

How to Use Electro Surgery during Digestive Endoscopy, Principles and Day-to-Day Practice, Balance Intensity-Duration is of Paramount Importance and must be Adjusted, According to the Aimed Destruction

Bernard Maroy*

Gastro BBMM, 2 Chemin de Frégeneuil, France

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Introduction

The recent Guidelines of ESGE [1] describe the present, common use of electrosurgery for endoscopy.

These concepts explain the high percentage of complication and failure of electro-surgery during digestive endoscopy.

Coming back to good conceptions can be very useful, especially for young, specialized, digestive endoscopists. As a matter of fact, understanding high frequency currents properties leads to choosing the adapted balance intensity-duration fitting each use to reach the highest probability of efficiency and the lowest of complications.

Basic Conceptions

Before recent hyper-specialization, endoscopists were used to perform also open surgery. So, they knew intuitively the basic rule: low “intensity” leads to a slow, deep coagulation. High intensity leads to a superficial carbonization. Duration was to be adjusted, according to the macroscopical effect.

In fact, high frequency currents physics [2,3] imply some characteristics.

First, “resistance” as regards high frequency current, is very different of that concerning continuous current and should be expressed as impedance and not as resistance. It should also be noticed that intensity is not the same, according to the location through cross section, current flowing preferentially in surface.

Desiccation induced by coagulation increases impedance, rerouting the current through non-coagulated path-ways, especially if applied by successive short bursts. It is an important point, especially as far as Hot Biopsy Forceps Polypectomy (HBFP) is concerned [3].

It is trivial for surgeons who operate on open wounds, that high intensity leads to bad coagulation of vessels, owing to too a superficial action of current, consequence of the steep increase of impedance, secondary to carbonization. On the contrary, good, deep, efficient coagulation necessitates lower setting and longer time, according to the thickness of grasped tissues [4,5].

Polyps- Sessile, HBFP

For polyps, the task is destruction of mucosa which is superficial, lacking large vessels and not of sub-mucosa, rich in arteries. Therefore, haemostasis is not a problem and recommending the lowest power setting possible is dangerous because this method is safe only if application time is short. Consecutive low total energy transfer to tissues explains the high percentage of failure for HBFP, together with single pulse.

On the contrary, if enough heat is transferred, low intensity implies

a longer application time and, therefore, a deep heating, explaining perforation and late bleeding, as well.

Safety is not always born of caution. In the present case, it is the contrary!

It must be also underlined that sucking-off colonic air increases wall thickness in all cases, all the more so sub-mucosa is elastic, like sub-cutaneous tissue of dog. It eases tenting, increasing the distance between HBF and muscularis propria and must avoid, therefore, any perforation. Tenting leads also to the appearance of a pseudo-pedicle concentrating the current and lessening the total output of energy delivered. As a matter of fact, despite approximately 40,000 HBFP, I failed to elicit any perforation since 1983 (no sucking off at that time). Delayed bleeding is limited to once every thousand HBFP of polyps, up to 15 mm. Efficiency is more difficult to assess. Approximately every hundred follow-up colonoscopy, I find a diminutive polyp on the scar of earlier HBFP. Only one interval cancer has been noticed. Therefore, efficiency seems to be good.

I use forced coagulation 80 w maxi, effect 4 or 80 w forced on ICC 200 during a total time, one second maximum, just enough to whiten the angulated junction between polyp and normal mucosa.

Polyps: snaring

Pedicated: As far as stalks are concerned, haemostasis is the task, avoiding burning the wall, as a secondary purpose. The risk lies in the central artery which must be coagulated before transection. Coagulation is to be adapted to diameter of the stalk (from 20 to 80 w, ICC 200) to obtain a relatively constant density of current.

Operator must tighten the snare himself, initially slightly to allow surface coagulation, heralded by whitening. If stalk is thin, it's enough. Current flows preferentially through the vessels because of lower impedance. In case of desiccation, mucosa retracts over sub-mucosa like the sheet of a rope over its core. Intense, pure cutting current overcomes then the high impedance.

If stalk is thicker, it is wise to tighten cautiously and relax abruptly the handle, as soon as cutting starts. Further coagulation without tension allows easy and safe coagulation of central artery before ending cut.

*Corresponding author: Bernard Maroy, Gastro BBMM, 2 Chemin de Frégeneuil F 16800, France, Tel: + (33)545940094; Fax: +(33)545942500; E-mail: bmaroy@yahoo.fr

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In case of a large and short pedicle, difficulty and risk are at the maximum. Endo-loop is rarely a solution because of slipping. Deep infiltration of pedicle with any necrotizing agent, like hypertonic saline, glucose or 90° alcohol allows thrombosis of central artery, heralded by the change of color of polyp's head, and a further, safe, quick section.

In case of a very large polyp, large contact with opposite wall lessens diffusion of current in pedicle and basis and allows macro-biopsy with strong tension of snare and 60 to 90 w, forced coagulation (ICC 200).

It is then easy to assess resectability, according to the base which becomes clearly visible.

If not, macro-biopsy confirms frequently cancer and justifies surgery. If it is resectable, it is possible to apply the above-mentioned method.

For intermediate polyps, traction elicits a thinner pseudo-pedicle, particularly easy and safe to cut or coagulate.

Sessile or flat: Finally, sessile and flat polyps can be quickly and easily resected by the "suck-and-cut" technique described by N Soehendra. Put a stiff snare over the polyp (if 20 mm or less to avoid trapping muscle), suck off air. Polyp climbs into the snare. Close it. Insufflate to check the quality of grasping. Suck-off. Tighten strongly the snare and cut with high intensity coagulation, as above. Section is clear-cut, without bleeding and perforation. However, warn patient to say immediately "Ouch" or anything else, in case of any pain.

As a matter of fact, pain means serosal heating and implies stopping immediately coagulation and tension on snare. Twice, it led to simple secondary "peritoneal heating". With the present method, I failed to have a single perforation among large polyps during 35 years. Late bleeding frequency is almost the same as with HBFP. The only case of significant immediate bleeding took place the first and last time I used "Endocut" for that purpose.

The same technic can be used for polypectomy or macro-biopsy in stomach. Duodenal polypectomy poses peculiar problems.

Automatism is like caterer: better than a bad cook but worse than a good one!

ERCP: However, "Endocut" is useful for biliary sphincterotomy. Bleeding is very rare and it does not increase pancreatitis frequency. In case of any bleeding, coagulation with the cutting wire at 60 w is efficient.

Cancer: Electro-surgical devices can also be used for destruction of cancers, rectal and, in selected cases, colonic. Task may be symptomatic like debulking or stopping bleeding or it may intent to be curative. This treatment needs a deep coagulation and, therefore, low intensity, according to ball's diameter [2-7]. It is adjusted to obtain progressive whitening, starting 1 cm around the tumor [4,6-8].

Heat diffusion ceases to be negligible as total energy delivery increases. It is dangerous for polyps destruction but useful for cancer destruction, as cancer's blood vessels fail to adapt to ease heat evacuation, contrary to normal tissues. So, heating helps selective destruction of cancer.

Radic proctitis: To treat radic proctitis [9,10], the task is the destruction of dilated vessels, sparing ischemic mucosa. Very low intensity, soft coagulation is to be selected, according to electrode's size, usually closed hot forceps. After adjusting intensity to obtain whitening in approximately 1s, the best method is to scan mucosal surface.

Scanning speed must be adjusted to be the lowest avoiding whitening. Efficiency is quick and durable, much better than formaline and much softer than argon-plasma coagulation. It avoids the destruction of the ischemic mucosa, which is especially important in case of ulceration.

Conclusion

It of paramount importance to understand the principles of electro-surgery and not to rely on poorly understood automatisms.

High-intensity together with low application time fits a superficial effect, like for HBFP.

Lower intensity fits a better coagulation of vessels, like for pedonculated polyps, according to stalk's diameter.

Low-intensity- long application time fits electrodestruction of cancers, owing to its effect in depth.

Very low intensity fits selective electro-coagulation of abnormal vessels for radic proctitis.

The high efficiency together with the very low percentage of complications over a 35year-long period provides strong evidence favoring the diffusion of these principles.

References

1. Rey JF, Beilenhoff U, Neumann CS, Dumonceau JM; European Society of Gastrointestinal Endoscopy (ESGE) (2010) European Society of Gastrointestinal Endoscopy (ESGE) guideline: the use of electrosurgical units. *Endoscopy* 42: 764-772.
2. Rey JF, Beilenhoff U, Neumann CS, Dumonceau JM; European Society of Gastrointestinal Endoscopy (ESGE) (2010) European Society of Gastrointestinal Endoscopy (ESGE) guideline: the use of electrosurgical units. *Endoscopy* 42: 764-772.
3. Morris ML, Tucker RD, Baron TH, Song LM (2009) Electrosurgery in gastrointestinal endoscopy: principles to practice. *Am J Gastroenterol* 104: 1563-1574.
4. Curtis LE (1973) High frequency currents in endoscopy: a review of principles and precautions. *Gastrointest Endosc* 20: 9-12.
5. Maroy B, Moullot Ph (2004) High intensity-low duration Hot biopsy forceps polypectomy: a safe method. *The Internet Journal of Surgery* 5.
6. Maroy B (2013) Electrosurgical hot biopsy forceps coagulation: more (intensity) is less (complications). *Endoscopy* 45: 680.
7. Maroy B, Moullot Ph, Bou G, Poirier A (1983) Electrocoagulation des cancers du rectum. *Symposium sur les Cancers du Rectum*. Paris 8 Mars.
8. Maroy B, Lebaillly J (2000) Endoscopic electrocoagulation of the digestive tract using a large-diameter ball screwed onto the flexible device before insertion of the scope. *Endoscopy* 32: S71.
9. Maroy B, Moullot P (1989) [Palliative electrocoagulation of stenosing cancer of the sigmoid colon]. *Gastroenterol Clin Biol* 13: 225-226.
10. Maroy B (1998) [Endoscopic treatment of refractory hemorrhagic and ulcerated radiation proctitis by a new electrocoagulation technique]. *Gastroenterol Clin Biol* 22: 556-557.
11. Maroy B (2008) Destroy the bleeding vessels and spare the ischemic mucosa. *Endoscopy* 40: 229.