Background

Evaluation of the pediatric airway often requires general anesthesia, exposing children to potentially harmful medications and situations. Patients with airway pathology including subglottic stenosis and tracheomalacia require continued evaluation and treatment including periglottic steroid injections. With advancements in ultrasonography, accurate and descriptive evaluation of the pediatric airway is feasible. Ultrasound guidance is readily available and used in various specialties of medicine, but yet to be described as a guiding tool for interventional procedures in the pediatric airway. We describe a case series of ultrasound guided vocal cord injections in pediatric patients, with needle placement via the cricothyroid membrane.

Methods

We present 3 children (aged 9-26 months) scheduled to receive elective periglottic steroid injection. With the child anesthetized and spontaneously ventilating, a linear (Sonosite L25x, 13.6 MHz) ultrasound probe was used to identify airway structures and under real time guidance a 22-gauge needle was inserted through the cricothyroid membrane and advanced to the vocal cords. Needle location was confirmed by direct visualization via rigid bronchoscopy. Steroid injection was performed in the periglottic area under ultrasound and direct visualization.

Results

Percutaneous needle was successfully inserted through the cricothyroid membrane to the periglottic area under ultrasound guidance in all patients. No complications were noted.

Discussion

We demonstrate the feasibility of needle cricothyrotomy under ultrasound guidance in children. Critical structures, including key airway anatomic features as well as major vessels, can be visualized. Because air is a non-conductive medium for ultrasound waves, visualization of the needle tip within the trachea remains a limitation to ultrasound-guided needle placement into the airway. The use of ultrasound, however, enables the practitioner to visualize and avoid critical structures surrounding the airway. This technique, permitting real-time ultrasound visualization and needle puncture of the cricothyroid membrane, could be advantageous in critical airway management of small children.

References