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Editorial

Endoscopic balloon dilatation in pediatric patients with esophageal strictures: From the past to the future

Following its first successful use in re-opening an artery with stenosis by Dr. Andreas Grüntzig in 1974,[1] balloon catheter was applied to not only angioplasty but also dilatation of esophageal strictures under fluoroscope in two adults in 1981 and under fiberesophagoscope in seven patients, including a child with caustic stricture complicated twice with perforation in 1984.[2,3] Balloon catheters can pass thorough severe, lengthy, irregular esophageal strictures with a bendable guide wire with subsequent balloon catheter dilatation for patients who had failed treatment with conventional bougienage techniques. Tam et al. reported the first series of 33 children who safely and successfully received endoscopic balloon dilatation (EBD) for dilating esophageal strictures and anastomotic strictures after esophageal replacement, but complicated in two caustic strictures.[4]

For the past two decades, the outcomes of EBD for children with esophageal stricture have improved, although the number of studies on pediatrics is less than that on adults. Most of these studies demonstrated EBD under general anesthesia as a safe and successful modality for treatment in the majority of pediatric patients with esophageal stricture. In addition to video endoscope with Savary–Gilliard bougies for endoscopic dilatation, EBD provides an alternative, convenient, and effective approach for treatment of esophageal strictures although both methods demonstrated different results and experiences depending on the availability of instruments and the skillfulness of performers. Regardless of semisolid or balloon dilators, esophageal follow-through imaging before endoscopic esophageal dilatation can facilitate the evaluation of the extension, multiplicity, and tortuosity of strictures or the presence of a pseudodiverticulum for correctly placing the guidewire through the stricture into the stomach during EBD. Meticulous evaluation before EBD can lower the risks of developing complications, such as creation of a false lumen in the esophageal wall, wrong track into a pseudodiverticulum, esophageal perforation, and mediastinitis.[5] The etiologies of esophageal stricture may influence the selection of different dilators. For example, hydrostatic dilators or two-step approach by orthograde EBD followed by gastrostomy and retrograde dilatation is preferred for treatment of esophageal strictures caused by epidermolysis bullosum.[5,6]

In recent studies, EBD is preferred than semisolid dilators for treatment of esophageal strictures due to the concern of iatrogenic mucosal injuries caused by shearing axial force during the repeated insertion of the bougies into esophageal strictures. In a 6-year retrospective study of 10 pediatric patients with esophageal strictures caused by chemical agent injury (70%), congenital tracheoesophageal fistula, post-esophageal surgery complicated with esophageal stricture (20%), and esophageal foreign body (10%), Chang et al. demonstrated that dysphagia and diet conditions were improved after EBD without remarkable complications in most of the patients receiving the intervention. An exception occurred in one patient with long esophageal stricture, suggesting the correlation between the length of stricture and the number of EBD performance.[3] Several studies for the past 5 years reported similar observation in the safety and effectiveness of EBD as treatment for esophageal stricture, particularly in short strictures. Chang et al. reported a 5-year retrospective study on 50 pediatric patients showing an overall clinical success rate of EBD therapy as high as 72% with emphasis of significantly increased weight-for-age z scores in all the patients receiving EBD, particularly in those with short strictures and strictures in the middle esophagus.[7] This report is the first to correlate long-term nutritional outcomes in weight-for-age z scores with the location and length of esophageal strictures,[7] rather than evaluating patients only with BMI as well as variations in the z scores of weight and height.[3,6]

Whether different etiologies correlate with clinical outcomes and effectiveness of EBD for esophageal strictures in children remains obscure and requires additional studies for clarification. In a 15-year retrospective study on 38 pediatric patients diagnosed with corrosive stricture ($n = 19$) and esophageal atresia ($n = 19$) who received EBD, Cakmak

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et al. assumed that the treatment effectiveness rate was lower and the complication rate was higher in corrosive strictures than in anastomotic strictures; however, the difference was not statistically significant.[8] Chang et al. claimed higher clinical success rates of EBD in patients with esophageal atresia than those with corrosive injury by statistical analysis from not all but a part of the enrolled patients.[7] Timing of EBD treatment and severity of corrosive injury should be considered in future studies. Moreover, we anticipated further research on advanced therapies (e.g., intralesional steroid injection or topical Mitomycin C) as rescue adjuncts to treat patients with recurrent or refractory esophageal strictures resistant to EBD therapy.

Conflicts of interest

The author declares no financial conflicts of interest related to the subject or materials discussed in the manuscript.

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