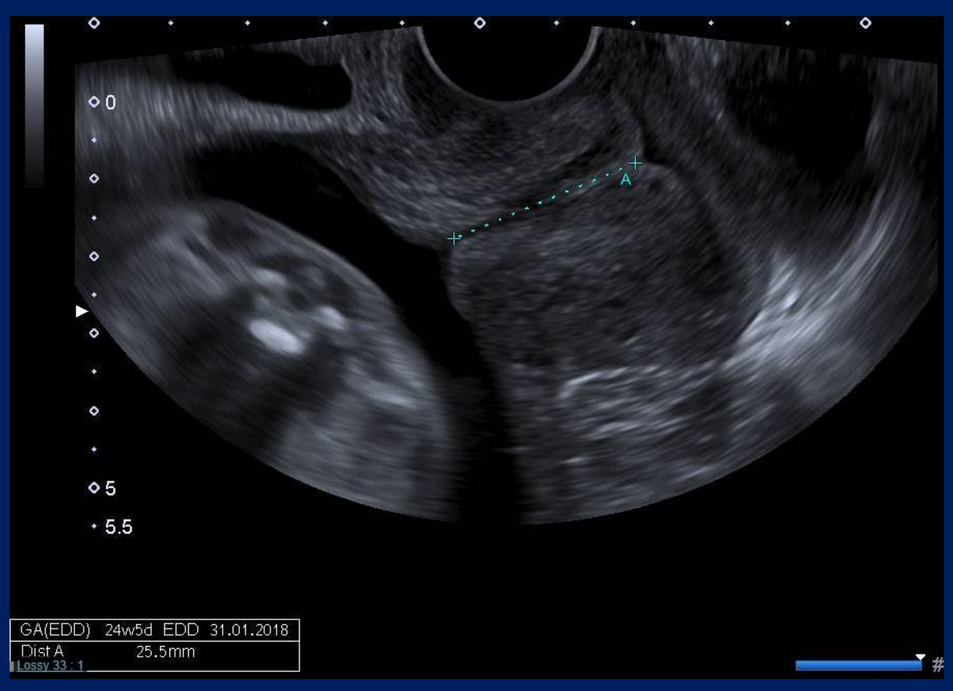
- Patient information and consent
- TV probe clean prior to examination (as per departmental protocol)
- Transducer covering with a clean sheath
- Offering of a chaperone
- Patient bladder should be empty immediately prior to the TV examination
- Transducer introduced in a longitudinal plane to obtain a sagittal section of the entire length of cervix
- Withdraw transducer slightly to ensure minimal pressure applied to the cervix
- Enlarge the image to ensure the cervix occupies approximately 2/3 of the screen
- Optimise image settings to aid identification of the internal and external cervical os
- Observe the cervix for between 3-5 minutes and take several measurements over that time. Shortest most accurate measurement recorded on report
- Linear measurement made between the internal and external cervical[3,4]

Anatomy



Longitudinal section of Cervical length. The cervical mucosa is seen as a hypoechoic area (indicated by yellow arrows). The internal os (red circle) and external os (blue circle) should be clearly identified for caliper placement.

Caliper Placement



Calipers should be placed on the internal and external os where the opposite sides of the cervical tissue come together.

Common pitfalls

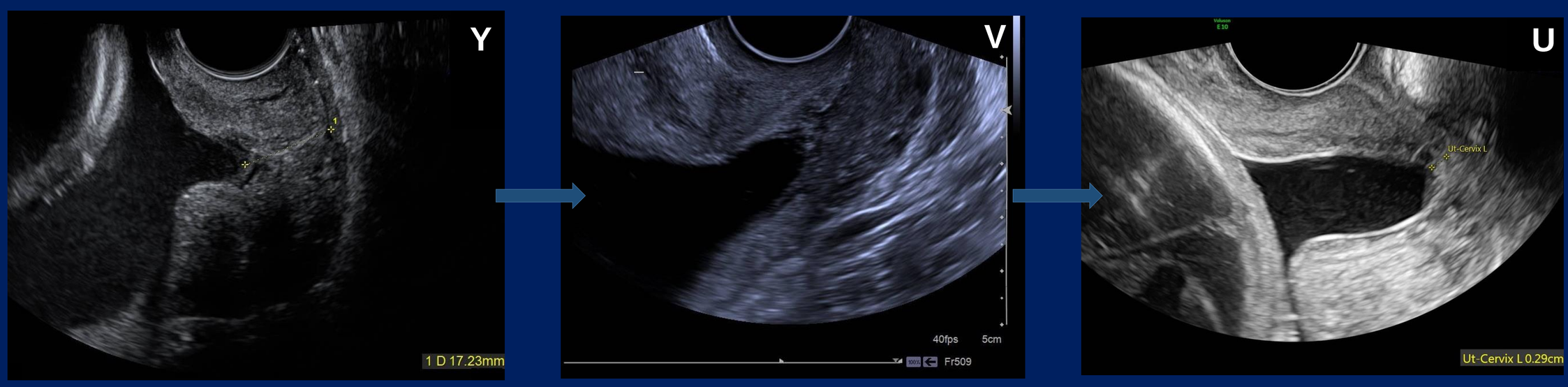
Maternal bladder not emptied prior to examination This compresses the cervix and can cause false elongation of the length. If funnelling present, the bladder can also compress this and affect the true visualisation of the funnelling. **Solution:** Ask patient to use bathroom to empty bladder.

Undue pressure on the cervix by the transducer The thickness of the anterior and posterior portions of the cervix should be equal. If undue pressure is applied the anterior portion will appear thinner and the pressure will elongate the cervix providing a false measurement.
Solution: Withdraw the transducer slightly to relieve any pressure.

Uterine contraction Can cause the cervix to appear longer than it actually is. A contraction may also hide the presence of funnelling by contracting the uterine walls together.
Solution: Continue the examination over 5 minutes to assess for resolution of any contraction. Assess the image to identify the true internal os by observing the cervical mucosa.

Curved cervix This is commonly seen, especially in a longer cervix. Linear measurement should still be performed. This may provide an under-measurement of the cervix but research performed by To et al[1] found that on average this measurement was altered by 2.2mm. If the cervix is short it will also be straight.[5]
Solution: For standardisation and reproducibility of technique, linear measurement should always be performed.

Cervical Funnelling Progression



Often seen as an indicator for preterm birth, different stages of funnelling are seen. The internal os will normally appear to be a T shape in a non-funnelling cervix. As funnelling occurs the cervix funnel will change shape from a T to Y to V to U. Where funnelling is present, the callipers should be placed to measure the closed length of cervix.

Conclusion

With the correct technique, the cervical length measurement is a valuable tool in the surveillance and prediction of preterm labour. The technique can be difficult to master however by following a standardised protocol and knowing how to overcome common pitfalls can assist the reproducibility of the technique and reduce interoperator variability. Cervical funnelling usually follows a distinct changing of shape and therefore it is important that the operator knows how to complete the measurement for accurate assessment.

This review has discussed the technique, anatomy and measurement process. This can be used as a tool for sonographers to ensure a standard technique is being followed in the measurement of cervical length.

References:

1. To MS, Skentou C, Chan C et al. Cervical assessment at the routine 23-week scan: standardizing techniques. *Ultrasound Obstet Gynecol* 2001; 17: 217-219.
2. Kagan KO and Sonek J. How to measure cervical length. *Ultrasound Obstet Gynecol* 2015; 45: 358-362.
3. Mella MT and Berghella V. Prediction of Preterm Birth: Cervical Sonography. *Semin Perinatol* 2009; 33: 317-324
4. O'Hara S, Zelesco M, Sun Z. A comparison of ultrasonic measurement techniques for the maternal cervix in the second trimester. *AJUM* 2015; 18: 118-123.
5. Chudleigh T, Smith A and Cumming S. Obstetric and Gynaecological Ultrasound. How Why and When. 4th ed. London: Elsevier, 2017, p358.

UNIVERSITY of DERBY

Nottingham University Hospitals NHS NHS Trust