The diameters of the pig tracheas in this study (range, 11-14 mm) are larger than human neonatal and infant airways that may require intervention before age 1 year (range, 5-6 mm). Further dynamic longitudinal studies in smaller animals may be needed to determine whether the stent accomplishes its intended goal of preventing pediatric airway collapse.

These preclinical results show promise for a new type of stent with successful initial performance in an animal airway model. The potential influence of this new device is excellent, and it could fill a critical vacancy where no good current options exist. This represents another example of important surgical innovation from an exemplary team, and further clinical progress is eagerly anticipated.

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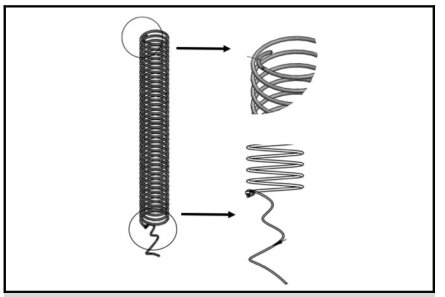
Commentary: Toward a more ideal pediatric airway stent for tracheobronchomalacia

Roosevelt Bryant III, MD



CasMin Twine helical stent.[1]

CENTRAL MESSAGE

The helical Niti-S airway stent shows promise as a more ideal prosthesis for the management of tracheobronchomalacia.

The first clinical deployment of a pediatric airway stent was in 1988 and was reported by Loeff and colleagues.[2] Since that time, an array of airway stents have developed to treat complex airway disease in children. Pediatric-specific applications of airway stents include use after tracheal reconstruction for congenital tracheal stenosis[3] and for tracheobronchomalacia[4] not responsive to medical therapy. However, the ideal pediatric airway stent has yet to be developed. The ideal airway stent for pediatric patients should be easy to place, should support the airway without the development of significant complications, and should be easy to remove to allow maximal growth of the airway.[3]

Potential stent-related complications include migration, granulation tissue formation, mucus formation, and infection,[5] particularly when granulation tissue develops. Despite the wide array (metallic,[6] silicon,[7] bioabsorbable[8]) of pediatric stents available, none of them is ideal. The known complications associated with these devices have led to a stent-related mortality rate as high as 12.9%.[7] Furthermore, the radial force used to keep certain kinds of stents in place has been shown to damage the microcirculation and serves as the nidus for mucosal injury and subsequent granulation tissue formation.[9,10]

From the Division of Congenital Heart Surgery, The Heart Center, Phoenix Children's Hospital, Phoenix, Ariz.

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Address for reprints: Roosevelt Bryant III, MD, Heart Transplantation and Mechanical Circulatory Support, Phoenix Children's Hospital, 1919 E Thomas Rd, Phoenix, AZ 85016 (E-mail: rbryant1@phoenixchildrens.com).

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In this issue of the *Journal*, Mondal and colleagues[11] present the results of a promising animal study looking at a novel airway stent, the helical Niti-S stent (Taewong Medical, Seoul, Korea), for the treatment of tracheobronchomalacia in children.[11] Its helical design is similar to the CasMin-Twine helical stent[1] used to treat canine tracheal collapse. The 2 types of helical stents share certain advantages. These include ease of deployment, limited mucus production, and focal mucosal changes limited to the areas of stent contact. The helical design provides radial support with substantially less mucosal contact and at a lower pressure. The results of the study by Mondal colleagues provide further evidence that the stent design provides less of a nidus for granulation tissue formation. This was also shown with the CasMin-Twine helical stent animal study. Where the 2 stents diverge is the novel removal tool associated with the helical Niti-S stent. Removal of the stent should allow optimal growth of the airway. A primary limitation of the study by Mondal colleagues is the short duration of therapy. After tracheal reconstruction for example, it can take 2 to 6 months for the airway to endothelialize.[3] It remains to be seen whether the helical Niti-S stent will be as amenable to removal with longer durations of therapy. However, the early advantages of the helical Niti-S certainly seem to be taking us toward a more ideal pediatric airway stent.

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