Ultrasound (U/S) is commonly used for estimation of urine volume in the bladder. In children, U/S is used to assess optimum bladder volume for readiness of urine sampling catheterization and when suspecting complications. Complications include: urethral injury from traumatic catheterization or premature balloon inflation; ureteral obstruction and trauma from ureteral access and balloon inflation, and catheter knotting with excessive inserted length. Urine drainage is a universal sign of proper urethral catheter location (not vaginal or a false traumatic urethral passage). Dry urethral catheterization happens in 1 of 10 pediatric patients. Inflating the balloon without urine flow is not recommended. No published reports describe real-time U/S use for urinary catheterizations.

A U/S probe is placed in the pre-suprapubic region to obtain a baseline bladder image (Figure 1) and held in place for continuous visualization. As the urinary catheter is advanced to the bladder, it can be seen by the U/S image (Figure 2), irrespective of the presence of urine return. In girls, this confirms the catheter is through the urethra, not the vagina. At this point, sterile saline can be optionally injected through the catheter into the bladder, which can be seen in the image as bladder expansion and appearance of microbubbles; urine/saline return may be observed. Balloon inflation can then be done under direct visualization (Figure 3).

If the catheter is visualized but the balloon is not visualized during inflation, suspicion should arise that it may be in a ureter or in the urethra with the tip distal to the balloon showing in the bladder.

This is a quick, non-invasive technique using a technology that is commonly available. The use of U/S in this setting is likely to increase overall first pass success in catheterization in this patient group with potential decrease in operating room time. This technique can be used in cases where the catheter location is uncertain to confirm and aid its correct placement in the bladder. It is also likely to prevent the migration into a ureter or the potential for knotting by preventing excessive catheter length insertion. In summary, real-time use of U/S was useful in guiding the urinary catheterization process in neonates and small children with the potential to be an improvement from the commonly used conventional blind technique.

REFERENCES