

## **How Endoscopic interventions replace Surgery?**

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Modern changes in flexible endoscopy have been mainly driven by an increasing variety of indications, new technologies and economics. The selection of diagnostic endoscopic methods depends on the clinical setting which includes screening, surveillance of risk conditions for neoplasia or evaluation of symptomatic patients. In therapeutic endoscopy progress has been made with regard to treatment of early GI neoplasia, benign and malignant gastrointestinal strictures, bleeding and management of even complex of pancreatobiliary diseases. Selected areas of research are endoscopic treatment of obesity, reflux disease, motility disorders and full-thickness resection, e.g. of submucosal tumors. Enormous improvement in endoscopic and endosonographic imaging has increased the accuracy of detection and characterization of mucosal lesions as well as local tumor staging. Targeted and minimally invasive techniques of tissue sampling facilitate the histological diagnosis. This progress allows to select patients for the most effective and safest endoscopic or surgical approach. Referral centers of endoscopy should provide advanced imaging and indication-based options of endoscopic access to sites of interest. These include e.g. video-capsules, ultraslim endoscopes, instruments for evaluation of the small bowel or specially designed therapeutic endoscopes. Endoscopes which allow triangulation for independent maneuvering of accessories are currently under evaluation. Their development as well as the introduction of new accessories like knives, clips, suturing machines, full thickness resection and devices, thermal devices and various implantable stents, sleeves or valves have been accelerated as spin-off technologies of NOTES (Natural Orifice Translumenal Endoscopic Surgery). These advanced techniques increase options of tissue resection and ablation, tissue apposition, bridging or closure of lumina or fistulae and creation of anastomoses. This progress could be only made by modern options of endoscopic management of procedure related complications. Advanced endoscopy has to be considered as a part of a multidisciplinary approach which should include particularly surgery, radiology, oncology and histopathology. Centers should offer appropriate training programs with the use of simulators, animal models and access to animal laboratories. New technologies have to be carefully evaluated preferably in controlled trials and registries are warranted for a variety of recently introduced methods. It is mandatory to improve the level of evidence in several areas of endoscopy. International cooperation is particularly important for evaluation of procedures with different experiences in centers of various countries.

In summary endoscopic screening procedures, early detection and characterization of early GI neoplasia will increase the number of cases which can be curatively treated with advanced endoluminal and transluminal endoscopic interventions. Endoscopic techniques will also play a

major role in treatment of motility disorders and metabolic diseases like obesity or diabetes type 2. Endoscopic interventions in the biliopancreatic tract increasingly allow a minimally invasive approach to a variety of diseases. This progress will partially replace conventional open surgery. It could offer alternatives to minimally invasive surgical techniques or there could be areas of competition or a combined approach. There is no doubt that the best patient care requires a close multidisciplinary collaboration with access to advanced endoscopic and minimally invasive techniques under careful evaluation and optimized teaching programs.