

Title: Validation of a Robotic Bronchoscope

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Abstract:

The goal of this study is to evaluate the clinical efficiency of a robotic bronchoscope and highlight the advantages of using this robotic scope rather than a traditional manual bronchoscope. Six physicians joined the study to compare the two bronchoscopes by reaching a number of points in the peripheral area of the lung in patient derived phantoms. Multiple metrics were collected including force incurred, generation reached, and the NASA-TLX survey. They reached an average of the 6.7 ± 0.8 th (robotic) and 6.6 ± 1.2 th (manual) generation. More force was incurred to the airway when the manual bronchoscope was used with 0.22 ± 0.19 [N] versus then when the robotic bronchoscope was applied with 0.19 ± 0.23 [N]. The physicians then filled out the NASA-TLX survey ranking their mental demand, physical demand, temporal demand, performance, effort and frustration while operating each scope. The manual bronchoscope imposed more physical demand than the robotic bronchoscope by NASA-TLX measure (55 ± 24 vs 19 ± 16). Overall, the results of this study indicate that the robotic bronchoscope has demonstrated significant improvement in conducting bronchoscopies than the conventional manual bronchoscope. This will allow for future use of robotic bronchoscopy in diagnosing tumors at earlier stages for more effective treatment.