

Hong Mershon B, Dalesio N
Johns Hopkins , Hanover , MD, USA

OBJECTIVE

To establish a standardized sonographic database of normal airway anatomy in 3 different age groups of children using 5 basic views.

BACKGROUND

Despite the advent of advanced airway devices and increased awareness, pediatric airway complications continue to be a major source of morbidity and mortality. The ultrasound is an invaluable tool that is easy to learn, quick, painless, and noninvasive. Expanding standard ultrasound techniques to acquire important airway views and to build an accessible database of images that show airway changes as children age can potentially improve our care of children.

METHODS

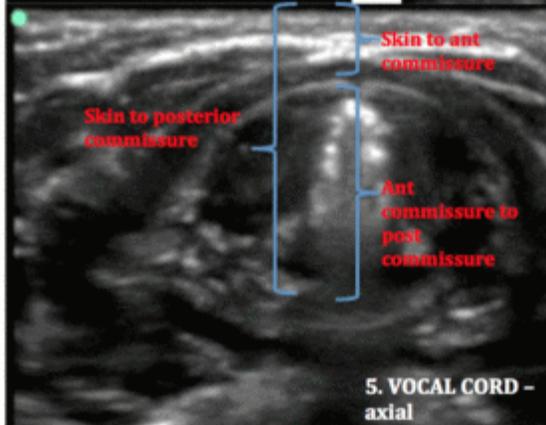
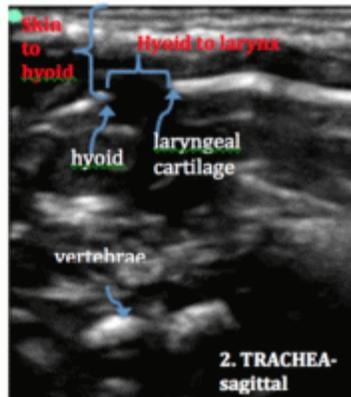
We studied 3 age groups of children with normal airways. Group 1: ages 1 day to 1 year; group 2: ages 1 year to 6 years; group 3: ages 6 years to 10 years. We obtained ultrasound images of the airway using the Sonosite machine in 5 different views moving cephalad from the chest: 1) sagittal view abutting the sternal notch, 2) sagittal view over the trachea, 3) sagittal view at the submental position, 4) axial view at the level of the cricoid, and 5) axial view at the level of the vocal cords. Images were obtained after induction but before intubation (figure 1). We also measured certain distances (shown as red in figure 1) in each age group that most likely change with age and could provide important clinical information.

DATA

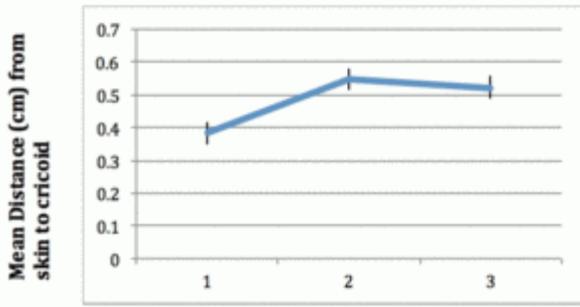
Preliminary analysis of the different views in the 3 age groups show that there are changes in measurements of airway anatomy as children get older (figure 2). We are currently collecting more images for each age group. Statistical analysis will be undertaken after all data has been collected.

CONCLUSION

What is the clinical significance of creating such an accessible image database? For instance, if we knew the average depth from the submental skin to the tongue in one age group, we can estimate more accurately how deep to insert a needle to assure a submucosal injection of atropine in a bradycardic patient on induction where IV access has yet to be established. We can also demonstrate a more safe and accurate way to use the ultrasound for cricothyroidotomy even in an emergency by standardizing the axial vocal cord view for all practitioners to become familiar with. Furthermore, having a database of “normal” airway anatomy in the different age groups can lead to further investigations in delineating airway pathology.

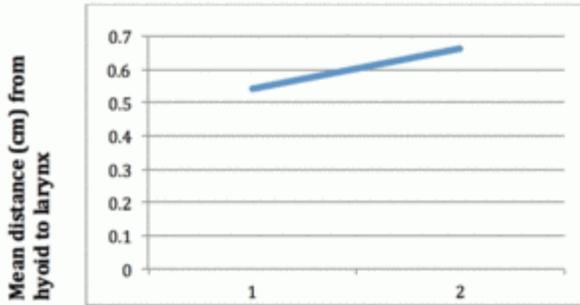
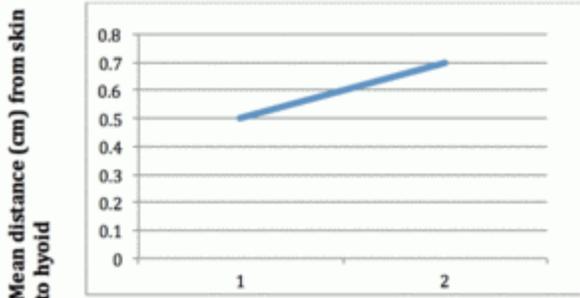


AXIAL CRICOID VIEW



Groups: #1 - 1 day to 1 year, #2 - 1 year to 6 years, #3 - 6 years to 10 years

SAGITTAL TRACHEA VIEW



Groups: #1 - 1 day to 1 year, #2 - 1 year to 6 years
