Robotic tracheobronchoplasty is feasible, but which patients truly benefit?

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Steven Milman, MD (left), and Thomas Ng, MD (right).

Central Message

Robotic tracheobronchoplasty is feasible, but well-designed prospective studies are needed to determine exactly which patients will benefit from surgery.

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Tracheobronchomalacia is a pathologic process causing collapse of the central airways, leading to dyspnea, persistent cough, and failure to clear secretions. Management of patients with this condition has been difficult for many reasons. First, tracheobronchomalacia has traditionally been defined as greater than 50% collapse of the airway lumen with expiration; however, 80% of healthy individuals will meet this criterion according to dynamic computed tomography.¹ Second, the degree of malacia does not necessarily correlate with other objective measures, such as pulmonary function tests.² Finally, most patients presenting for evaluation will also have comorbid pulmonary diseases, such as chronic obstructive pulmonary disease or asthma, that have similar symptoms.^{3,4} In 2011, Gangadharan and colleagues³ reported on 63 patients undergoing open tracheobronchoplasty for tracheobronchomalacia during a 7-year period. The median hospital stay was 8 days, morbidity was 38%, and mortality was 3.2%. At 3 months, subjective measures showed improvement in symptoms; however, there was no improvement in forced expiratory volume in 1 second. In fact, forced expiratory volume in 1 second was worse after surgery in almost 40%, which illustrates the importance of identifying the subset of patients who will truly benefit from this complex procedure.

In this month's issue of the *Journal*, Lazzaro and colleagues⁴ report their experience with the use of a robotic platform to perform tracheobronchoplasty. During a 14-month period, 42 patients underwent the robotic procedure. Median stay was 3 days, morbidity was 45% (grade 3 or higher in 19%), and there was no mortality. After surgery, there was improvement in symptoms, quality of life, and pulmonary function test results. With such favorable results reported, Lazzaro and colleagues⁴ are to be congratulated; before we jump onto the robotic bandwagon, however, the limitations of this study must be examined closely. First, the number of patients in this study is small. Second, the

follow-up is short, with pulmonary function tests measured only at 4 months, 6-minute walk test at 5 months, and the St George's Respiratory Questionnaire at 2 months. Long-term data to confirm durability of these benefits are not available. Third, the stent trial was abandoned after 11 cases, and it is not stated how these 11 patients fared post-operatively and whether the results of the stent trial correlated with surgical success. Finally, there was a significant amount of missing data, 5% for pulmonary function tests, 40% for the 6-minute walk test, 64% for the St George's Respiratory Questionnaire, and 17% for the satisfaction survey.

What should we take away from this article? Lazzaro and colleagues⁴ clearly demonstrate the feasibility of robotic tracheobronchoplasty; however, several important questions still remain unanswered. Exactly which patients benefit from surgery? Are the proposed benefits of surgery long-lasting? It is important to note that in both the series of Gangadharan and colleagues³ and that of Lazzaro and colleagues,⁴ forced expiratory volume in 1 second was worse in a large proportion of the patients (nearly 40% and 30%, respectively), and no long-term data were provided. No matter whether tracheobronchoplasty is performed by open or robotic technique, in this fragile population, it is important that we conduct well-designed prospective studies to identify the subset of patients who will most benefit from surgery; as a corollary, we must identify the

subset of patients who will derive no benefit and thus may be harmed by surgery.

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