

# Radiography – the emergence of a profession

Workshop presented by Dr Bev Snaith 18 August 2013

Abstract

Radiography has emerged from a technical role to professional status and as such the importance of effective and evidence based practice has gained more relevance. The interactive sessions are designed to explore the radiographer contribution to patient care by identifying opportunities to improve knowledge and understanding of the impact of their role on practice. Back to basics sessions will take 2 commonly examined areas and review the evidence base around standard and non-standard projections and identify issues in everyday practice.

Presentation notes (sessions cover a single pdf of presentation)

The term radiographer has been used, but intended to be synonymous with radiologic technologist

Session 1:

- UK career progression has parallel development paths including (but not limited to) academic, management and clinical, which includes both advanced and consultant radiographer roles.
  - Bev Snaith is a consultant radiographer specialising in emergency care. She specialises in general radiography, including reporting all examinations and also performs and reports abdominal ultrasound examinations.
  - Mid Yorkshire Hospitals in the UK is a large organisation covering 3 hospitals in the north of England.
  - The largest hospital was built in 2011 and has approximately 500 beds
  - Staff include radiology assistants, radiographers, advanced and consultant radiographers
  - All staff wear distinctive uniform identifying both their profession and role.
  - Bev qualified in 1987 with a Diploma of the College of Radiographers but has since completed Masters degrees and a PhD
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- Radiography has a distinctive profile, but is not necessarily recognised as a profession internationally
  - Sim and Radloff (*Radiography* 2009) identified a number of recognised traits of a profession, it is useful to use these as a benchmark to review the Sri Lankan radiological technologist.
    - Education level differ in many countries, the UK introduced degree only entry in the early 1990s complemented by recognised postgraduate pathways, and culminating in masters and doctoral qualifications. Sri Lanka is in the transition between diploma and degree with initial steps towards specialist postgraduate qualifications.
    - Sri Lanka has a professional organisation, affiliated to the ISRRT
    - A code of conduct defines the profession and expectations of role

- Autonomy means taking responsibility for decisions, but does not mean working alone or being in charge. But it does require a distinct knowledge base.
    - Altruism, the concern for the welfare of others is of course an expectation of a health profession
  - So is the Sri Lankan radiographer a professional, a technician or a technical expert – or can it be all 3?
  - Think about your individual role and your view of the radiographic role in Sri Lanka and how it has changed in your career
  - Whatever your role a number of factors will have influenced changes including changes in technology and professional practice
  - Over the last 2 decades the UK has moved from the Diploma to Degree, with decreasing technological content and increasing professional influences, have determined the content of the programmes with increasing multi-modality experience and greater exposure to professional topics, some of which is taught alongside other health professionals.
  - But the changes have not stopped upon graduation with expectation for a preceptorship period with mentorship and support, although this is informal in the UK other countries, such as Australia have a formal professional development year on qualification.
  - But technology content is also limited in postgraduate programmes, recognising the broader educational content.
  - Recognising the technological changes of the last decade has this made us better radiographers, or does technology require less skill? Additionally do we have the evidence (knowledge) base to support the technology and techniques?
  - The knowledge of the radiography profession relates both to technique, dose, pathways and technology
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- Implementing CR and DR – the challenge
  - CR – computed radiography, DR – digital radiography, PACS – picture archive and communications system
  - In the UK CR and PACS systems were introduced in 2005/6, replacing automatic processing.
  - All reporting is filmless and done on computer monitors and all clinics and wards review images on computers.
  - Images can be shared with other hospitals through networks
  - CR required changes in practice, but DR requires change again.
  - Radiographers need to be involved in the implementation of any technology, through choice of equipment, technique review, training and ongoing quality assurance.
  - As an example when DR was installed some images were mottled when compared to other rooms with the same equipment – this turned out to be a fault with the table manufacture
  - When new technology is introduced, protocols need to be reviewed as well as exposure charts and techniques
  - Technology allowed changes to chest technique and work was required to ensure that whether an image was obtained with CR or DR the resultant images were comparable
  - But issues with quality were identified with foot radiographs and revisiting the evidence based determined that radiographers were not using the standard text book positioning and were using a straight tube rather than angling towards the ankle. When education was provided image quality was improved.

- Changes in technology also meant that radiographers altered their workflow and started to perform both lateral and AP knee radiographs erect as there was no wait between images with DR. This required training and development of new protocols to standardise positioning, but this also had to recognise the variation in stance with patient size and required a change in angle dependent on patient anatomy
- The UK has now recognised that there are other issues with technology development, a key one being anatomical markers and the ease to be able to type 'left' or 'right' on after the image has been produced rather than applying a marker at exposure. This has medico-legal implications.

## Session 2:

- Back to basics – the chest
- Despite the chest radiograph being the most commonly performed imaging examination worldwide it is often one of the most poorly executed. But more than that the referring clinicians often do not understand how the image has been obtained and therefore may misinterpret various signs.
- The anatomy of the chest varies from birth to adulthood with the lungs taking up a smaller proportion of the trunk in a baby. The ribs in a young child are horizontal with the shoulders yet to descend into their adult position, the result is an apparent 'lordotic' projection, but one which is absolutely normal for this age.
- If we accept that a baby's anatomy is different from the adult is the technique different and do we have a knowledge base to support it.
- The next few slides are from a presentation given by Professor Maryann Hardy at the UK Radiological Congress.  
<http://www.ukrc.org.uk/assets/Speaker%20presentations%202013/Monday/Eponymous%20lecture%20-%20CoR%20William%20Stripp%20Memorial%20Lecture/William%20Stripp%20Memorial%20Lecture%20-%20See%20how%20they%20grow!%20Maryann%20Hardy.pdf>
- Unfortunately the common international radiography technique books do not agree on how to perform a neonatal chest radiograph
- When local radiographers were asked to place a square on a picture to represent the collimation for a chest radiograph the results varied significantly.
- The Black dashed rectangle represents the optimum collimation with the star the centring point. The red line represents the largest area identified by the radiographers – with resultant dose increase.
- So to establish the knowledge base for neonatal chest radiographs radiographers need to review the research evidence and develop new evidence
- Have you ever reviewed the quality of all chest radiographs performed in your hospital, they're not all optimal.
- But to understand technique it is important to review the anatomy
- The lungs extend further posteriorly and are formed from lobes and segments.
- Covered by 2 layers of pleura the majority of size variation during respiration is basal through the action of the diaphragm although the ribs also expand via the intercostals muscles.
- Only the right atrium and left ventricle borders are usually seen on a normal PA radiograph.
- The mediastinum is bordered by a number of anatomical structures and abnormalities in any of these can vary the appearances

- The aortic arch and descending aorta can vary with age
  - The right hemidiaphragm is usually 2.5cm higher than the left and cardiac fat pads may 'fill in' the borders with the heart.
  - The trachea is central with the right main bronchus being more vertical
  - The hila are formed of the pulmonary vasculature and vary between individuals and sides.
  - Extending from the hila are the vascular markings which are smaller in the upper zones than lower and taper towards the lung periphery.
  - The breast shadows may obscure the lower zones
  - Below the diaphragm the liver, spleen and stomach provide important reference points
  - The bony anatomy is an important part of the chest and should be symmetrical but not obscure the lung fields
  - But technical challenges can reduce the diagnostic quality of the radiograph
  - An AP chest will result in a larger heart and wider mediastinum
  - Similarly a supine radiograph will increase the heart and mediastinum size, but will also change the vessels
  - Optimal inspiration will demonstrate 9 posterior (or 6 anterior ribs) above the right hemidiaphragm
  - However a poor inspiration will increase the heart size and result in vascular crowding in the lower zones which may mimic infection
  - If a patient leans back during exposure the resultant lordotic projection changes the anatomical appearances and means that the only diagnostic decision can be made about the lungs.
  - Conversely a kyphotic projection also means that the lungs are the only anatomy which can be reliably reviewed
  - Patient rotation should not be confused with scoliosis of the spine
  - The radiographic exposure should be sufficient to demonstrate all anatomy, but different technologies will provide opportunity to optimise the anatomical detail
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- Clinical governance – relevance to radiography
  - This is an international strategy to improve patient care and has a number of themes
  - Patient experience can be influenced through information, improving patient consent, reducing radiation doses and infection prevention
  - Research has shown that cassettes and markers are sources of cross infection and due to the number of patients passing through a single department could be an important potential risk
  - Information can be used to provide the need for developments, but it is important to protect patient information
  - Quality of experience and examination is important in radiography and should ensure optimal diagnosis
  - However it is important to recognise the importance of staff in improving patient care. This includes the protection of, and training for staff.
  - All of this requires effective leadership of staff and services

### Session 3:

- Back to basics – the pelvis
- The pelvis is a 3D structure which has to be represented in a 2D image

- Referrals for pelvis may be for a wide range of pathologies and histories
- The pelvis itself is formed from separate ossification centres which fuse during childhood
- Additional ossification centres appear during childhood, apophyses, which fuse by 25years
- The pelvic stability is maintained by strong ligaments
- In terms of technique variations in centring point and collimation may alter anatomical appearances and patient orientation and gonad protection need to be considered
- If a patient is appropriately positioned and not rotated the obturator foramina and pelvic brim should be symmetrical
- Rotation will change the appearance of both the pelvis but also the acetabular angles and hip joints
- Pathological changes may vary the position of the pelvis with resultant anterior or posterior pelvic tilt. However inappropriate centring may mimic these appearances. It is therefore important to ensure correct radiographic positioning as pelvic tilt has an influence on acetabular orientation which can cause hip impingement.
- This image shows anterior tilt with flattened obturator foramina and increased distance between coccyx and pubis.
- This demonstrates posterior tilt with coccyx overlying the symphysis. It is important to confirm correct centring to ensure the appearances are actual rather than projectional.
- Another challenge with the pelvis is obtaining a good horizontal beam lateral hip radiograph.
- Utilising an air gap technique with a larger distance as described by Barrall in 2004.

- Multidisciplinary working
- Radiology is a support service and as such means radiographers must work with many different professionals throughout hospital and community settings
- The multiprofessional team includes medical, nursing and allied health professionals as well as support staff
- Effective multidisciplinary working is important to share the workload, provide effective care and deliver capacity
- Working with other professionals is not easy and relies on effective communication to allow an understanding of each others roles, knowledge and skills, contribution to patient care and each individuals and professionals aspirations.
- This communication may be through many different fora but needs to be 2-way
- Radiographer – radiologist communication occurs every day and positively influences patient care
- But feedback from such discussions can improve radiographer knowledge and can also provide opportunities for knowledge base development
- The knowledge base of the profession is developed through research and is disseminated at conferences and through publication
- Radiography is relatively small and therefore has limited peer review journals, but further the profession has been slow to embrace a research culture and confidence has been cited as a key reason for inactivity, although time, knowledge gaps and limited networks have also been described as contributing to the problem
- Radiographers do also publish in other professional or modality specific journals and a review of 4 international radiography journals published in 2012/13 (Snaith *Radiography*; *JMIRS*; *JMRS*) showed that articles by radiographers are increasing.

- However the review of journals tells us the most articles are written by more than 1 person, but most authors publish very little (often just 1 article) and a very small number of authors contribute disproportionately to the evidence base
  - Positively, articles in 4 international journals (UK, Canada, South Africa and Australia) show that authors come from all over the world
  - Publishing is a challenging process and deciding where to publish will be influenced by the impact factor of a journal (although no radiography journals have an impact factor currently). The scope of the journal and intended audience will more likely determine publication choice. But publishing comes with pitfalls and requires an element of confidence, which grows with confidence as all authors will experience rejection at some point.
  - One of the best ways to move forwards is to collaborate with others, this has been shown to improve both the quality and quantity of articles. It can also increase confidence and act as a challenge and driver to all concerned.
  - But there are different levels of collaboration, whether with an academic supervisor, a mentor, a co-author or a true collaborator with both parties challenging and contributing to developments.
  - Collaborators are not easy to find and you need to find someone who is of the appropriate seniority and has shared interests and who you are comfortable with
  - Potential co-authors may come from anywhere and opportunities to meet people can arise at conferences and professional meetings
  - To start on the research/publication journey can start from work with a number of people and may also include patient case reports or describe improvements in services.
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- Next steps
  - Think about your own personal and professional development and where opportunities for learning may arise
  - In relation to these presentations, what is the key thing which will influence your practice?

Thank you

Bev Snaitth