

Implementing Transabdominal Ultrasound for Gynaecological Brachytherapy Insertion

Interprofessional Collaboration with Sonographers
and the East of England Imaging Academy

Background & Rationale

Intracavitary gynaecological brachytherapy requires accurate uterine applicator placement.



Anatomical Challenges

Uterine version, tumour distortion and post-EBRT stenosis complicate insertion



Risk of Blind Insertion

Increases perforation risk and may compromise applicator geometry



Ultrasound Guidance

Reduces perforation risk and supports safer, more accurate insertion [1,2]

Interprofessional Implementation Model

A joint implementation group established shared ownership across clinical boundaries



Clinical Oncologists

Clinical
leadership
& governance



Therapeutic Radiographers

Delivery team
& competency
leads



Diagnostic Sonographers

Co-designed
training
& provided
supervision



East of England Imaging Academy

Provided offline
resources for
training

Education & Training Pathway



Phase 1 · Taught Sessions

Ultrasound physics, anatomy, image interpretation



Phase 2 · Supervised Practice

Hands-on image acquisition experience gained under sonographer supervision.

- Outpatient training lists
- Brachytherapy insertions



Phase 3 · Competency Sign-Off

Observed procedural assessment for formal competency confirmation



East of England Imaging Academy

✓ Co-designed specific training with practice educator sonographers

✓ Provided standardised competency framework

✓ Expanded training offered to all relevant staff

✓ Ensured consistency across operators

Competency Assessment Domains

1 Pre-Procedure Preparation

- Selects equipment and confirms probe type
- Confirms bladder filling as acoustic window
- Sets up machine parameters independently

2 Image Acquisition - Sagittal

- Obtains midline sagittal view of uterus
- Identifies uterine position and canal orientation
- Confirms applicator tip position in sagittal view

3 Image Acquisition - Axial

- Obtains axial (transverse) view independently
- Localises applicator shaft in cross-section
- Assesses position relative to uterine wall

4 Recognition of Complications

- Identifies sonographic signs of perforation
- Escalates clinical concerns appropriately
- Maintains composure and clear communication

5 Documentation

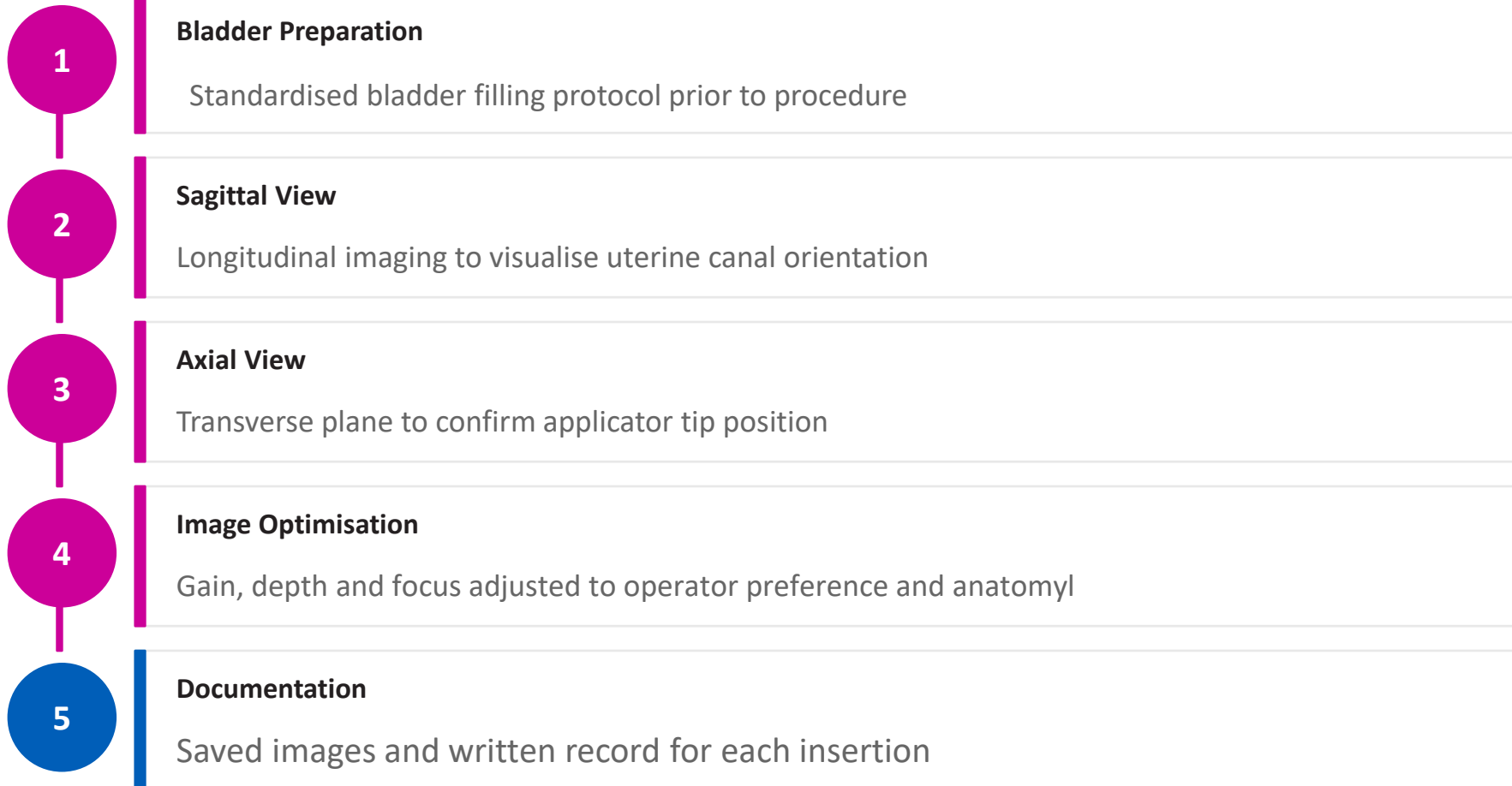
- Saves required images per protocol
- Labels images correctly
- Completes procedure record contemporaneously

6 Professionalism & Team Working

- Communicates clearly with brachytherapy team
- Recognises and works within scope of practice
- Responds appropriately to clinical direction

Standard Ultrasound Workflow

A standardised workflow ensured reproducibility and consistent image acquisition across operators



Results at a Glance

92.9%

Success rate of identifying uterine
canal and applicator tip position

n = 28 insertions

2

Perforations identified
& safely escalated
During implementation stage

6 → 8

Consultant Oncologist confidence of
insertion

(out of 10)

Pre → post implementation of US



Theatre duration

No notable increase from baseline

Results: What We Learned



Image Acquisition

Ultrasound confirmation of canal orientation and applicator tip position achieved in 92.9% of cases (n=28), demonstrating therapeutic radiographers can acquire diagnostic-quality images.



Early Detection of Complications

Two uterine perforations (7.7%) identified on imaging during early implementation (n=26). Prompt recognition enabled safe escalation - demonstrating the safety advantage of guided over blind insertion.



Staff Confidence

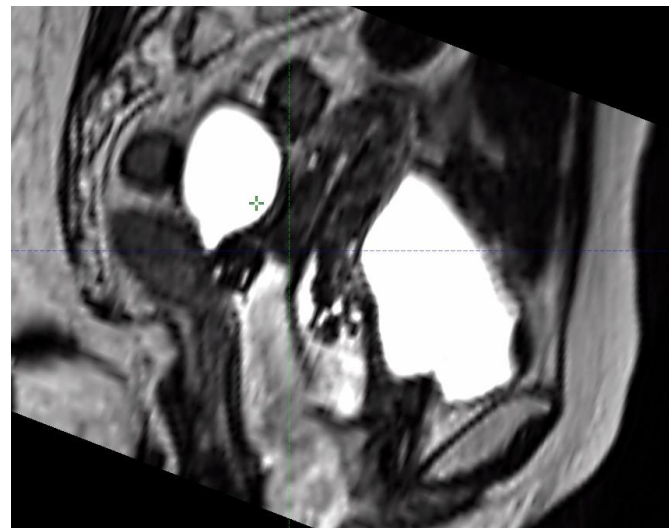
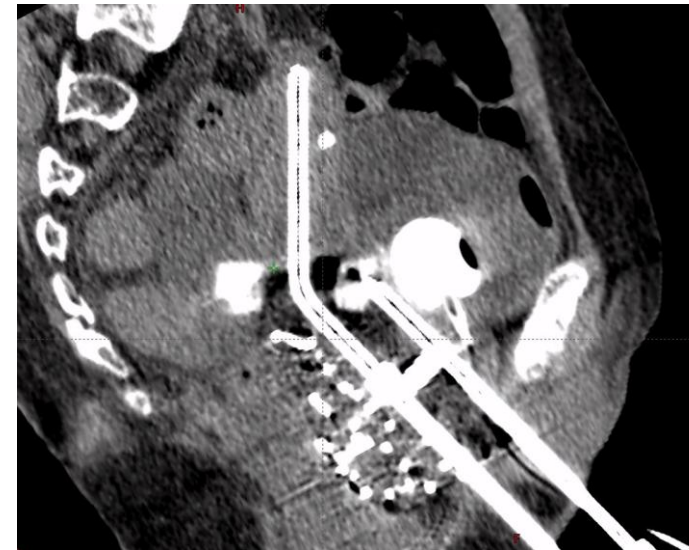
Insertor confidence improved from 6 to 8 out of 10 post implementation. Fewer repositioning events were reported per case.



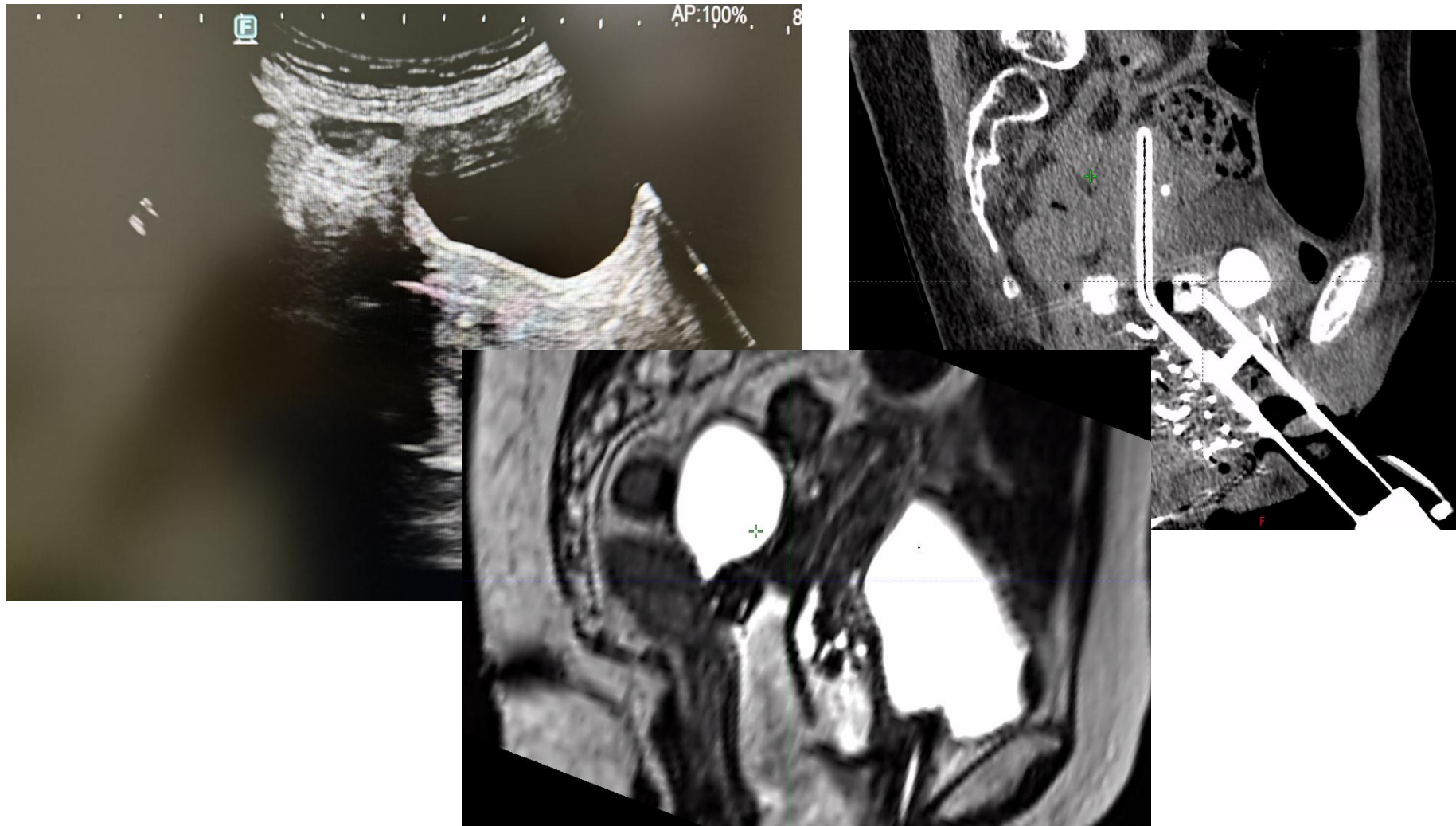
Procedural Efficiency

Ultrasound guidance was incorporated without increasing overall theatre duration, addressing a key concern raised during service planning.

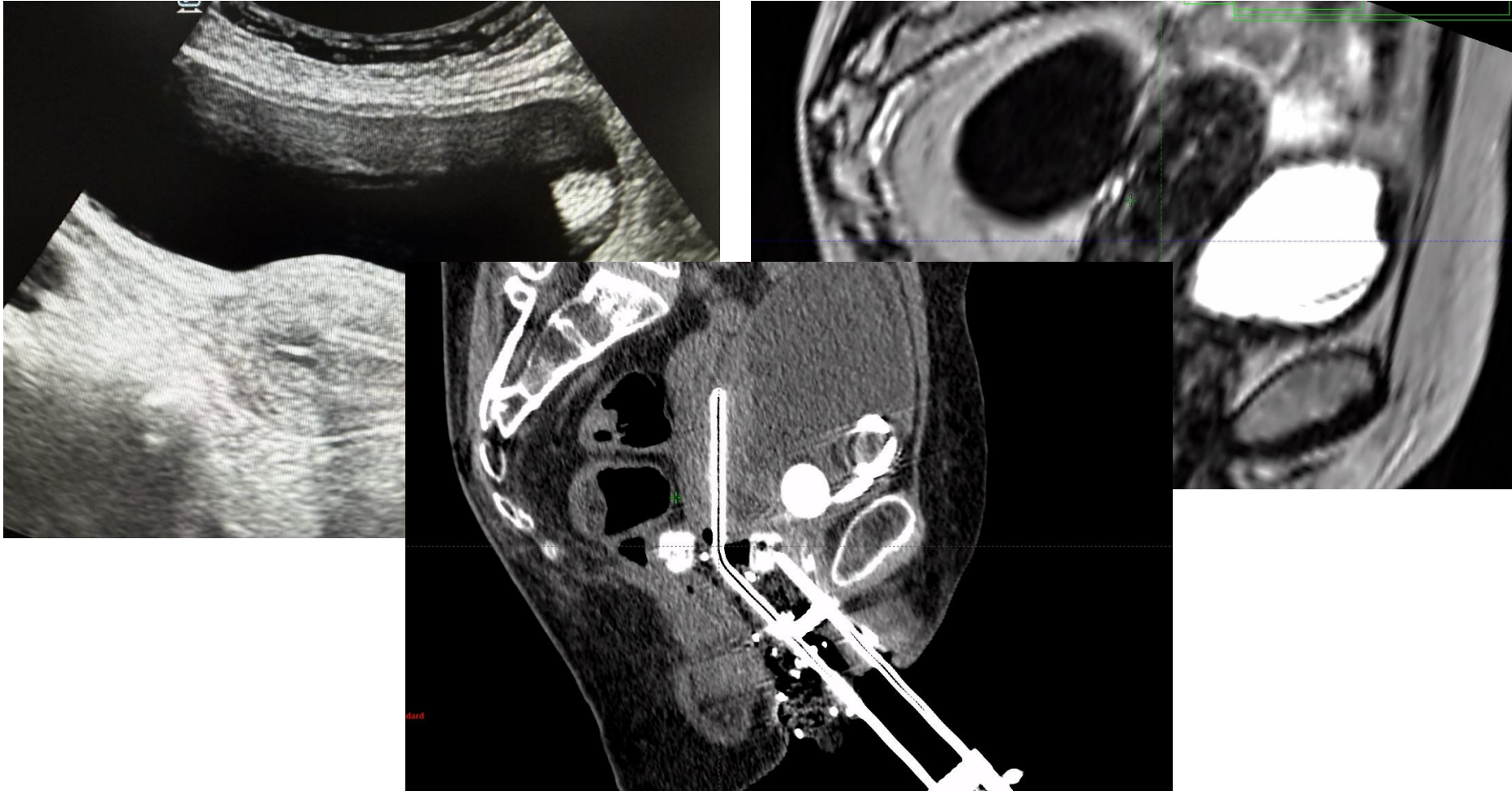
Transabdominal Ultrasound with CT and MRI



Transabdominal Ultrasound with CT and MRI – Bowel Gas



Transabdominal Ultrasound with CT and MRI – Post procedure legs down



Transabdominal Ultrasound with CT and MRI – Other findings



Tips & Tricks - Optimising Your Ultrasound in Theatre

1

Ensure adequate bladder filling

300–350 ml via catheter before insertion. Reassess volume if image quality is poor , a full bladder is your acoustic window.

2

Identify uterine version before insertion

Determine anteverted vs retroverted in sagittal view first. Communicate the angle of the canal to the clinician before the applicator advances.

3

Optimise depth, gain and focus

Set depth to include the fundus. Adjust gain to fill in shadowing. Move the focal zone to the level of the applicator tip for maximum resolution.

4

Maintain continuous sagittal imaging during insertion

Follow the echogenic applicator tip in real time. Do not wait until after insertion to confirm position intervene early if tip deviates.

5

Know your escalation pathway

If the tip cannot be seen within the cavity, or free fluid is noted, stop and alert the clinician immediately. Document and follow escalation protocol.

Conclusions & Future Directions

What We Have Demonstrated

→ Cross-professional model is feasible and deliverable

→ Shared governance across therapeutic radiography, sonography and clinical leadership

→ Structured competency framework via Imaging Academy partnership

→ Ultrasound guidance supports safer insertion with prompt complication detection

→ Sonographer collaboration expands training capacity beyond local constraints

Ongoing Evaluation

 Longer-term outcomes including perforation rates and dosimetry

 Competency maintenance and periodic reassessment

 Training expansion to additional therapeutic radiographers

 Formal evaluation of patient experience and tolerability

 Sharing the cross-professional model across UK brachytherapy centres

Thank You

Questions welcome

"A cross-professional model with shared governance can deliver ultrasound-guided brachytherapy insertion safely, with improved staff confidence and maintained efficiency."

References

[1] Sapienza LG, et al. Decrease in uterine perforations with ultrasound image guided applicator insertion in intracavitary brachytherapy for cervical cancer. Gynecol Oncol. 2018;151(3):573-578.

[2] Rao PB, Ghosh S. Routine use of ultrasound guided tandem placement in intracavitary brachytherapy for the treatment of cervical cancer. J Contemp Brachytherapy. 2015;7(5):352-356.