Introduction: The use of ultrasound in the critical care field is not limited to the usual procedures, like vascular access and other related procedures, but extends to those that are unthought-of. One of these is the use of ultrasound to guide the insertion of the percutaneous tracheostomy needle. Most of the time, using bronchoscopy to assure the correct placement of the needle in trachea is successful and uneventful. However, there are three situations where unwanted events may take place. First, the trachea may not be palpable especially following the withdrawal of the endotracheal tube to the level of the vocal cords, which may result in repeated attempts of needle insertion. Several complications may take place as a result. Second, superficial vessels may pass in front of the trachea and may be injured and cause significant bleeding during or hours after the procedure. Third, the bronchoscope may get damaged by the needle if it accidentally punctures it. Using ultrasound guidance is likely to prevent such complications/difficulties to a great extent.

Objectives: To test the usefulness of ultrasound guidance during percutaneous tracheostomy in decreasing complication rates and preventing damage to the bronchoscope.

Methods: We tested this method on 33 of our regular patients scheduled for percutaneous tracheostomy (so far). Any patient who is eligible for a percutaneous tracheostomy is eligible to be entered into the study. The same consent used for percutaneous tracheostomy is used to perform the procedure. The operator must at least be capable of using ultrasound guidance in central venous cannulation. The trachea is initially examined using the linear array transducer in long plane to identify the cricoid cartilage and the tracheal rings. A mark is then made at the level of second or third rings depending on the patient’s neck anatomy. On transverse plane, the trachea and surrounding structures are examined for superficial vessels using both plain ultrasound and color Doppler. If that is excluded and under sterile technique, the tracheostomy needle/cannula is introduced using ultrasound guidance in transverse plane at the center of the second or third tracheal ring that was marked previously. The needle & cannula are introduced under direct guidance until air is aspirated, then the cannula is advanced and the needle is removed. The bronchoscope is then used to ensure the correct position of the cannula from the inside of the trachea. The percutaneous tracheostomy is then completed in the standard way. The operator then completes a standard questionnaire on how the procedure went as compared to the standard procedure.

Results: We noted that ultrasonography helps identify any superficial or deeper vessels adjacent to the trachea prior to needle insertion. In addition, it shows the tracheal rings on transverse plane, which helps guiding the needle to the middle of the ring preventing repeated needle insertion attempts especially if the trachea is impalpable. On long plane, the cricoid cartilage and tracheal rings can be easily identifies which allows accurate needle insertion site in relation to the tracheal rings. Furthermore, we only used the bronchoscope after the needle cannula has been inserted to ensure its correct placement in order to validate this method, which prevents the scope from being damaged. The participants thought that the bronchoscope is unnecessary if ultrasound is used. The major disadvantage of such procedure is the fact that it is somehow more time...
consuming than the standard procedure, which in, my opinion, is justified to prevent potentially serious complications.

**References:**