Autologous skin-grafting surgery with novel continuous liquid infusion stent for prevention of esophageal stenosis after complete circular endoscopic submucosal tunnel dissection

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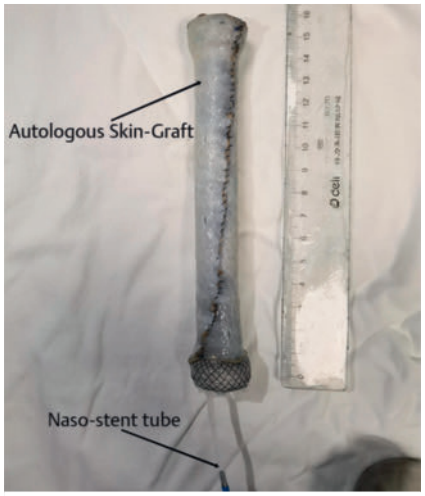
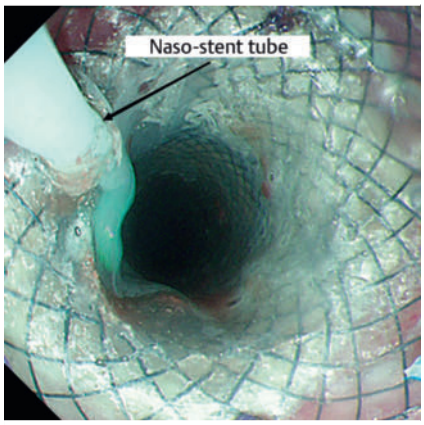
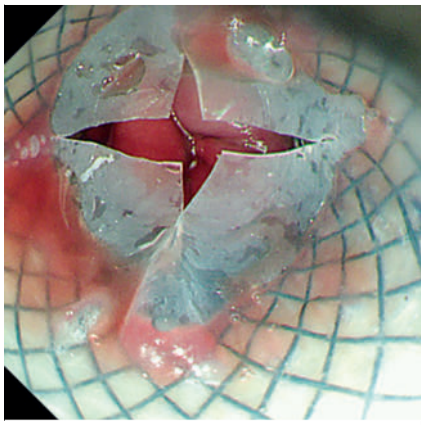


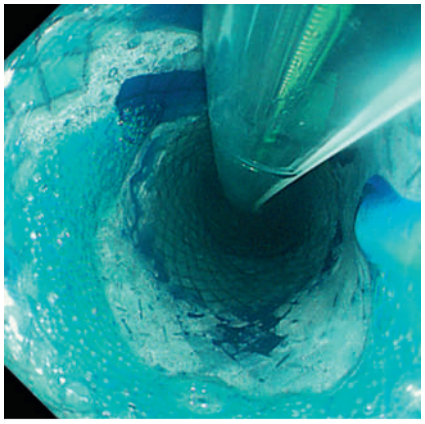
▶ **Fig. 1** The oversleeve-like skin graft was sewn onto the novel continuous liquid infusion stent.



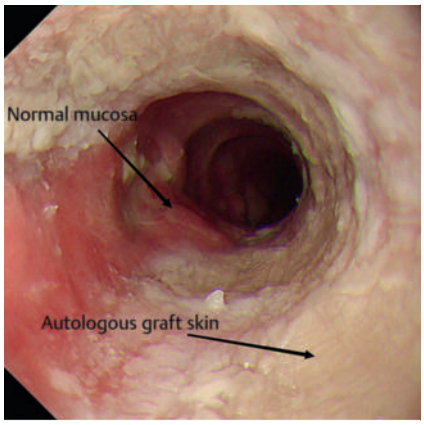
▶ **Fig. 2** The naso-stent tube attached to the stent was drawn from the nostrils.



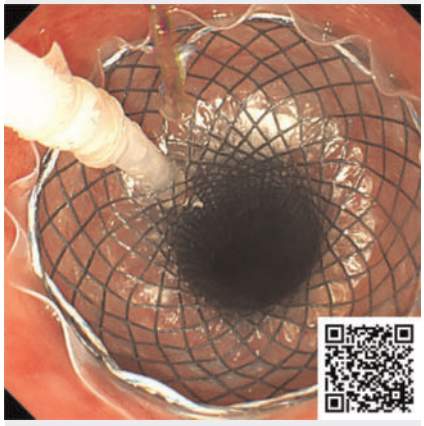
▶ **Fig. 3** A unidirectional valve at the tail of the stent and sustained-release drug storage capsule were designed for temporary storage of liquid.



▶ **Fig. 4** To test the slow-release function of the stent, methylene blue solution was administered through the naso-stent tube.



▶ **Fig. 5** The main part of the skin graft survived after 8 weeks.



Video 1 Autologous skin-grafting surgery with novel continuous liquid infusion stent for the prevention of esophageal stenosis after complete circular endoscopic submucosal tunnel dissection.

We usually prevent postoperative esophageal stenosis with autologous skin-grafting surgery for complete circular endoscopic submucosal tunnel dissection (ccESTD) [1, 2]. However, the survival rate of skin grafts and the prevention of stenosis still need to be improved. Therefore, we used a novel liquid infusion stent for the prevention of esophageal stenosis after ccESTD.

A 67-year-old man diagnosed with wholly circumferential superficial esophageal neoplasm, 27–36 cm from the incisors, underwent double-tunnel ccESTD in our hospital. To fill the long circular artificial ulcer in the esophagus, a novel continuous liquid infusion stent (patent CN 218010622 U) with a 15 × 8 cm skin graft was used, as described below.

The skin graft was harvested from the right outer thigh of the patient, and the oversleeve-like skin graft was sewn onto the novel continuous liquid infusion stent (▶ **Fig. 1**). The skin graft with novel continuous liquid infusion stent was placed at the esophageal artificial ulcer. A naso-

stent tube attached to the stent was drawn from the nostrils (▶ **Fig. 2**). A unidirectional valve at the tail of the stent and sustained-release drug storage capsule were designed for temporary storage of liquid (▶ **Fig. 3**). To test the slow-release function of the stent, methylene blue solution was administered through the naso-stent tube (▶ **Fig. 4**, ▶ **Video 1**). Recombinant human epidermal growth factor (rhEGF) solution (100 000 IU) was pumped through the naso-stent tube every 2 days until the stent was removed after 4 weeks. There was no sign of stenosis after 8 weeks, and the main part of the skin graft survived (▶ **Fig. 5**).

To the best of our knowledge, this is the first report of autologous skin-grafting surgery with novel rhEGF infusion stent for prevention of post-ccESTD esophageal stenosis. However, more cases are required to determine the long-term efficacy of this technique in preventing postoperative esophageal stenosis.

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Conflict of Interest

E. Linghu owns the patent mentioned in the text. S. Liu, N. Chai, Y. Lin, N. Wang, L. Li, and N. Zhang declare that they have no conflict of interest.

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