Optimising neonatal x-ray quality: results of an audit

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INTRODUCTION

- Babies who require specialist neonatal care present diagnostic and therapeutic dilemmas to the treating clinicians¹,²
- X-ray imaging is a tool frequently used to assist clinical management¹,²
- The effects of ionizing radiation on this vulnerable population are well documented¹
- Quality assurance (QA) programs are an established method to maximise diagnostic quality while keeping radiation exposure to a minimum²

AIMS

- To examine the film quality of x-rays produced at a tertiary referral neonatal unit in the United Kingdom
- To establish inter- and intra-observer variation when applying a film quality checklist

METHODS

- 174 x-rays were randomly selected from a large, tertiary neonatal service over a 3 month period (10% workload)
- Film grading system developed by Cook et al.³ was used
- Two radiographers, after bespoke training, independently rated each x-ray for quality using pre-defined criteria
- Observer agreement was determined using Kappa (K) statistic

RESULTS

- 100 of 172(59%) of x-rays were rated high quality (average score ≥ 27) [Image 1 – 3]. 2 cases not rated by both Observers.
- Nearly all x-rays had appropriate density (165 of 174 x-rays)
- Rotation was the most common cause of reduced image quality [Image 4]
- Correct use of lead protection produced most discrepancies between observers [Image 5]
- Observer agreement was fair⁴ for overall x-ray quality; $K = 0.23$ (p < 0.01) [Table 1]
- Observer agreement was variable for individual film quality criteria (Weighted $K = 0.12 – 0.92$, all p < 0.05) [Figure 1]
CONCLUSIONS

- Identifying of common patterns assists in maintaining high standards and minimizes radiation exposure.

- Targeted training allows radiographers to accurately assess image quality with a moderate degree of reliability.

REFERENCES

1 – DeMauro et al 2011 Imaging of the Newborn, Cambridge University Press.