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Current Status of Digestive Endoscopic Electrosurgical therapy with Argon Plasma Coagulation (APC)
アルゴンプラズマ凝固装置を用いた消化器内視鏡手術の現状

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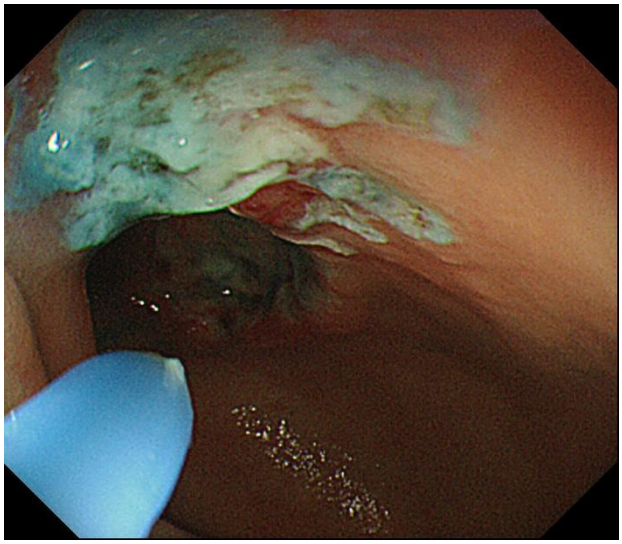
Electrosurgery is used in the majority of endoscopic therapeutic procedures. Various endoscopic devices have been developed following endoscopic development. Argon plasma coagulation (APC) is mainly used for coagulating superficial vascular lesions, such as sporadic angiodysplasias, gastric antral vascular ectasia (GAVE) and radiation proctitis. APC has been used for various situations such as ablation of residual polyp tissue after pieacemeal resection of large sessile polyps, pappilative ablation of tumors, in particular tissue ingrowth/ overgrowth of esophageal stent. Endoscopic ablation is discussed in the context of Barrett's esophagus with frequent reports in medical journals. Some reports have indicated that APC was effective in completely eradicating in 58%-100% of cases. Serious complications and less severe side effects have been reported. However, the effectiveness of APC for HDG in Barrett's esophagus is controversial. Further experiment and development are needed to establish endoscopic ablation therapy for HDG or early-stage malignancies.

Electrosurgery is used in the majority of endoscopic therapeutic procedures. Various endoscopic devices have been developed, following endoscopic development. Elctrosurgery is based on the transformation of energy from high frequency electric current into heat, with the resulting effect of cutting and/or coagulating tissue at the point of current application. As current passes through tissue, electrons collide with various tissue components. During these collisions, a certain amount of energy is dissipated depending on the nature of the material traversed and results in a rise in temperature. Electrosurgical waveforms are mainly divided two types depending on the tissue effects, which are coagulation and cutting. Coagulation means that temperature rises within cells, which then dehydrate and shrink. And cutting means that heating of cellular water occurs so rapidly that cell burst. In endoscopic therapy, the proportion of cells coagulated to those cut can be varied.

Argon plasma coagulation (APC) is a noncontact, monopolar, elactcoagulation technique that works by applying high frequency current to the tissues through ionized argon, an inert gas that requires to be ionized to conduct current. APC is particularly useful in treating large surface areas. Compared with contact methods of coagulation, APC provides a more homogeneous tissue effect and can treat large surface area rapidly. However, it may harbor a lower perforation risk because the penetration depth is limited to 1-3mm.

For clinical endoscopic therapy, APC is mainly used for coagulating superficial vascular lesions, such as sporadic angiodysplasias, gastric antral

vascular ectasia (GAVE) and radiation proctitis.



And also, APC has been used for various situations, ablation of residual polyp tissue after pieacemeal resection of large sessile polyps, pappilative ablation of tumors, in particular tissue ingrowth/ overgrowth of esophageal stent.

Recently, APC is also used for endoscopic ablation device. Ablation means removing abnormal growths or harmful substances by mechanical manners. Endoscopic ablation is discussed in the context of Barrett's esophagus with frequent reports in medical journals. Some reports have indicated that APC was effective in completely eradicating in 58%-100% of cases. Serious complications and less severe side effects have been reported. Perforation was reported in 0%-3.6% of cases. Other serious adverse events include stricture and major bleeding was reported in 0%-15%. At this time, routine ablation of nondysplastic Barrett's esophagus of APC is not recommended because of the relatively high incidence of complications, low rate of progression to cancer, and lack of long-term data on effectiveness of eradication in preventing cancer progression.

Ablation of high grade dysplasia (HGD) in Barrett's esophagus with APC has been studied, but the limited data can be available. So, it is difficult to recommend APC for routine care for HGD in Barrett's esophagus. Attwood SE et al. reported that Barrett's esophagus and HGD with a response in 25 of 29 patients (86%), and four patients developed cancer and repeated APC ablation. Practically, in the most cases of HDG patients, endoscopic mucosal resection (EMR) or endoscopic submucosal dissection (ESD) are carried out with electrosurgical high frequency electric current knives. ESD is new endoscopic technique, which enables en bloc resection. However, the technique of ESD is not yet standardized. So, endoscopists mainly rely on personal or reported experience thus far.

Endoscopic ablation therapy with APC is expected to be viable alternative to surgical dissection or EMR/ESD for dysplasia and early stage malignancies including HGD in Barrett's esophagus, especially in high risk patients. Further experiments and improvement are needed to establish endoscopic ablation therapy with APC.

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