Advanced Practice in Diagnostic Imaging

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Disclosure

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Overview

- What is an advanced practitioner?
- Why advanced practitioner radiographers?
- The path to advanced practice with a journey through the evidence
- Challenges and opportunities
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What is an Advanced Practitioner?

“Advanced practice in Medical Radiation Technology is defined as a higher level of practice wherein clinical responsibilities routinely exceed the current principal expectations of practice.”

Canadian Association of Medical Radiation Technologists 2014

“Occurs when a practitioner is regularly performing beyond the core practice boundaries of the profession on a regular basis with appropriate availability of resources, educational underpinning and professional mentorship.”

Australia Institute of Radiography 2014

“A role, requiring a registered practitioner to have acquired an expert knowledge base, complex decision-making skills and clinical competences for expanded scope of practice, the characteristics of which are shaped by the context in which the individual practices.”

Health Education England 2014
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Core Advanced Practice Domains

- Expert Practice
- Leadership/Service Transformation
- Education
- Service Evaluation/Research

- Higher Level Practice
- Critical Thinking
- Complex Decision Making
- Autonomy
- Leadership

- Clinical Expertise
- Evidence-based Judgement
- Scholarship & Teaching
- Clinical Leadership
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Why Advanced Practitioner Radiographers?

- Improved patient care
- Radiographers fundamental to the diagnostic pathway
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First practitioner to see image
Limited radiologist support
Radiographer opinion
Evolution of Radiographer Image Interpretation

- Swinburne (1971) “pattern recognition” by trained radiographers
- Berman et al. (1985) “red dot” for MSK trauma
- Brealey et al. (2006) excellent accuracy; 81% sensitivity, 95% specificity for “red dot”

Radiographer advanced practice established in the UK

Opportunity (of a lifetime) to develop skills
Evidence Base – Skeletal Reporting

- **Piper et al. (2005)** Structured exam: 27 radiographers; ~2,700 X-rays; sensitivity 93%, specificity 92% and accuracy 93%

- **Piper et al. (1999)** Multisite clinical evaluation: 10 radiographers; 7,170 reports; accuracy 97% - 99%

- **Brealey et al. (2005)** Meta-analysis provided definitive evidence: 28,900 examinations; 92% sens 97% spec
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Opportunity (of a lifetime) to develop skills

Was this an advanced practitioner role?
New role, new challenges

Established AP team: 4 reporting radiographers, 8 sonographers

Comprehensive service developed

Adult chest X-ray interpretation
Chest X-rays – Definitive Radiographer Reports

- Piper et al. (2014) Structured examination: 40 radiographers, 4,000 CXRs; 95% sensitivity & specificity, 89% agreement

- Woznitza et al. (2014) Clinical audit: 100 cases; 1 radiographer, 3 consultant radiologists; high concordance 92% (Ƙ = 0.83), 96% (Ƙ = 0.91), 96% (Ƙ = 0.91)
An Advanced Practitioner?

- Expert Practice ✔
- Leadership/Service Transformation
- Education ✔
- Service Evaluation/Research
Justification of Medical Exposures

- Radiographers act as gatekeepers
- Legislation in UK regarding medical radiation exposures: IR(ME)R 2000
- Referring clinician required to explain clinical benefit, detailed to enable exposure
Image Acquisition & Quality

- Request queries
- Assist/mentor junior radiographers & assistant practitioners
- Initial interpretation
- Plain imaging queries & patient questions
- Lead quality audits
Chest X-rays – Agreement of Experts

- Random stratified sample of CXRs
- Two independent expert consultant chest radiologists, blinded to clinical report
- Reports compared for agreement: Kappa [K ] and McNemar statistics
- 193 cases included; 79 (41%) normal clinical report
Observer Agreement: Kappa

Kappa Statistic

- CC1-RR: 0.64 (p < 0.001)
- CC2-RR: 0.61 (p < 0.001)
- CC1-CR: 0.68 (p < 0.001)
- CC2-CR: 0.66 (p < 0.001)
- CC1-CC2: 0.52 (p < 0.001)
Diagnostic Accuracy – Adult Chest X-rays

- 10 consultant radiologists & 11 reporting radiographers
- 106 adult chest x-rays with robust reference standard diagnosis
- Normal reporting conditions
- Reporting radiographers must be comparable to consultant radiologists
Diagnostic Accuracy – Figure of Merit

Observer Performance

- Radiologist average performance: 0.79 (0.76 – 0.81)
- Radiographer average performance: 0.83 (0.81 – 0.85)

$t = 11.585; p < 0.001$
Contribution to Patient Care

- Patient focused care
- Rapid rise in workload
- Political/economic climate
Contribution to Care: Service Evaluation

Woznitza et al. (2014) Service evaluation at single department

- Retrospective interrogation of Radiology Information System
  - Efficiency: Waiting Times, Radiographer Reports
  - Effectiveness: Report Turnaround Time, Discrepancies

- Re-audits in 2015 and 2016
Contribution of Advanced Practitioners

2013-14
3 Consultant Radiologists

2014-15
4.5 Consultant Radiologists

2015-16
6 Consultant Radiologists
Contribution to Care: New Services

- Radiographer-led immediate ED skeletal reporting service

- Role for radiographer-led discharge?
Consultant Practitioner?

- Level 1 tertiary referral neonatal unit
- 14,000 cot days per annum
- ~3,000 x-rays annually
- 2010: Not reported by radiology department

- Implement radiographer–led plain imaging reporting service
Response to Demand: Neonatal Reporting

- Reporting radiographer interpreting skeletal and adult chest x-rays
- Bespoke, intensive training programme

Benefits?
- All x-rays reported, next working day
- 90% by radiographer
- Weekly MDT; radiographer deputises for consultant paediatric radiologist
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Challenges

- No defined pathway/characteristics
- Integration
- Communication
- What are the opportunities?

Where there is need!
Emergency Department

- CIHI (2012) ED capacity an issue; overcrowding, long waits, possibility of poor care
- Are you making best use of the MDT?
- Radiographer preliminary clinical evaluation
- Radiographer-led discharge?
Health Promotion: Lung Cancer

- Lung cancer has a significant impact on health
- Most common cause of cancer death
- Poor 5 year survival: Canada 17%; UK 10%

- Byrne *et al.* (2014): 48 day wait from abnormal imaging to biopsy for lung cancer
- role for AP rads to decrease waiting times?
Health Promotion: Lung Cancer

- Prevention: smoking cessation intervention
- Risk stratification: patient history & referral
- Early diagnosis: LDCT lung cancer screening

Conclusions

- Advanced radiographer practice improves patient care
- Growing evidence base for radiographer advanced practice, including clinical reporting
- Radiographer reporting contributes to patient focused radiology service
Conclusions

“professional guidelines could be changed as a result of popular pressure and published peer-reviewed audit/research”

Gibbs Radiography 2013;19:164
Questions?

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