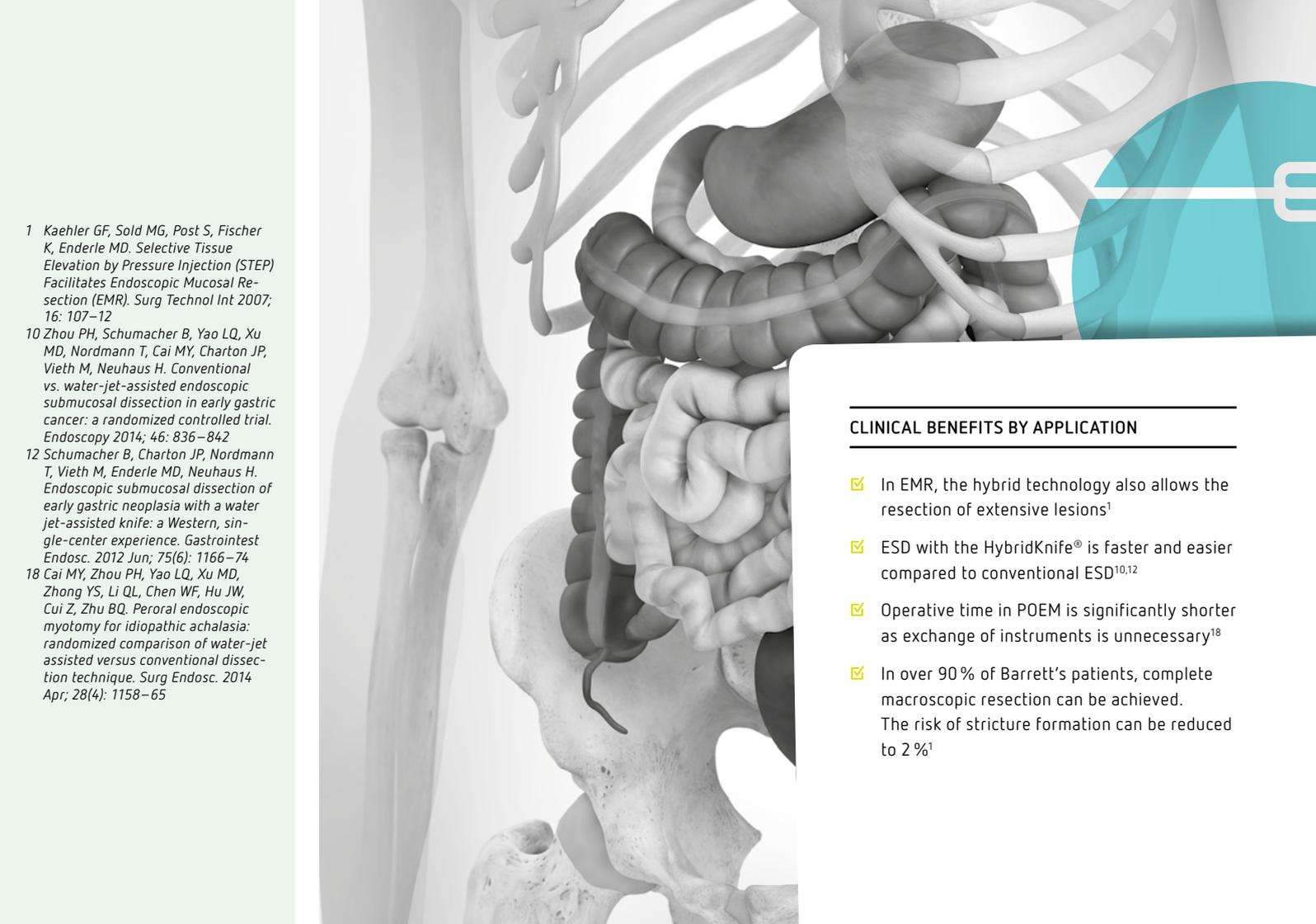


**erbe**  
power your performance.



**Hybrid technology**  
in flexible endoscopy

- 
- 1 Kaehler GF, Sold MG, Post S, Fischer K, Enderle MD. Selective Tissue Elevation by Pressure Injection (STEP) Facilitates Endoscopic Mucosal Resection (EMR). *Surg Technol Int* 2007; 16: 107–12
- 10 Zhou PH, Schumacher B, Yao LQ, Xu MD, Nordmann T, Cai MY, Charton JP, Vieth M, Neuhaus H. Conventional vs. water-jet-assisted endoscopic submucosal dissection in early gastric cancer: a randomized controlled trial. *Endoscopy* 2014; 46: 836–842
- 12 Schumacher B, Charton JP, Nordmann T, Vieth M, Enderle MD, Neuhaus H. Endoscopic submucosal dissection of early gastric neoplasia with a water jet-assisted knife: a Western, single-center experience. *Gastrointest Endosc.* 2012 Jun; 75(6): 1166–74
- 18 Cai MY, Zhou PH, Yao LQ, Xu MD, Zhong YS, Li QL, Chen WF, Hu JW, Cui Z, Zhu BQ. Peroral endoscopic myotomy for idiopathic achalasia: randomized comparison of water-jet assisted versus conventional dissection technique. *Surg Endosc.* 2014 Apr; 28(4): 1158–65

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#### CLINICAL BENEFITS BY APPLICATION

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- ✔ In EMR, the hybrid technology also allows the resection of extensive lesions<sup>1</sup>
- ✔ ESD with the HybridKnife® is faster and easier compared to conventional ESD<sup>10,12</sup>
- ✔ Operative time in POEM is significantly shorter as exchange of instruments is unnecessary<sup>18</sup>
- ✔ In over 90 % of Barrett's patients, complete macroscopic resection can be achieved. The risk of stricture formation can be reduced to 2 %<sup>1</sup>



# Electrosurgery with water-jet elevation

*The water-jet provides expanded utility for electrosurgical procedures in flexible endoscopy. The layer-specific elevation creates a fluid cushion in the submucosa of the gastrointestinal tract which protects the adjacent tissue layers e.g. muscularis.*

*Numerous studies document the advantages of the hybrid technique in ESD (endoscopic submucosal dissection), EMR (endoscopic mucosal resection), POEM (peroral endoscopic myotomy) and the ablation of Barrett's Esophagus – these application benefits are a direct result of the double function of electrosurgery and hydrosurgery with the HybridKnife® or HybridAPC.*

*Many renowned users are convinced of the clinical benefit our hybrid technology offers. This testimonial brochure captures their personal experiences with hybrid technology.*

# Workstation for hybrid techniques in gastroenterology

The gastroenterology workstation offers a broad spectrum of electrosurgical applications in endoscopy. In its full configuration the workstation consists of the electrosurgical unit VIO®3 01, argon plasma coagulation module APC3 02 and hydrosurgery unit ERBEJET®2 03, as well as an endoscopic irrigation pump (EIP 2) 04 .



*For over 20 years now, we have been using the principle of HF surgery based on automated cut coagulation (endoCUT®) technology in interventional, flexible endoscopy. This has meanwhile become an indispensable part of every thermal tissue treatment. Further convincing improvement has been achieved with the VIO®3. In addition to the intuitive and adapted touchscreen operation, the significantly faster and more precise first cut in resection (endoCUT® Q and I) are particularly impressive, as are the considerably more homogeneous tissue and ignition effects of the APC3.*



**University lecturer, Dr. Axel Eickhoff**  
Chief Physician Clinic II  
Gastroenterology, Diabetology and Infectiology  
Clinic Hanau



*Instruments for  
hybrid techniques and  
water-jet elevation*

- 01 HybridKnife®, T-Type, I-Jet  
No. 20150-060
- 02 HybridKnife®, I-Type, I-Jet  
No. 20150-061
- 03 HybridKnife®, O-Type, I-Jet  
No. 20150-062
- 04 HybridAPC  
No. 20150-015
- 05 Flexible Probe  
No. 20150-020

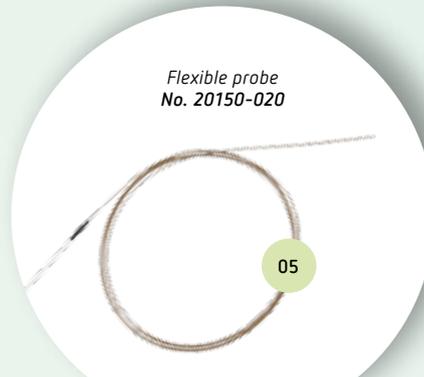


*Gastroenterology workstation:  
with units and modules for  
electrosurgery, plasma surgery,  
hydrosurgery and  
endoscopic irrigation*

# EMR with flexible water-jet probe

- 1 Kaehler GF, Sold MG, Post S, Fischer K, Enderle MD. *Selective Tissue Elevation by Pressure Injection (STEP) Facilitates Endoscopic Mucosal Resection (EMR)*. *Surg Technol Int* 2007; 16: 107–12
- 2 Belle S, von Boscamp M, Sold M, Mack S, Pilz L, Ebert M, Kaehler G. *Submucosal injection with waterjet improves endoscopic mucosal resection of colorectal adenoma – a randomised controlled clinical trial*. *Scand J Gastroenterol* 2017; VOL. 52, NO. 2, 222–227
- 2a Belle S, Collet PH, Szyrach M, Ströbel P, Post S, Enderle MD, Kähler G. *Selective tissue elevation by pressure for endoscopic mucosal resection of colorectal adenoma: first clinical trial*. *Surgical Endoscopy* 2012; Volume 26

- ✓ The selective fluid cushion\* in the submucosa simplifies EMR<sup>1,2a</sup>
- ✓ This technique also allows the resection of extensive lesions<sup>1</sup>
- ✓ The fluid collects selectively in the submucosa<sup>1</sup>
- ✓ The resection speed is significantly faster with the elevation technique<sup>2</sup> (0.776 cm<sup>2</sup>/min vs 0.49 cm<sup>2</sup>/min of the lesion)<sup>2</sup>



\* For certain lesions, an elevation is recommended in the ESGE Guideline 03/2017



*Colon adenoma after elevation  
with water-jet*



*Colon adenoma after resection and elevation  
with water-jet*



*The ERBEJET®2 allows me to safely apply submucosal injections in mucosal tumors, even with large expansion or a difficult anatomical position. The reliability with which a large fluid cushion can always be created precisely in the submucosa, is impressive. This enables us to “crack” even the toughest cases, so that no adenoma is ever operated on unnecessarily.*

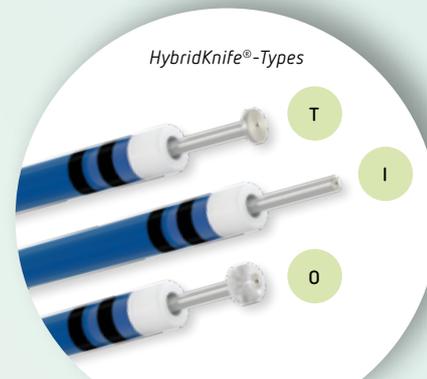


**Prof. Georg Kähler**  
Head of Central Interdisciplinary Endoscopy  
University Clinic Mannheim

# ESD with HybridKnife®

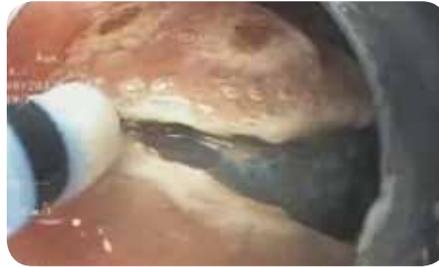
- 10 Zhou PH, Schumacher B, Yao LQ, Xu M-D, Nordmann T, Cai MY, Charton JP, Vieth M, Neuhaus H. Conventional vs. water-jet-assisted endoscopic submucosal dissection in early gastric cancer: a randomized controlled trial. *Endoscopy* 2014; 46: 836–842
- 11 Repici A, Hassan C, Pagano N, Rando G, Romeo F, Spaggiari P, Ron-calli M, Ferrara E, Malesci A. High efficacy of endoscopic submucosal dissection for rectal laterally spreading tumors larger than 3 cm. *Gastrointest Endosc.* 2013 Jan; 77(1): 96–101
- 12 Schumacher B, Charton JP, Nordmann T, Vieth M, Enderle MD, Neuhaus H. Endoscopic submucosal dissection of early gastric neoplasia with a water jet-assisted knife: a Western, single-center experience. *Gastrointest Endosc* 2012, Jun; 75(6): 1166–74
- 13 Repici, A et al. A prospective, single center study of endoscopic sub-mucosal dissection of rectal LST lesion larger than 3cm by using an innovative concept of injecting and Cutting: The water-Jet Hybrid-Knife (ESD-H). *Gastrointest Endosc Vol 73, Issue 4, Supplement, Page AB156, April 2011*
- 14 Neuhaus, H. Endoscopic mucosal resection and endoscopic submucosal dissection in the West – too many concerns and caveats? *Endoscopy* 2010; 42: 859–861

- ✔ ESD is a technique for the complete, reliable en-bloc resection of neoplasias in the stomach<sup>12</sup>
- ✔ ESD with the HybridKnife® is faster and easier than in comparison with conventional ESD as fewer instrument changes are necessary<sup>10,12</sup>
- ✔ ESD with the HybridKnife® is a reliable and effective method for treating large LST-lesions (laterally spreading tumors) of the rectum en-bloc and curatively<sup>11,13</sup>
- ✔ The en-bloc resection rate of rectal LST is 85 %<sup>13</sup>
- ✔ ESD with the HybridKnife® can achieve complete local remission of neoplasias in the stomach in approx. 90 % of patients<sup>12</sup>
- ✔ The HybridKnife®-ESD could become the method of choice in the local treatment of neoplasias in the gastrointestinal tract<sup>14</sup>





*Submucosal dissection after elevation  
with water-jet*



*Mucosal incision of the tumor (adenoma)  
with the HybridKnife® I-Type*



*Bleeding can subsequently be coagulated  
with the HybridKnife®*



*We treat our patients with the HybridKnife® as it provides perfect conditions for fast resection or submucosal endoscopy (e.g. POEM or STER) with a low complication rate. With the water-jet, we create a submucosal fluid cushion which offers protection against perforations as well as compressing the blood vessels and making them highly visible. This reduces bleeding episodes during surgery. However, should bleeding occur, it can usually be arrested easily through coagulation with the HybridKnife®. Changes of instruments are only rarely required.*



**Prof. Horst Neuhaus**  
Chief Physician Medical Clinic  
Evangelical Hospital Düsseldorf

# ESD with HybridKnife®



*Tumor resection with the HybridKnife®*



*HybridKnife® is not just elevating, it also allows me to manage all the other steps of an ESD with the same instrument. In combination with the modes of the VIO® 3 generator, HybridKnife® is my preferred choice for the en-bloc resection of lesions in the GI tract.*



**Prof. Alessandro Repici**  
Clinical Director  
Endoscopic Diagnostics and Surgery  
Humanitas Research Hospital, Milan



*Tumor in situ prior to elevation*



*Incision of the tumor margin with the HybridKnife® O-Type*



*Submucosal dissection of the tumor with the HybridKnife® O-Type*



*ESD with the HybridKnife® creates a resection bed with homogeneous resection border*



*I started using the HybridKnife® O-Type next to the I-Type in the more difficult to reach areas and learned about the great versatility this knife has to offer. It really makes ESD a single-instrument procedure. It makes a full circumferential incision in a 'lift-and-cut' fashion, without having to remove the knife a single time, rather easy. This is true even in retroflex positions.*

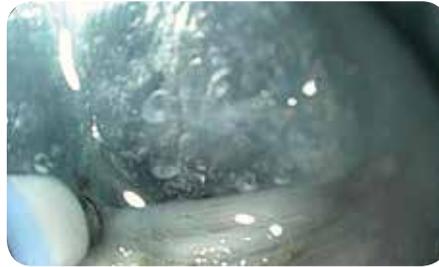
*The knife can cut in forward positions as well as lateral cutting and dissecting while hooking tissue in awkward positions without having to fear deeper thermal injury. Bleeding can be managed with the knife with submucosal lifting at my disposal at any time. I hardly use a coagulation forceps anymore.*



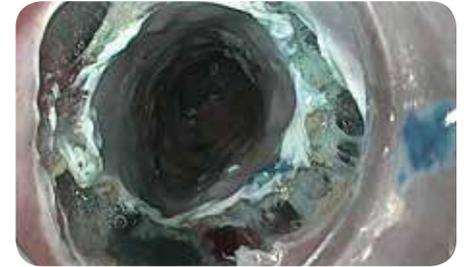
**Dr. Arjun Koch**  
Department of Gastroenterology and Hepatology  
Erasmus MC, Rotterdam



*Initial clinical finding*



*Mucosa elevation with the HybridKnife®*



*Circumferential incision and dissection*

 Various endoscopic techniques were developed for mucosa resection. Endoscopic submucosa dissection (ESD) is required for lesions greater than 2 cm due to a high risk of relapse in piece-meal resection. An interesting novel development for performing ESD is given by the HybridKnife® which has become well established over the past 10 years, and which was developed for the en-bloc resection of large dissections. This method is a combination of a water-jet which elevates the mucosa, and a radio-frequency [electrosurgery] technology for ablation with controlled cutting and coagulation technique. The HybridKnife® enables submucosal elevation at a defined pressure into the mucosa with subsequent circumcision and dissection of the lesion to be removed using the same instrument without necessitating a change.

The advantages of the method are considerable time savings and a significant reduction in perforation risk, as injection and cushion formation are possible at any time. The technique can be used both in the esophagus, stomach, as well as the colon and rectum. In recent years, submucosal tunneling has become a further field of application, as is, for example, necessary in treating achalasia.



**University lecturer, Dr. Brigitte Schumacher**  
Clinic for Internal Medicine and Gastroenterology  
Elisabeth Hospital Essen



*Resection bed after dissection of the lesion*



*Resected tissue after circumferential, tubular ESD*

ESD with HybridKnife®



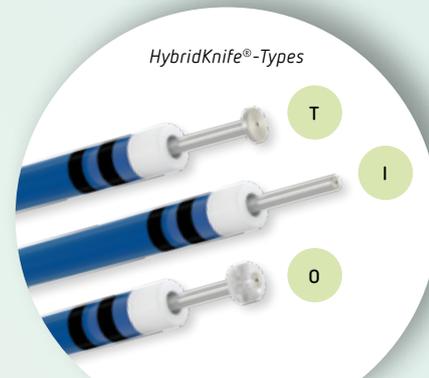
# POEM with HybridKnife®

- ✓ Procedural time in POEM with the HybridKnife® is significantly shorter as instrument exchange is unnecessary<sup>18</sup>
- ✓ POEM can be performed quicker with the HybridKnife® as elevation is facilitated and as the type of elevation leads to less bleeding<sup>8</sup>
- ✓ POEM appears to be a reliable and effective therapy for achalasia<sup>17</sup>
- ✓ POEM offers a high rate of therapeutic success for roughly 90% of patients with an Eckardt Score of  $\leq 3$ <sup>18</sup>
- ✓ The efficacy of POEM is comparable with the (more invasive) laparoscopic Heller myotomy<sup>16</sup>

16 Stavropoulos SN, Modayil R, Friedel D. Per oral endoscopic myotomy for the treatment of achalasia. *Curr Opin Gastroenterol.* 2015 Sep; 31(5): 430–40

17 Li QL, Zhou PH. Perspective on peroral endoscopic myotomy for achalasia: Zhongshan experience. *Gut Liver.* 2015 Mar; 9(2): 152–8

18 Cai MY, Zhou PH, Yao LQ, Xu MD, Zhong YS, Li QL, Chen WF, Hu JW, Cui Z, Zhu BQ. Peroral endoscopic myotomy for idiopathic achalasia: randomized comparison of water-jet assisted versus conventional dissection technique. *Surg Endosc.* 2014 Apr; 28(4): 1158–65





*Submucosal tunneling with the HybridKnife®*



*Myotomy with the HybridKnife® T-Type*



*Post-operative condition following myotomy*



*HybridKnife® is my favorite knife in endoscopic resection, such as ESD and POEM procedures for its efficient submucosal injection for creating the submucosal tunnel and accurate cutting and coagulation.*



**Prof. Ping-Hong Zhou**  
Head of Endoscopy Center  
Fudan University Zhongshan Hospital, Shanghai

# POEM with HybridKnife®



*Mucosa elevation with the HybridKnife®*



*Incision of the mucosa*



*Submucosal tunneling with the HybridKnife®*



*Myotomy with the HybridKnife®*



*Post-operative condition following myotomy*



*Thanks to HybridKnife®, I can significantly reduce the time taken for doing an endoscopic surgical procedure especially when there is fibrosis and hypervascularity. The credit goes to the all in one capability of this wonderful instrument.*

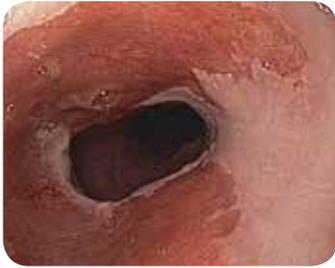


**Dr. Amit Prabhaka Maydeo**  
Baldota Institute of Digestive Sciences  
Global Hospital, Mumbai

# Ablation of Barrett's esophagus with HybridAPC

- 3 Manner H, May A, Kouti I, Pech O, Vieth M, Ell C. Efficacy and safety of Hybrid-APC for the ablation of Barrett's esophagus. *Surg Endosc*. 2015 Jun 24
- 4 Sturm C, Eickhoff A, Manner H. Hybrid-Argon-Plasmakoagulation zur Behandlung des Barrett-Ösophagus und mukosaler Schleimhautläsionen. *Der Gastroenterologe* 2015; 6: 322–32
- 5 Manner H, Neugebauer A, Scharpf M, Braun K, May A, Ell C, Fend F, Enderle MD. The tissue effect of argon-plasma coagulation with prior submucosal injection (Hybrid-APC) versus standard APC: a randomized ex-vivo study. *United European Gastroenterol J*. 2014 Oct; 2(5): 383–90
- 6 Manner H, Rabenstein T, Pech O, Braun K, May A, Pohl J, Behrens A, Vieth M, Ell C. Ablation of residual Barrett's epithelium after endoscopic resection: a randomized long-term follow-up study of argon plasma coagulation vs. surveillance (APE study). *Endoscopy*. 2014 Jan; 46(1): 6–12
- 7 Manner H, Kouti I, May A, Pech O, Behrens A, Vieth M, Ell C. Die neue Technik der Unterspritzungs-APC (i-APC) zur Ablation des Barrett-Ösophagus: Zwischenergebnisse der Pilotserie; *Z Gastroenterol* 2013; 51–K239
- 8 Rösch T, Manner H, May A, Knabe M, Schachschal G, Ehlken H, Neuhaus H, Beyna T, Bergman J, Weusten B, Pech O, Faiss S, Anders M, Ell C. Multicenter Feasibility Study of Combined Injection and Argon Plasma Coagulation (Hybrid-APC) in the Ablation Therapy of Neoplastic Barrett Esophagus (Abstract DDW 2017)

- ✔ HybridAPC can be used reliably and effectively for the therapy of Barrett's Esophagus<sup>3,8</sup>
- ✔ In over 90 % of Barrett's patients, complete macroscopic resection can be achieved<sup>3</sup>
- ✔ Histologically confirmed complete ablation could be achieved in over 90% of the patients<sup>8</sup>
- ✔ The risk of stricture formation can be as low as 2 % and is thus lower than with other ablation techniques<sup>3,4,8,7</sup>
- ✔ Thermal ablation of the mucosa without causing major damage to the musculature is possible with the HybridAPC<sup>5</sup>
- ✔ Thermal ablation of residual Barrett's with APC significantly reduces the relapse rate compared with endoscopic monitoring (3 % to 36.7 %) <sup>6</sup>
- ✔ HybridAPC improves ablation efficacy<sup>4</sup>
- ✔ On average, the following number of sessions is required for Barrett's ablation<sup>3,8</sup>:
  - Standard APC: 3.5 sessions
  - Barrx™: 3.2 sessions
  - HybridAPC: 2.5 sessions
- ✔ HybridAPC significantly reduces the side effects of APC application without elevation, for example, the stricture rate or post-operative pain<sup>4,8</sup>
- ✔ The method has the potential of being as good as the gold standard radiofrequency ablation<sup>8</sup>



*Esophagus with scar following EMR and long sectional, non-neoplastic Barrett's segment*



*Submucosal elevation*



*Target tissue after repeated APC application with HybridAPC*



*Complete lining of the former Barrett's region with neosquamous epithelium*



*HybridAPC  
No. 20150-015*



*With injection under the tissue and ablation with a probe, the HybridAPC allows me to perform fast and safe ablation of the Barrett's mucosa. Transitions to scars following EMR or ESD can be treated easily, controlled and effectively with this technique.*



**Prof. Mario Anders**  
Chief Physician Clinic for Internal Medicine  
Gastroenterology and Interdisciplinary Endoscopy  
Vivantes Wenckebach Clinic, Berlin

Erbe Elektromedizin GmbH  
Waldhoernlestrasse 17  
72072 Tuebingen  
Germany

Phone +49 7071 755-0  
Fax +49 7071 755-179  
info@erbe-med.com  
erbe-med.com