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An audit to assess quality of neonatal chest radiographs in a district general hospital compared to European commission guidelines

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Background:

Neonatal chest radiography is a common diagnostic examination, especially in preterm neonates where anatomical as well as biochemical immaturity impacts the synthesis and secretion of surfactant. Quality of neonatal chest radiography varies significantly, with concerns regarding increased radiation dose due to failure to appreciate neonatal anatomical proportions. High mitotic capacity in neonates increase the risk of developing cancer by 2 to 3 times when exposed to radiation compared to adults. Hence, the main aim of this completed audit cycle was to assess the baseline of adherence to the standards of neonatal chest radiograph imaging and thereby carrying out an intervention to implement changes that would improve the quality of the radiographs to minimize unnecessary radiation to this age group.

Methods:

A pre-intervention retrospective audit was conducted over 1-year period in 2020 selecting 100 neonatal chest radiographs, in AP view and supine position, in a neonatal ICU in Medway NHS Foundation Trust. Six parameters from the European Commission Guidelines (1996) were

used to assess the adequacy of chest radiographs, with an aim in reducing unnecessary radiation dosage. The parameters used were inspiration, rotation, craniocaudal collimation boundary, transverse collimation boundary, head position and arm position. An intervention was made via departmental presentation and neonatal grand-round presentation with recommended changes published in the trust intranet that was available to view for all the staffs in the hospital. After 6 months a reaudit was performed including neonatal chest radiographs over 2 months that were assessed using the same parameters.

Results:

Significant improvements were noted with reduction in upper thorax rotation by 42.9% (from 49% to 28%) and reduction in lower thorax rotation by 48.9% (from 47% to 24%). Head position was straight in 74% compared to pre-intervention 57%. Cranial collimation boundary improved by 20% and caudal collimation boundary improved by 47.8%. Improvements were required in inspiration, transverse collimation boundary and arm position.

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Conclusion:

Implementation of European Guidelines has shown to improve the quality of neonatal chest radiographs. Significant improvements in the craniocaudal collimation and head position along with reduced rotation led to reduced exposure to radiation in neonates in the hospital. Further need of intervention has been acknowledged to reduce radiation dose by defining surface marking for collimation boundaries due to the anatomical differences. The hospital is planning to incorporate this in the departmental Standard Operating Procedure.

Biography

[Nitish Raj](#) has completed his MBBS from [Tribhuvan University from Nepal](#). He has been academically active since his medical school showing outstanding performance. He has been an integral part of organising Basic Science Olympiad in Nepalese Army Institute of Health Sciences from 2012 to 2019 as Student Ambassador for Elsevier. After registration with the General Medical Council of the United Kingdom, he has served the prestigious NHS with clinical experience in Trauma and Orthopaedics as well as General Surgical Department. He has a special interest to develop a career in Trauma radiology and Intervention Radiology.