

ADVANCES IN GERD

Current Developments in the Management of Acid-Related GI Disorders

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Radiofrequency Ablation for Barrett Esophagus With Dysplasia

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G&H How is radiofrequency ablation performed?

NS Radiofrequency ablation is a method of delivering thermal energy to the abnormal lining of the esophagus. In some respects, it is not very different from technologies that we have had available for years that essentially damaged the abnormal epithelium in the hope that normal epithelium would regenerate in its place. The unique component of radiofrequency ablation is the platform from which the thermal energy is delivered. The density of the energy and the uniformity of the dosage across the treatment area allow for much more reliable tissue damage without the stricturing seen with some other thermal methods.

G&H How effective is radiofrequency ablation for eradicating dysplastic Barrett esophagus and halting neoplastic progression in the short and long term?

NS The data suggest that radiofrequency ablation is highly effective at causing reversion of the abnormal tissue to neosquamous epithelium; in fact, multiple studies have demonstrated that 80% or more of patients return to normal squamous epithelium. Less research has been conducted regarding the halting of the progression to cancer with radiofrequency ablation. There was one randomized controlled trial that demonstrated that the progression to cancer was decreased quite markedly in patients who had undergone the procedure. Patients with dysplastic Barrett esophagus who were treated with radiofrequency ablation in that study had a risk of progression to cancer of 1.2%

compared to 9.3% in the control group at 1-year follow-up; this was essentially a decrease in cancer progression of 80–90%. However, it is important to note that the treated cohort was relatively small and that, although the result was statistically significant, it represented only a total of 5 cancers. More data are needed to completely understand if radiofrequency ablation is able to prevent cancer.

G&H What are the advantages and disadvantages of this procedure compared to traditionally used treatments?

NS Compared to the traditional treatment, which is surgical resection of the esophagus, radiofrequency ablation is certainly much less invasive. It also has a favorable side-effect profile in comparison to esophagectomy and can be performed as an outpatient procedure. Compared to esophagectomy, there are many advantages.

In terms of comparison to other ablative therapies, radiofrequency ablation appears to cause fewer strictures than photodynamic therapy, which had been previously used in patients with dysplastic Barrett esophagus. It is also easier to treat a larger area of Barrett esophagus with radiofrequency ablation compared to some of the earlier technologies, which required thermal contact with a small probe and thus took a long time to treat the entire area.

However, strictures are still seen with radiofrequency ablation, at a rate of 3–6%. Patients may rarely bleed from the procedure, and almost all patients who are treated experience some chest discomfort afterwards. There is also a theoretical risk of perforation of the esophagus; however, this risk is relatively low (certainly less than 1%).

G&H Does the grade of dysplasia or length of Barrett esophagus have an impact on the effectiveness of radiofrequency ablation?

NS These factors may have an impact. The data are not conclusive, but at least in some studies, it appears that it is easier to eradicate low-grade dysplasia than high-grade dysplasia. Additionally, the more Barrett esophagus there is to treat, the more sessions it may take for treatment and, potentially, the greater the likelihood of incomplete eradication of the Barrett esophagus.

G&H Is radiofrequency ablation usually used in combination with other therapies, or by itself?

NS All patients who undergo radiofrequency ablation take high-dose proton pump inhibitor therapy. Additionally, radiofrequency ablation is often used in conjunction with endoscopic mucosal resection. Nodular areas of the Barrett esophagus are removed with endoscopic mucosal resection prior to the use of radiofrequency ablation because the latter therapy involves a relatively superficial burn and it is difficult to try to treat nodules with a procedure that burns only superficially. After removing the nodules with endoscopic mucosal resection, the remaining area is treated with radiofrequency ablation.

G&H Is surveillance needed after successful ablation?

NS The need for surveillance is uncertain at this time because radiofrequency ablation is still a relatively new technology. Currently, our center and most centers in the country performing this procedure do utilize surveillance endoscopy after ablation. It remains to be seen whether surveillance endoscopy schedules can be either attenuated or eliminated entirely after ablation. As more data are collected on the history of patients after ablation, we will have a much clearer understanding of rates of progression and whether surveillance endoscopy is still worthwhile.

G&H Are there any significant complications or concerns when using this therapy?

NS As mentioned above, the majority of patients experience some discomfort afterwards. In the AIM-Dysplasia study, patients rated the discomfort on average as a 23 on a scale of 1–100 and reported that it improved after several days. Stricture is the most common of the more serious complications. As previously mentioned, stricture occurs in approximately 3–6% of patients and requires, on average, 2–3 dilations to open up. There are also risks of bleeding, infection, and perforation. However, in general, the technique is well tolerated and certainly has a favorable side-effect profile compared to alternative management strategies.

G&H How does radiofrequency ablation compare to other methods, in terms of cost-effectiveness?

NS Inadomi and colleagues conducted a cost-effectiveness analysis that was published last year in *Gastroenterology* examining the cost-effectiveness of multiple forms of ablation compared to endoscopic surveillance as well as esophagectomy. In general, radiofrequency ablation was very cost-effective for all grades of dysplasia and it compared quite favorably to intensive endoscopic surveillance.

G&H Is there a significant learning curve associated with radiofrequency ablation?

NS The learning curve has not been well described in the literature. We conducted a single-center study at the University of North Carolina to explore this issue. We found that as we performed more cases, the number of procedures that the patient had to undergo to achieve complete eradication of Barrett esophagus dropped from 4.3 to 2.3. Clearly, we were becoming better at performing the ablation as time went on. Fortunately, with regard to complications, we did not see the same pattern; we were able to perform the procedure safely from the time we started it. Thus, we did not see a learning curve with respect to the complication rate, though we did see one with respect to the number of sessions necessary to achieve complete ablation. However, the number of necessary cases is still not entirely clear. In the study, we analyzed our first 120 cases and the trend was still going down. As we collect more data, it may be possible for the number of treatments needed for complete eradication to go down further. I suspect that this will not be the case, as 2.3 treatments is a low number, but we do not know for sure.

With this technique, doctors who perform relatively low volumes (eg, 1 or 2 cases a month) will likely not develop the requisite expertise to obtain good outcomes. Nevertheless, I think that the technique can be mastered by doctors in private practice and community settings, as long as they have enough volume to keep themselves sharp.

G&H What are the next steps for research in this area?

NS One area of particular interest is the durability of the changes that are seen. It is good to show that we can eradicate Barrett esophagus and obtain neosquamous epithelium and obviously it is good to show that we can reduce cancer risk in the short term, but the long-term benefits of this procedure are still incompletely understood. Of course, only time will tell us the answer. Thus, it will be of great benefit to follow cohorts that we have ablated to see what happens to them in the long term and their ultimate risks of cancer.

Suggested Reading

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