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Quality Assurance and Echocardiography

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Quality assurance and quality control of diagnostic tests in medicine are crucial for ensuring the accuracy, reliability, and consistency of medical diagnostics. These tests are designed to assess various aspects of the diagnostic process, including the performance of equipment, the proficiency of personnel, and the integrity of testing procedures.

Quality control in echocardiography involves systematic procedures and practices to ensure the accuracy, reliability, and consistency of echocardiographic studies. The role of quality assurance has become more paramount given the current pressures on services across the UK. The increased demand has led to time constraints, accelerated training programmes, increasing numbers of patients attending departments, staff retention issues and therefore, increasing use of locum services or locum echocardiographers.

As a basic outline, here are some key principles with respect to quality assurance / control that can be utilised across echocardiography services. Some of these may be utilised through regular collaboration with in-house medical physics or electronic service departments or with those outside agencies involved in the service and maintenance of the devices:

Transducer Care and Maintenance: Regular inspection and maintenance of echocardiography transducers are essential to ensure optimal image quality. This includes cleaning the transducer surface, checking for cable integrity, and ensuring proper storage to prevent damage.

Equipment Calibration: Periodic calibration of echocardiography equipment is necessary to maintain accurate imaging and measurement capabilities. Calibration ensures that the ultrasound system is operating within specified parameters for optimal image quality and diagnostic accuracy.

Image Optimisation: Echocardiographers should be trained to optimise imaging settings to achieve the best possible image quality while minimising artefacts. This includes adjusting parameters such as gain, depth, focus, and frequency to optimise visualisation of cardiac structures.

Standardised Imaging Protocols: Implementing standardised imaging protocols helps ensure consistency in image acquisition across different operators and settings. Standardised protocols define the required views, imaging planes, and measurement techniques for specific echocardiographic studies.

Quality Assurance Checks: Regular quality assurance checks should be performed to assess image quality, system performance, and measurement accuracy. This may involve

daily or weekly checks of equipment functionality, image uniformity, and resolution using phantoms or standardised test objects.

Measurement Accuracy Verification: Verification of measurement accuracy is essential to ensure the reliability of quantitative echocardiographic parameters such as chamber dimensions, wall thickness, and ejection fraction. This may involve comparing measurements obtained from echocardiography with those from other imaging modalities or reference standards.

Peer Review and Interobserver Variability Assessment: Peer review and assessment of interobserver variability help identify discrepancies in image interpretation and measurement between different operators. This promotes consistency and accuracy in echocardiographic reporting.

Documentation and Record-Keeping: Comprehensive documentation of echocardiographic studies, including images, measurements, and interpretations, is essential for quality control purposes. This facilitates review, audit, and quality improvement initiatives.

Continuing Education and Training: Ongoing education and training programmes are essential to ensure that echocardiographers stay updated on the latest techniques, guidelines, and quality control practices. Continuing education helps maintain proficiency and competence in performing echocardiographic studies.

Adherence to Regulatory Standards: Echocardiography laboratories should adhere to relevant regulatory standards, guidelines, and accreditation requirements to ensure compliance with best practices and quality control protocols.

Peer Review in Echocardiography:

Perhaps one of the more challenging aspects of quality control is the peer review of echocardiographers within the service structure to ensure ongoing patient safety and echocardiographer wellbeing. Here are some important considerations to ensure this process is robust and meets these challenges:

Interobserver Variability Assessment: Peer review helps identify discrepancies in image interpretation and measurement between different operators, promoting consistency and accuracy in echocardiographic reporting.

Continuing Education and Training: Ongoing education and training programs to keep echocardiographers updated on the latest techniques, guidelines, and quality control practices, maintaining proficiency and competence.

Peer Review Meetings: Regular peer review meetings where echocardiography studies are reviewed by a panel of experts to discuss challenging cases, share insights, and provide constructive feedback.

Feedback Mechanisms: Providing feedback to echocardiographers based on peer review findings to address areas for improvement and promote professional growth.

Standardised Reporting: Adoption of standardised reporting templates and guidelines to ensure consistency and completeness in echocardiography reports, facilitating effective peer review.

Quality Improvement Initiatives: Participation in quality improvement initiatives to benchmark performance, identify areas for improvement, and implement strategies to enhance the quality of echocardiography services.

Recommendations:

Each department should appoint a quality assurance team. This could include senior echocardiography staff alongside clinical imaging department leads. The aim of this group is to provide an overarching governance to ensure safe practise with reference to national guidelines, local standards of practise and to ensure diagnostic echocardiography is performed with patient safety at the forefront. Staff within their team should have their work observed and assessed with sufficient time for feedback and reflection at regular intervals as designated by local policy.

Quality assurance and control are vital and can be incorporated into weekly departmental echocardiography case review meetings or can be scheduled separately perhaps taking the whole meeting once per month. All quality assurance meetings should have a specific agenda, minutes and should be stored within the local department so that they can be referred to at any time necessary. Actions arising from such meetings should be clear, concise and given in a way that allows individuals to review in the future.

It is also essential that any staff outside of the local team that perform echocardiography regularly (e.g. locum echocardiographers, medics from other departments / specialities or other professions routinely performing echocardiography in the institution) should all be part of this process and attend weekly meetings as often as they can. Many locum agencies will conduct their own quality assurance processes with their own echocardiographers. However, it is strictly advised that the local departments consider locum echocardiographers as part of their own team. This includes providing quality assurance of their work and classing them as a member of the echocardiography team. The results of the quality assessment exercise should be fed back regularly to their locum employer.

All echocardiography staff within a service should have unrestricted access to local standards of practice and have been fully inducted into the service so that they are clear on all requirements for their delivery of echocardiography. Learning opportunities in the form of weekly multi-disciplinary team meetings, educational seminars, webinars or larger meetings and conferences should be mandated. Furthermore, as newer guidance emerges from professional bodies, quality assurance leads should ensure their teams are aware of potential changes to delivery of the service either by an education session or dedicated time at a weekly departmental meeting.

By integrating quality control measures and peer review processes into echocardiography practice, healthcare providers can ensure high standards of imaging quality, accuracy, and reliability, ultimately improving patient care and outcomes. Of course, integrating these processes takes additional time and potentially staff away from the echocardiography room. However, employers and departmental leads should consider patient safety and staff wellbeing a priority and as such, it is extremely important and valuable to have these roles embedded into specific job plans.