Title

Radiofrequency ablation for haemorrhoidal disease: description of technique

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Conflict of interest

Modern Aesthetic Solutions Ltd (Registered Office: 39 Steeple Close, Poole, Dorset BH17 9B) has provided the Rafaelo® radio frequency device as a loan for 5 years to the University College

London Hospital and funded the cost of Rafaelo® specific equipment for the initial 10 patients who underwent radiofrequency ablation of haemorrhoids. Furthermore, Modern Aesthetic Solution Ltd continues to sponsor a biannual live link course at University College London Hospital to teach radiofrequency ablation for haemorrhoids to other surgeons.

Video publication

Haemorrhoidal disease (HD) results from the displacement of anorectal vascular cushions. The main symptoms are per-rectal (PR) bleeding, pain, pruritus and discharge. The current treatment aims to alleviate symptoms and restore normal anorectal anatomy. Surgical treatment options are tailored to suite the degree of haemorrhoids and the severity of the symptoms. Less invasive treatments akin to rubber band ligation (RBL) are more desirable due to less pain and early return to normal activities. The evidence suggest that RBL is as effective as haemorrhoidectomy for second-degree haemorrhoids.[1] However, for third degree haemorrhoids, more invasive techniques, such as Milligan Morgan haemorrhoidectomy was more effective.[2] Previous reports showed that radiofrequency ablation (RFA) for haemorrhoids is associated with less pain and earlier return to normal activities when compared to RBL.[3]

RFA is characterised by low heat ($120^{O}C$) generation, which makes thermal injury to the anal sphincters less. The technique is suitable as a treatment modality for grades I to IV haemorrhoids. However, consideration for repeated RFA in patients with large haemorrhoidal tissue might be required. In our practice, we preformed this under heavy sedation. We did not offer the RFA treatment to patients during pregnancy; those who have a pacemaker; and patients suffering from perianal Crohn's disease and ulcerative colitis (proctitis). In addition to the standard examination under the anaesthetic kit, we use the following equipment: HPR45i

probe (Fcaresystems, Antwerpen, Belgium), designed specifically for the procedure; proctoscope with a window to expose the haemorrhoidal tissue; Eisenhammer retractor; Emmett forceps; local anaesthetic (10 millilitres of bupivacaine hydrochloride 0.5% solution); sterile saline; two spinal needles; and tonsil swabs soaked in cold water. The Rafaelo® EVRF machine (Fcaresystems, Antwerpen, Belgium) is used to generate the energy required. It is attached to two wires at the front: one is for the HPR45i probe and the other is for the foot paddle which activates and controls the delivery of heat. The machine is placed on the left-hand side of the patient, who is in a lithotomy position with the operating table on a slight head down.

For the procedure, 10 millilitres of bupivacaine hydrochloride 0.5% is infiltrated as perianal block at 3 and 9 o'clock positions of the anal canal. A standard EUA of the anorectum with an Eisenhammer retractor is performed to assess the pathology. The proctoscope is then inserted in the anal canal, the inner tube removed, leaving the outer tube with a window exposing the haemorrhoidal tissue above the dentate line. Using a syringe and a spinal needle we inject 1-2 millilitres of saline in the submucosa to create a liquid layer between the haemorrhoidal tissue and the underlying anal sphincter muscles. This step aims to prevent heat transfer to the sphincter muscles. We then inserte the HPR45i probe into the haemorrhoid and lifte it away from the muscle. As the foot paddle is pressed continuous RFA energy is applied to the haemorrhoidal tissue. A peeping noise is heard when the paddle is activated. We stop pressing the paddle when whitish discoloration of the target tissue is observed and the sensation of contracts around the probe is felt. The recommended Jules per location is 1200 to 3000 Jules. This may need to be repeated up to 3 times in different locations depending on the size of the haemorrhoid. The tip of the probe is used as a coagulation instrument in case of bleeding, in order to achieve haemostasis. The whitish discoloration of the tissue is an indicator that the

coagulation has been effective. A small swab soaked in cold water is immediately applied on the tissue to cool the heat down and prevent any damage to the underlying muscle. Fibrosis is expected to occur in the area in the following 2 weeks. The proctoscop is then removed and re-inserted with the inner tube insitu to repeat the procedure for any other haemorrhoidal tissue.

It is necessary to leave sufficient mucosal bridges between the targeted areas of treatment to avoid anal stenosis. Coagulation of tissues at the level of the anoderm should be avoided, as this can cause severe pain after the procedure and is more likely to cause damage to the anal sphincter muscles. The treatment should be performed approximately 0.5-1 cm above the dentate line to minimise pain, and damage to anal sphincters, keeping in mind that the internal anal sphincter muscle extends above the dentate line. Therefore, steps described above including infiltration of saline or local anaesthetic in the submucosa and cooling down the tissue with cold saline soaked gauze are highly recommended. If the patient's main symptom is displacement of anorectal mucosa, other treatment modality, such as excisional haemorrhoidectomy should be considered as an alternative option. We feel that the RFA treatment trial should not prevent further treatment with other means, such as excisional or stapled haemorrhoidectomy. On the other hand, patient who had unsuccessful treatment of HD in the past should not be denied RFA.

We found the procedure technically feasible and easy to perform and teach to other surgeons. Once confidence in performing the procedure is achieved, we see no reason why not to perform the RFA under local anaesthetic in the clinic setting, akin to rubber band ligation. Alternatively, RFA could also be performed in the endoscopy department with the patient in foetal position. Our experience so far has been positive and encouraging.

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