Flexible diverticulotomy for Zenker's diverticulum – a bicentric study

H. Epping[1]; A. Ziachehabi[2]; G. Spaun[1]; F. Wewalka[1]; A. Maieron[3]; W. Schimetta[4]; R. Schöfl[1]

[1] Ordensklinikum Linz GmbH Barmherzige Schwestern, Interne IV - Gastroenterologie & Hepatologie, Endokrinologie und Stoffwechsel, Ernährungsmedizin
[2] Kepler Universitätsklinikum, Innere Medizin mit Schwerpunkt Gastroenterologie / Hepatologie [3] Universitätsklinikum St. Pölten [4] Johannes Kepler Universität Linz

Background

Zenker's diverticulum is a pseudodiverticulum of the hypopharynx that may lead to dysphagia, regurgitation and aspiration.
Anatomical weakness of the Killian´s triangle, functional disorders of the upper esophageal sphincter, and gastroesophageal reflux have been discussed as potential causes. Age has been clearly confirmed as a risk factor. The peak incidence is between the ages of 70 and 80 years. Since we lack any satisfactory conservative treatment for Zenker's diverticulum, it usually requires surgical or interventional treatment. However, this exposes the elderly patient population to a high risk of surgery as well as anesthesia. Therefore, a gentle treatment method such as flexible diverticulotomy *(figure 1)* is desirable.
In the present study, we investigated the development of flexible diverticulotomy in terms of safety and effectiveness since its introduction in 2010 at the Ordensklinikum.

Figure 1: Zenker´s diverticulum peri-interventionally with a distance cap and a triangle tip knife

Methods

A retrospektiv bicentric study included all patients (n=69) with Zenker's diverticulum treated with flexible diverticulotomy at the Ordensklinikum Linz Barmherzige Schwestern & Elisabethinen between 1 January 2010 and 31 December 2019. The aim was to determine the potential effect of the endoscopist's experience on success, complication, and recurrence rates. Patients were divided into two groups (group 1 = 2010-2014, group 2 = 2015-2019) and the data were statistically compared.

Table 1: Patient characteristics

Patients characteristics	Intervention group 1 (2010-2014; n=11)	Intervention group 2 (2015-2019; n=58)
Sex		
male	6 (54.5%)	41 (70.7%)
female	5 (45.5%)	17 (29.3%)
Average age in years (SD)	78.18 (± 13.37)	71.00 (± 12.30)
Symptoms		
dysphagia	10 (90.9%)	44 (75.9%)
regurgitation	6 (54.5%)	33 (56.9%)
aspiration	7 (63.6%)	10 (17.2%)
Size of Zenker's diverticulum in cm (SD)	3.3 (± 1.5)	3.2 (± 1.4)
Median hospital stay in days	8.5	4.0

Results

Based on the patient's characteristics, shown in *table 1*, two main differences between the groups were identified. First, the patients in group 2 were younger and had lower symptom severity. This suggests that flexible diverticulotomy is nowadays not only relevant for the oldest patient collective, but has a broader application in the treatment of Zenker's diverticulum.
Second, patients of group 2 benefited from a shorter median hospital stay.

The primary technical success of the intervention was defined as a complete transection of the diverticular septum or smooth intubation of the esophagus with an endoscope. As shown in *figure 2*, patients of group 2 benefited from a higher primary intervention success rate.

Complications were classified as lethal, severe (requiring ICU treatment), or mild. No lethal outcome was encountered. Only 2 (2.9%) interventions required a stay at the intensive care unit and mild, well-controlled bleeding occurred in 10 (14.5%) interventions. In all 12 (17.4%) interventions resulted in complications. Complications were evenly distributed between the two intervention groups and no improvement was observed overtime during the study period *(figure 3)*.

Notably, recurrences in group 1 occurred after a median of 127 days, and in group 2 after 255.5 days. Patients in group 2 generally benefited from the intervention for a longer period of time, as demonstrated by the flatter course of the graph for group 2 in *Figure 4.*

Figure 2:
Success rates
(2010-2014 n=8; 2015-2019 n=54)

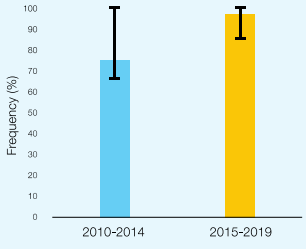


Figure 3:
Complication rates
(2010-2014 n=11; 2015-2019 n=58)

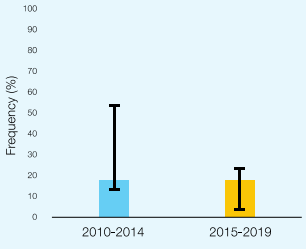
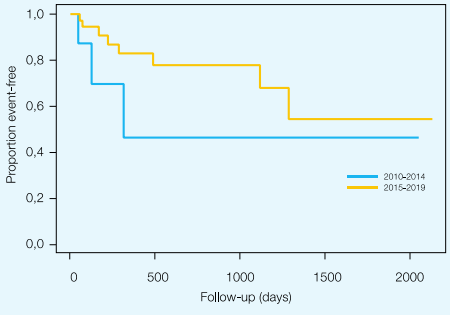


Figure 4:
Recurrence rates
(2010-2014 n=8; 2015-2019 n= 46)



Conclusion

In summary, our data clearly showed that the effectiveness of the procedure increases with the experience of the endoscopist. Patients benefit from shorter hospital stays and longer recurrence-free intervals. Therefore, flexible diverticulotomy should be performed primarily at specialized centers with high case numbers.