Measuring ETT carina distance using the AirWave device in patients identified as a difficult airway.

Presented During: Quality and Safety 10
Tuesday, January 20, 2015: 12:15 PM - 1:15 PM

Poster No:
862
Submission No:
4206
Type:
Abstract
Presentation Format:
Poster Only
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Introduction:
The SonarMed\textsuperscript{\textregistered} AirWave\textsuperscript{\texttrademark} airway monitoring system is a device that can be used for detecting endotracheal tube (ETT) placement above the carina. The system uses a sensor that contains miniature speakers for emitting sound waves into the ETT and microphones for sensing the returning echoes. The amplitude and timing of the echoes are analyzed by the system monitor using software to non-invasively monitor placement. The sensor is connected directly to the ETT with a cable that is connected to the AirWave monitor. The monitor displays real time information regarding distance from baseline (carina distance). Our aim was to determine the accuracy of the SonarMed Airwave monitor measurements compared to measured ETT depth on chest radiography as a patient safety initiative.

Methods:
Data was collected on 29 patients identified by physician order as having a difficult airway. Post-intubation chest x-rays were obtained on all patients to identify the baseline ETT distance from the carina measured by the respiratory therapist. This measured distance from the chest x-ray was entered into the monitor as the carina distance. The baseline was set on the monitor upon initiation. The respiratory therapist documented the first carina distance displayed on the SonarMed AirWave monitor. This distance was compared against the actual carina distance measured from the post intubation chest x-ray. The time delay of first documentation ranged from 3 minutes to 10 hours and 41 minutes after the post intubation chest x-ray. The two measurements were compared on all patients. Quality Institutional Review Board (QIRB) approval was obtained.

Results:
Of the 29 patients evaluated we saw no statistical difference between the SonarMed device and the measured ETT depth of the chest x-ray (CI: 95% -1.139-0.3394) p=0.282

Conclusions:
The use of the non-invasive SonarMed® AirWave™ airway-monitoring device can provide accurate real time measurements of the ETT placement above the carina when compared to measuring the depth of ETT on chest x-ray. However it cannot be a substitute for a routine post intubation chest x-ray.

General Classification:
Clinical

Patient Type:
Adult

Categories - Abstracts:
Quality and Safety

Keywords:
airway
difficult airway
endotracheal tube