

Interpretation of Emergency Department Focused Cardiac Ultrasonography by Pediatric Emergency Medicine Physicians and Pediatric Cardiologists



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INTRODUCTION

Point of care ultrasound, including focused cardiac ultrasound (FOCUS), is a diagnostic tool with rising popularity in the pediatric emergency department. National societies in both emergency medicine and echocardiography regard FOCUS as an expeditious method to assess specific cardiovascular findings. Barriers to gain widespread acceptance among other subspecialties include image quality, interpretation, and ability to affect patient outcome. We sought to compare these barriers in images acquired by pediatric emergency medicine (PEM) faculty as reviewed by pediatric cardiologists with advanced training in echocardiography.

MATERIALS AND METHODS

This is a retrospective observational review of FOCUS examinations obtained over one year at a large, tertiary care, pediatric emergency department. Images were obtained and immediately interpreted by PEM physicians and learners. Acquired images were retrospectively assessed by three pediatric cardiologists for image quality and interpretation.

We reviewed 558 patient charts, and our cardiologists reviewed 384 sets of FOCUS images. The majority of exclusions were due to incomplete documentation.

PATIENT SELECTION CRITERIA AND DEMOGRAPHICS

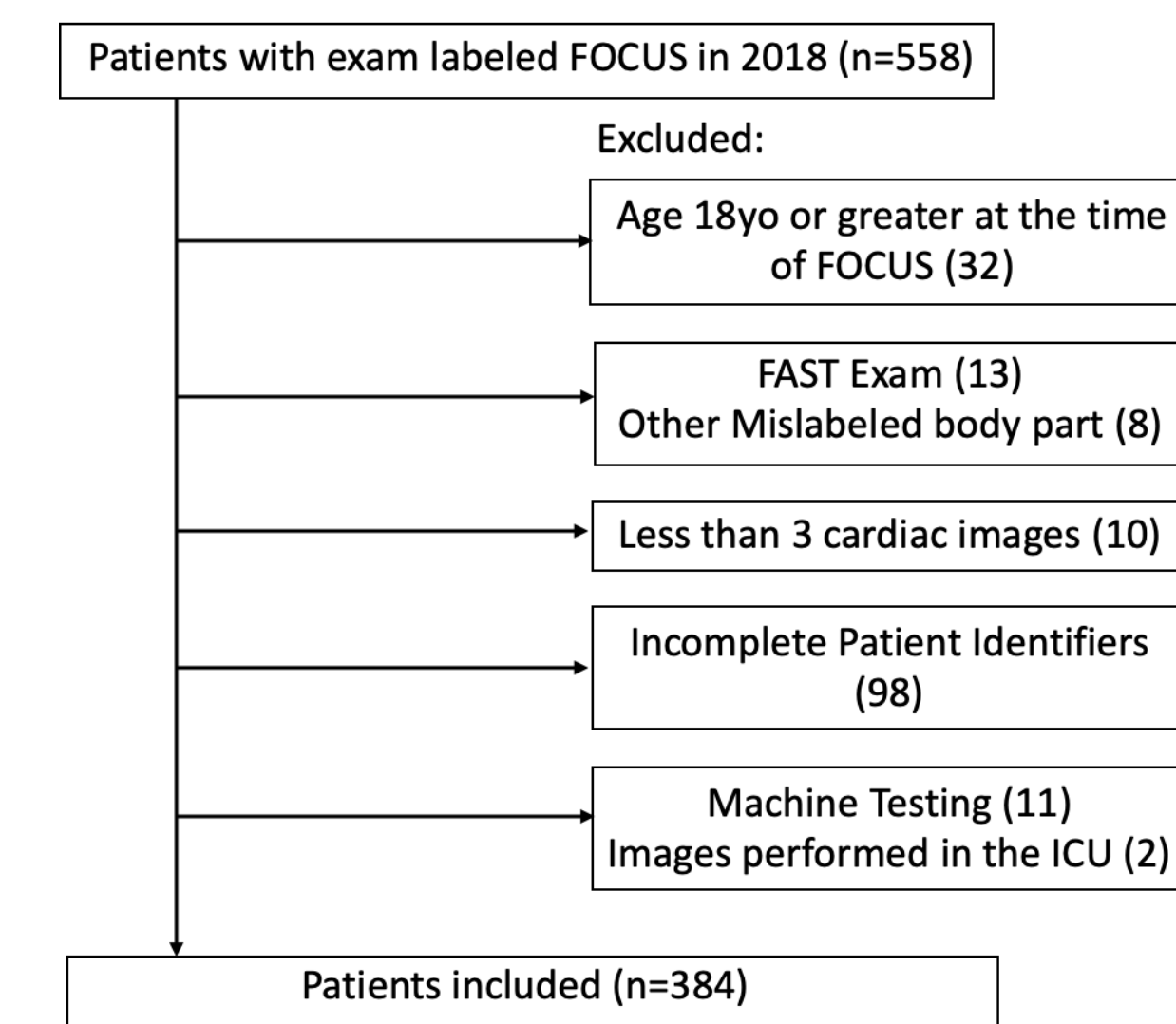


Figure 1. Patient selection flow chart. Patients were selected for inclusion based on FOCUS images performed in our ER

Variables	
Patients	384
Age in years, mean ± SD	9.57 ± 4.92
Gender, n (%)	
Male	195 (50.8)
Female	189 (49.2)
Race, n (%)	
White	225 (58.6)
Black or African American	145 (37.8)
Unknown or Not Reported	8 (2.1)
Multiracial	5 (1.3)
Asian	1 (0.3)

Table 1. Patient demographics for patients receiving FOCUS images in the Emergency Department in 2018.

CHIEF COMPLAINTS AND DISCHARGE DIAGNOSES

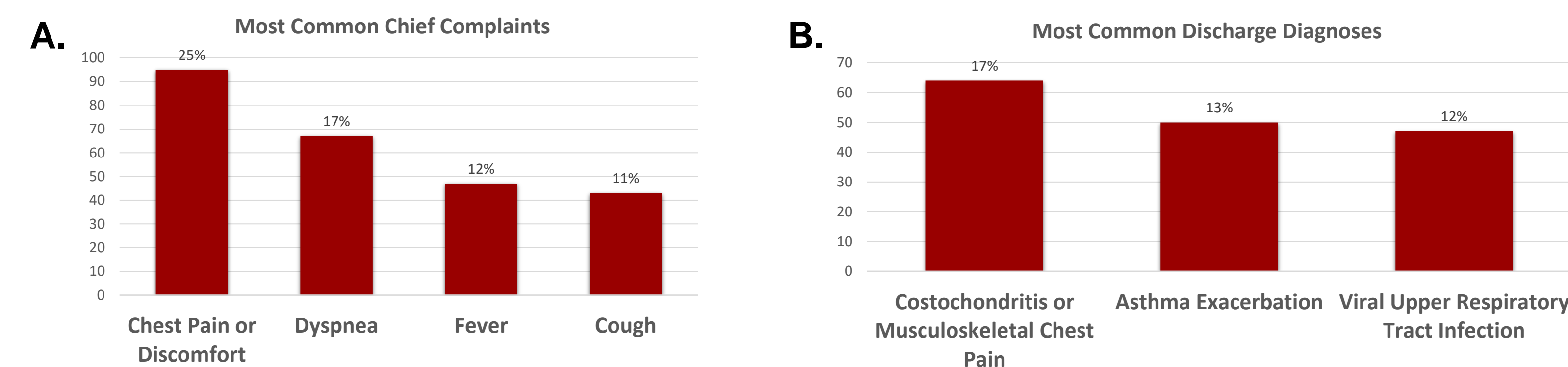


Figure 2. A.) Most common chief complaints of patients who underwent FOCUS imaging. B.) Most common discharge diagnoses of patients who underwent FOCUS imaging.

RESULTS

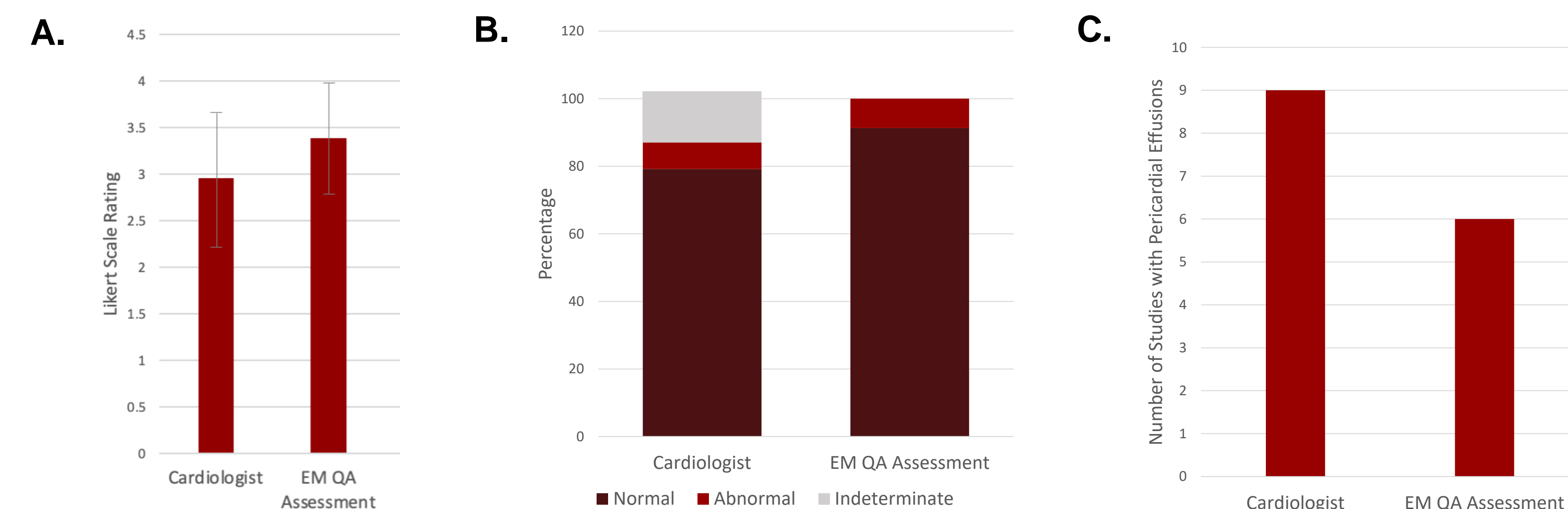


Figure 3. A.) The average assessment of image quality via Likert scale rating by the cardiologist was 2.96 ± 0.71 while the EM QA assessment was significantly higher at 3.39 ± 0.59 (p<0.0001). The inter-class correlation coefficient (ICC) among the cardiology reviewers was 0.75. B.) The cardiologists found abnormalities in 7.8% of studies, and the PEM physicians in 8.7%. C.) Of these studies the most common pathology was pericardial effusion, 9 per cardiologists versus 6 per PEM sonographers.

RESULTS

The average assessment of image quality via Likert scale was different among the two groups in a statistically significant way such that cardiologists rated the images slightly lower than EM QA assessment. The inter-class correlation coefficient (ICC) among the cardiology reviewers was 0.75. Most overall assessments between the groups were similar. There were similar number of images deemed abnormal by both groups and the most common abnormal pathology was pericardial effusion. Full echocardiograms were obtained in 31 (8.1%) patients, while cardiologists recommended additional imaging in 35 (9.1%).

CONCLUSIONS

Although there was no significant difference between FOCUS interpretation and clinical outcome, image quality was the prevailing barrier to overall assessment. These findings help to understand mitigating factors for FOCUS acceptance by other specialties.

REFERENCES

Labovitz, A et al. "Focused Cardiac Ultrasound in the Emergent Setting: A Consensus Statement of the American Society of Echocardiography and American College of Emergency Physicians." *J Am Soc Echo*, vol 23, no 12, 2010, pp. 1225–1230.
Marin, J et al. "Point-of-Care Ultrasonography by Pediatric Emergency Medicine Physicians." *Ped Em Care*, vol 31, no 7, 2015, p. 525.
Vieira, R et al. "Pediatric Emergency Medicine Fellow Training in Ultrasound: Consensus Educational Guidelines." *Academic Em Med*, vol 20, no 3, 2013, pp. 300–306.
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