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The efficacy and safety of a new radiofrequency ablation device for the treatment of Barrett's esophagus: a pilot study

Submission date
23/06/2017

Recruitment status
No longer recruiting

Registration date
23/06/2017

Overall study status
Completed

Last Edited
27/09/2018

Condition category
Digestive System

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
The oesophagus is the tube that connects the mouth to the stomach. Barrett's oesophagus is a condition where the cells of the oesophagus grow abnormally. Radiofrequency ablation (RFA) has proven to be an effective and safe technique for the treatment of Barrett's esophagus. During RFA a probe called an electrode is used to give an electrical current (radiofrequency) to the abnormal cells, which heats them up and destroys them (ablation). Currently, most patients first undergo ablation with a balloon-based electrode (the Barrx360 System), followed by additional ablation using a cap-based electrode (the Barrx90 System). The Barrx360 procedure starts with the introduction of a sizing balloon to measure the internal diameter of the oesophagus, because the ablation balloon comes in different sizes. The sizing balloon is used to take multiple measurements of the esophageal diameter and assists the endoscopist in choosing an ablation catheter with the appropriate diameter. The sizing balloon is then removed and the oesophagus can be treated with one of the five sizes of the ablation balloon. The standard treatment for Barrx360 procedures consists of two ablation runs with extensive cleaning of the ablation zone after the first ablation. The entire treatment procedure is time-consuming as it consists of many different steps and requires multiple introductions and removals of the endoscope, sizing catheters and ablation balloons which are impractical and uncomfortable to the patient. This could be simplified by incorporating the sizing balloon and the Barrx360 ablation balloon into a single device. The new Self Sizing RFA balloon catheter (360 Express RFA balloon catheter) consists of an electrode furled around a balloon. This single balloon catheter can adjust to the internal oesophageal diameter, making it possible to size and treat the oesophagus in a single step. The aim of this study is to assess the effectiveness and safety of the 360 Express RFA balloon catheter for the treatment of Barrett's esophagus.

Who can participate?
Patients aged 18 to 85 with Barrett's esophagus

What does the study involve?
All patients are treated using the 360 Express RFA balloon catheter. After 3 months, the effect of the procedure is evaluated by comparing endoscopic pictures taken before and after the

treatment. Complications related to the treatment and the duration of the procedure are evaluated as well. After 3 months, patients undergo additional treatment for their Barrett's esophagus every 3 months according to clinical guidelines. At the end of the entire treatment period the percentage of patients that achieve complete removal of all abnormal tissue and the percentage of patients who develop a stenosis (narrowing) at any point during the entire treatment period are analyzed.

What are the possible benefits and risks of participating?
The ablation procedure with the 360 Express RFA balloon catheter is less complicated because sizing of the internal diameter of the esophagus is not performed as done in the RFA procedures using the regular RFA System (Barrx 360 system). This shortens the procedure and fewer introductions of the gastroscope are needed. The self-sizing balloon has the same pressure and the same radiofrequency energy. No additional risks are expected for patients participating in the study more than patients undergoing the regular ablation.

Where is the study run from?
1. Academic Medical Center (Netherlands)
2. Sint Antonius Hospital (Netherlands)
3. Catharina Hospital (Netherlands)
4. Erasmus Medical Center (Netherlands)

When is the study starting and how long is it expected to run for?
June 2014 to December 2016

Who is the main contact?
Jacques Bergman

Contact information

Type(s)
Public

Contact name
Mrs Kamar Belghazi

Contact details
Meibergdreef 9
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Additional identifiers

Protocol serial number
NL49843.018.14

Study information

Scientific Title

The efficacy and safety of a single step sizing and radiofrequency ablation catheter for circumferential ablation of Barrett’s esophagus: a pilot study

Acronym
Self-Sizing RFA pilot study

Study objectives
The hypothesis is that by incorporating the sizing and ablation balloon into a single device, procedure time will be shortened without affecting the safety of the procedure. The efficacy of the procedure may be increased due to the improved adjustment of the ablation balloon catheter to the esophageal mucosa.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Medical Ethics Review Committee of the Academic Medical Center in Amsterdam, 24/09/2014, ref: NL49843.018.14

Primary study design
Interventional

Study design
Uncontrolled prospective multicenter pilot study

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Barrett's esophagus with biopsy-proven low-grade dysplasia, high-grade dysplasia or early cancer

Interventions
In all 30 patients that will be included in this study, the Barrett’s segment will be circumferentially treated using the 360 Express RFA balloon catheter.

RFA treatment
Study Device
Circumferential ablation is performed using the Barrx™ 360 Express RFA balloon catheter (GI solutions Covidien/Medtronic, Sunnyvale, CA, USA) (figure 1). The 360 Express consists of a 4 cm long bipolar electrode array that is wrapped around a balloon. The Barrx Flex energy generator delivers radiofrequency energy in a bipolar mode to the balloon device. After placement over a guide wire, the device is inflated under endoscopic control, to a set pressure via the Barrx Flex energy generator. As the balloon inflates, the electrode unwraps until the electrode contacts the esophageal wall (figure 1). Upon activation with a foot paddle, energy is delivered using the identical energy algorithms (12J/cm2, 40 W/cm2) as with the standard RFA Balloon Catheter, leading to controlled depth ablation of the Barrett’s epithelium. After the ablation is complete, the generator automatically deflates the device causing the electrode to rewrap to its pre-expanded diameter. The Barrx Flex energy generator and the 360 Express balloon have a CE mark for use in Europe.

RFA procedure
Procedures are performed under conscious sedation with midazolam and/or fentanyl or under monitored deep sedation with propofol. Prior to ablation, the esophagus will be inspected using white light high-resolution endoscopy (WLE) and narrow band imaging (NBI) to exclude presence of (residual) visible abnormalities and significant stenosis. The extent of columnar lined esophagus will be documented according to the Prague C&M classification and still images with WLE and NBI are taken at 1cm intervals. Then, a guide-wire will be introduced and the endoscope removed. The 360 Express balloon will be introduced, followed by the endoscope. Under endoscopic visualization, the balloon will be positioned at the proximal end of the Barrett' s segment. Under visual control the BE will be ablated (12 J/cm2) working from proximally to distally using visual repositioning. A small overlap (i.e. <1cm) between ablation zones is allowed. After the first ablation pass, the endoscope will be removed followed by removal of the ablation catheter. The coagulum will be cleaned off the balloon catheter. The endoscope is reintroduced to clean the ablation zone, by irrigation and scraping off coagulum using the rim of a distal attachment cap placed on the tip of the endoscope. Then, the guide-wire will be re-introduced, the endoscope removed and the ablation catheter and endoscope reintroduced to repeat ablation (12J/cm2).

After three months, the effect of the 360 Express procedure (regression percentage of the Barrett's tissue) will be evaluated by comparing endoscopic pictures that were taking from every centimeter of the Barrett's segment prior to the 360 Express treatment to the endoscopic pictures that were taking from every centimeter of the Barrett's segment after the 360 Express treatment. Complications related to the 360 Express treatment and the duration of the 360 Express procedure are evaluated as well. After three months, patients will undergo additional treatment for their Barrett's esophagus every 3 months according to clinical guidelines. At the end of the entire treatment period the percentage of patients that achieved complete removal of all Barrett's tissue and the percentage of patients who developed a stenosis at any point during the entire treatment period will be analyzed.

Intervention Type
Device

Primary outcome(s)
Percentage of endoscopically visual surface regression of BE epithelium at 3 months. The percentage of endoscopically visible surface regression of BE will be independently scored by two endoscopists who reviewed the endoscopic images that were taken from every cm of the original BE segment immediately prior to the initial circumferential RFA procedure and during the first post-treatment endoscopy at 3 months. The primary outcome is defined as the mean percentage of BE surface regression of the two endoscopists. In case the BE surface regression percentage differs ≥30% between both endoscopists, a new score will be established during a consensus meeting.

Key secondary outcome(s)
1. Duration of the 360 Express ablation procedure. The total procedure duration is defined as the time from the first introduction of the endoscope until the time of removal of the endoscope. The ablation time is defined as the period between the introduction of the 360 Express catheter and the removal of the 360 Express catheter.
2. Adverse events related to the 360 Express ablation procedure. Timing of complications is defined as 'acute' (during the procedure), 'early' (≤48 hours), or 'late' (>48 hours). Severity of complications is graded as 'mild' (unscheduled hospital admission, hospitalization <3 days, hemoglobin drop <3g/dL, no need for transfusion), 'moderate' (hospitalization 4–10 days, ≤4

units blood transfusion, need for repeat endoscopic intervention, radiological intervention), 'severe' (hospitalization >10 days, intensive care unit admission, need for surgery, >4 units blood transfusion; or in the case of stenosis >5 dilations, stent placement, or incision therapy), or 'fatal' (death attributable to procedure <30 days or longer with continuous hospitalization)
3. Rate of complete endoscopic and histological eradication of dysplasia (CE-D) and intestinal metaplasia (CE-IM) at the end of the treatment phase
4. Number of patients with a stenosis requiring dilation at any time during the treatment phase

Completion date
08/12/2016

Eligibility

Key inclusion criteria
1. Age 18 to 85 years
2. BE segment between 2 and 10 cm at baseline, prior to any ER
3. Biopsy proven LGD, HGD or cancer confirmed by an expert pathologist
4. in case of prior ER for early cancer or visible lesions, the resection had to be limited to <2 cm in length and <50 % of the circumference
5 Written informed consent

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 Years

Sex
All

Key exclusion criteria
1. Prior endoscopic ablation treatment
2. Significant esophageal stenosis preventing passage of a diagnostic endoscope or any prior endoscopic dilatation for esophageal stenosis
3. In case of prior ER: positive vertical resection margins, deep submucosal invasion (>T1sm1), poorly or undifferentiated cancer (G3-G4), or lymphatic/vascular invasion
4. In case of prior ER: no invasive cancer in any of the biopsies obtained from residual BE
5. An interval of > 6 months between the last high-resolution endoscopy with biopsies and the RFA treatment, or an interval < 6 weeks between ER and RFA
6. Contra-indications for RFA treatment (e.g. anti-coagulant therapy (apart from aspirin or NSAID) that could not be discontinued prior to RFA, esophageal varices)

Date of first enrolment
28/09/2014

Date of final enrolment
02/12/2014

Locations

Countries of recruitment
Netherlands

Study participating centre
Academic Medical Center
Amsterdan
Netherlands
1105 AZ

Study participating centre
Sint Antonius Hospital
Nieuwegein
Netherlands
3435 CM

Study participating centre
Catharina Hospital
Eindhoven
Netherlands
5623 EJ

Study participating centre
Erasmus Medical Center
Rotterdam
Netherlands
3015 CE

Sponsor information

Organisation
GI solutions, a subsidiary of Covidien, Inc. (Formerly BARRX Medical, Inc.)

ROR
https://ror.org/00grd1h17

Funder(s)

Funder type
Industry

Funder Name
Covidien/Medtronic, Inc. (USA)

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study are/will be available upon request from Dr Kamar Belghazi.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/08/2018		Yes	No