Mini C-arm Versus Portable Radiograph: Radiation Exposures with Closed Reduction of Pediatric Upper Extremity Fractures in the Emergency Room Setting

Principal investigator: Jessica McMichael M.D.
Co-Investigators: Eli Ahdoot D.O., Amit Parekh D.O

Children’s Hospital Orange County, Orange, CA

I, or my coauthors have nothing to disclose.
Purpose/Hypothesis

- Multiple imaging options are available when performing pediatric forearm fracture reductions in the emergency room.
- This study aims to perform a direct comparison of entrance skin exposure (ESE) to the patient between mini C-arm and plain radiograph when used by orthopaedic residents performing pediatric forearm fracture reductions.
Methods

- Electronic medical records were searched for ICD10 codes corresponding to pediatric forearm fractures.
- Patients who had closed reductions of their forearm in the emergency room setting were included in the study.
- They were separated into two cohorts of reductions performed using portable radiograph versus mini C-arm fluoroscopy.
Methods

• Primary outcome measure of ESE was calculated for both groups which was calculated in accordance with the institution’s radiation exposure formula.

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\text{ESE} = \text{patient mAs} \times (\text{closest kVp mR/mAs at skin entrance surface}) \times (\text{patient kVp / kVp indicated in chart}) ^2 \times (\text{Target to Ion Chamber / patient SSD}) ^2
\]
Results

- The use of Mini C-arm fluoroscopy demonstrated increased radiation in comparison to plain film radiographs with a P value of 0.019.
Conclusion

• When comparing the two modalities of imaging, more images were taken when using fluoroscopy, patient skin exposure was greater and there was no difference in rates of secondary reductions or surgical interventions.

• Our findings suggest routine use of fluoroscopy in the ED setting does not provide any additional benefit in achieving acceptable closed reduction of uncomplicated forearm fractures and results in increase ESE.