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A cadaveric simulation-teaching model for radiology residents

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1 | WHAT PROBLEM WAS ADDRESSED?

Anatomy is a cornerstone of radiological practice. Radiology residents usually draw on their basic anatomy knowledge for radiological examinations. They focus on learning anatomical radiology, meaning a two-dimensional grey scale depiction of the body, without having any formal surgical anatomy learning.

Meanwhile, interventional imaging is developing. Understanding of anatomy revealed during Computed Tomography, Ultrasound and Magnetic Resonance Imaging scanning is highly valuable, because radiologists use these technologies to guide needle or trocar placement. Residents' prior knowledge of anatomy did not always transfer to adequate procedural skills for interventional radiology, suggesting the need for further simulation practice.

We therefore set up targeted cadaveric dissections and cadaveric simulation-teaching model for radiology residents with two objectives: first, to restore three-dimensional knowledge of surgical anatomy with specific regional anatomy focus; second, to familiarise radiology residents with interventional radiology.

2 | WHAT WAS TRIED?

We developed a laboratory course with three 3-h fresh-frozen cadaveric dissection sessions and one 4-h cadaveric practical training session. This elective course was intended for 5 to 10 radiology residents who have been from 6 months to 2 years of radiology learning. The instructor, both radiologist and anatomist, organised content around anatomical regions frequently examined in radiology, for instance, joints and abdominal cavity.

The first sessions began with a prosection to familiarise residents with dissection devices, while anxiety dissipated. We adopted a case-based learning approach using appropriate and frequent radiological cases as triggers for contextual learning.

During the prosection, the instructor drew attention to the anatomy of tissues and organs, meaning their size, location, consistency, relationships between them and tissue dynamics while emphasising anatomical–radiological–clinical correlations.

When they felt familiar with the dissection devices and the cadaver, residents were free to explore cadavers, facilitated by the instructor. Dissection was then used to explore topics in greater depth and to experience the tactile sensations during needle or trocar placement.

In the last session, after some technical demonstrations, residents performed supervised execution of infiltration and biopsy using radiography and ultrasound.

3 | WHAT LESSONS WERE LEARNED?

Residents provided favourable feedback about the use of targeted cadaveric dissection for bridging the gap between radiological anatomy and surgical anatomy. They saw value in the opportunity to compare three-dimensional anatomy with two-dimensional radiological images and to observe ageing-related conditions (e.g., atheroma, arthritis and tendon tears) frequently diagnosed with radiology.

Practical training of residents in interventional procedures is usually done in patients, often conscious. This situation causes stress for the trainee carrying out the procedure, and can discourage some students from trying interventional radiology. The cadaveric simulation-teaching model led to improved trainee-reported confidence with interventional radiology.

In summary, our experience suggests that the use of dissection is beneficial for understanding radiological anatomy and for training in image-guided procedures for in-training radiologist. To respond to radiology resident's demand, we intend to increased use of cadaveric simulation in postgraduate radiological training, the limitations being

interventions guided by angiography or, in our laboratory, Computed Tomography or Magnetic resonance Imaging-guided procedures.

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