

INTRODUCTION

- 35% or more of foreign body (FB) ingestions are radiolucent and can be a life threatening event for pediatric patients ¹⁻⁵.
- The current imaging protocol for suspected ingested FB is an esophagram.
- Digital tomosynthesis (DTS) produces cross-sectional images similar to computed tomography (CT) and similar resolution in the XY axis to computed radiography (CR) (Figure 1).

METHODS

- A retrospective chart review on patients between 0 and 18 years of age with impacted food bolus or suspected esophageal FB who received an esophagram and chest DTS between January 2014 and June 2016.
- DTS images analyzed by a board certified pediatric radiologist, radiology resident, and radiology technologist for identification of FB impaction and compared to esophagram and scope results.

Figure 1: DTS Diagram

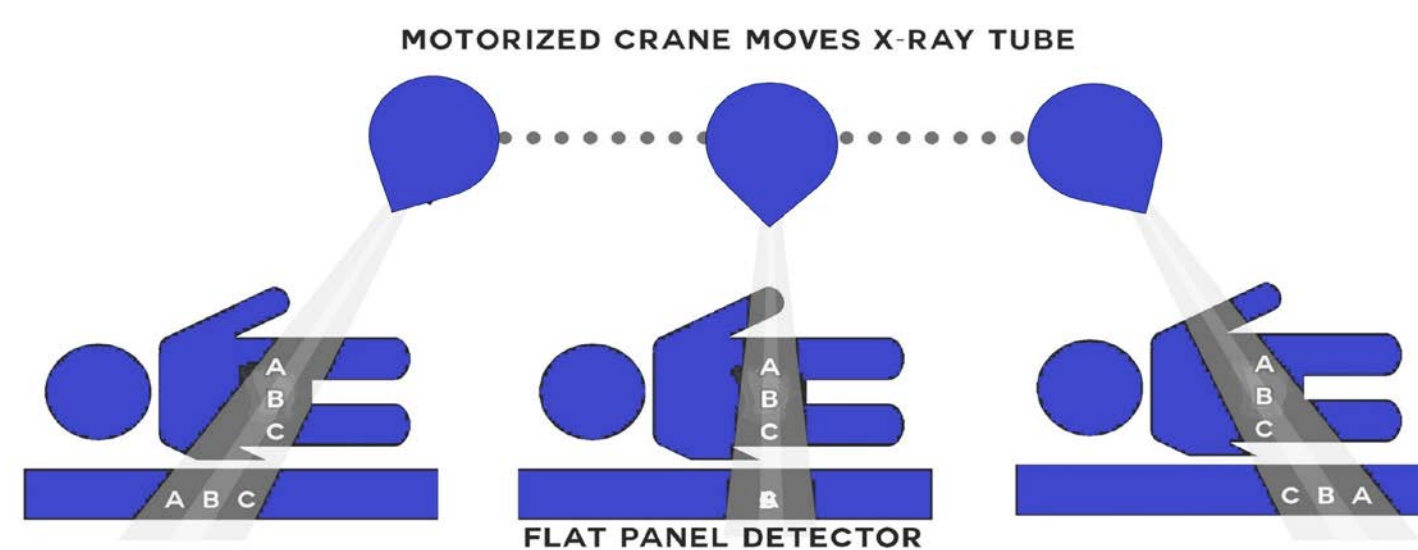


Figure 1: The flat panel detector remains stationary while the motorized tube crane moves through a linear sweep taking multiple projections. Using post processing we can recreate different imaging planes because they are projected in different places on all the projection images ⁴.

RESULTS

- A total of 17 patients underwent chest DTS and esophagram study for suspected esophageal FB.
- Seven (41%) were female and the overall mean age was 12 years (range 3-17 years).

Figure 2: DTS Scout vs Esophagram

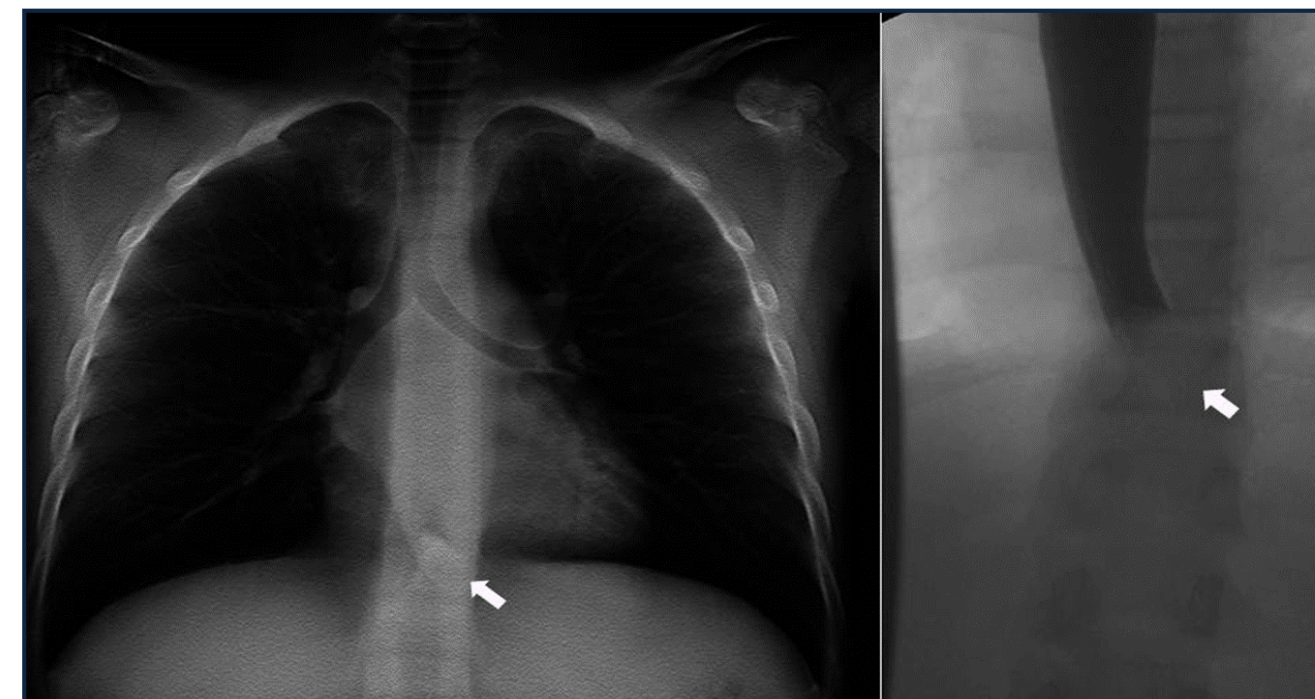


Figure 2: DTS image (left) demonstrates a food bolus at the GE junction with a soft tissue/air interface. Corresponding esophagram (right) confirms the presence of a foreign body.

- The chest DTS dose was 0.4 mGy and the average esophagram dose was 1.9 mGy (Figure 3).

Figure 3: Dose Comparison by Modality

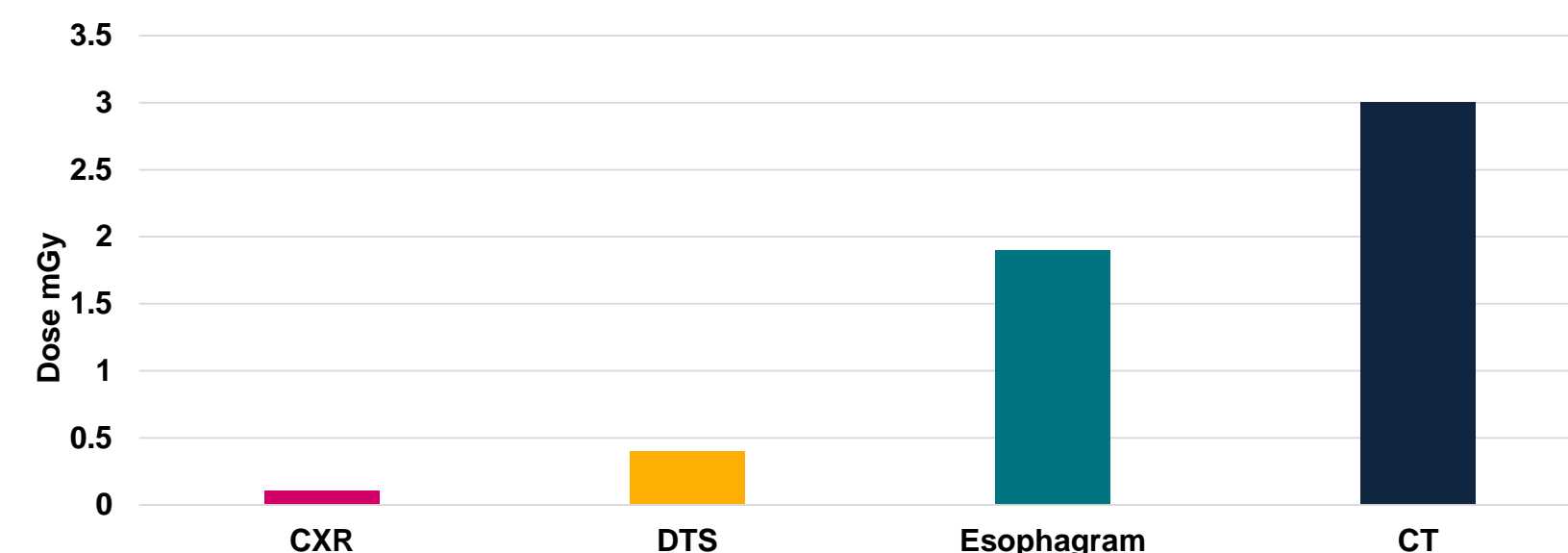


Figure 3: Compared to CT, DTS is associated with approximately 5% of the radiation dose, and only twice the dose of a two-view chest CR ⁴.

Figure 4: Sensitivity and Specificity

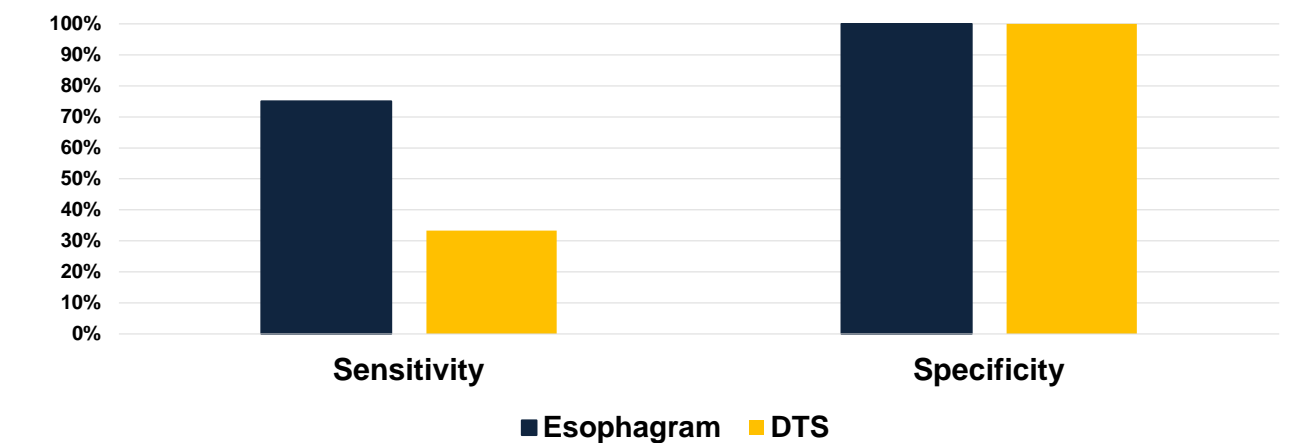


Figure 4: Esophagram detected FB with 75% sensitivity and 100% specificity. DTS detected FB with 33% sensitivity and 100% specificity.

CONCLUSION

- By statistical analysis, the sensitivity of DTS in detection of radiolucent foreign body was inferior (33% for trained readers) to conventional esophagram (75%). Specificity was 100% with both modalities.

SUMMARY

- DTS shows lower sensitivity for detection of esophageal FB, which may be considered acceptable given the substantial reductions in radiation and ease of acquisition. This opens the door to further evaluation about the circumstances in which this modality is most efficacious.
- Our study is limited by its single-center patient population. In addition, our average patient age of 12 years old is not well-representative of the overall average age for foreign body ingestion, which is most common in children under three years old ⁵.

REFERENCES

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