

**Values of clinical application of Doppler-guided hemorrhoid artery ligation (DG—HAL) in treatment of hemorrhoids(a report of 40 cases).**

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**Abstract** The objective of this article was to evaluate the efficacy of procedure for Doppler-guided hemorrhoid artery ligation (DG—HAL) in treatment of hemorrhoids. The 40 patients with the symptomatic hemorrhoids underwent a DG—HAL. The mean operation time was 26.5minutes and postoperative hospital stay was 1.15 days; the time of returning to work was 2.15 days and 94.2% of patients were satisfied with the results. There were no recurrence , and no faecal incontinence after short-up(2weeks-3months). Results show that DG—HAL for symptomatic hemorrhoids is a safe procedure with good results, low complications ,shorter hospital stay and earlier recovery. Doppler-guided hemorrhoid artery ligation seems to be ideal for 1-day surgery, and it fulfills the requirements of minimally invasive surgery. But long-term effect is to be investigated.

Key words: hemorrhoids, Doppler-guided hemorrhoid artery ligation, operation

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**Abstract** The objective of this article was to evaluate the efficacy of procedure for Doppler-guided hemorrhoid artery ligation (DG—HAL) in treatment of hemorrhoids. The 30 patients with the symptomatic hemorrhoids underwent a DG—HAL. The mean operation time was 26.5minutes and postoperative hospital stay was 1.15 days; the time of returning to work was 2.15 days and 94.2% of patients were satisfied with the results. There were no recurrence , and no faecal incontinence after short-up(2weeks-3months). Results show that DG—HAL for symptomatic hemorrhoids is a safe procedure with good results, low complications ,shorter hospital stay and earlier recovery. Doppler-guided hemorrhoid artery ligation seems to be ideal for 1-day surgery, and it fulfills the requirements of minimally invasive surgery. But long-term effect is to be investigated.

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The treatment of hemorrhoids has undergone significant changes in recent years both in theory and in method along with the progressing knowledge of the nature and mechanism of hemorrhoids. The Colon and Rectal Surgery Committee of the Chinese Society of Surgery under the Chinese Medical Association<sup>[1]</sup> has given the definition of hemorrhoids a new phrasing in the April of 2000, that is, hemorrhoids are local masses formed by pathologic hypertrophy or migration of the anal cushions, or stasis of the blood stream in the subcutaneous blood vessels around the anus, and the aim of the treatment is to alleviate and eliminate major symptoms and to protect the physiological functions of anus in utmost. New methods treating hemorrhoids according to this conception have been come into forth constantly. From the June of 2005, 40 patients with various kinds of hemorrhoids have been treated by Doppler-guided hemorrhoid artery ligation (DG—HAL) in General Hospital of PLA, China, as described below.

#### 1 Data and Methods

1.1 Clinical Data The investigation was made on 40 cases of symptomatic hemorrhoids (in which 27 cases were male, 13 cases were female, in the age of 19-62 years old, with the mean age of 32.7 years). Detailed medical history inquiries, clinical examinations, and anoscopy used for diagnosing and staging of the disease were carried on each patient. They were graded according the *Interim Standard of Hemorrhoids Diagnosis and Treatment* set by The Colon and Rectal Surgery Committee of the Chinese Society of Surgery under the Chinese Medical Association in 2000. There were 6 patients in first degree, 15 patients in second degree, 15 patients in third degree, and 4 patients in fourth degree. There were 11 patients accompanying with anal fissure, 6 patients with acute thrombus, 2 patients with perianal eczema, 3 patients with rectal inflammatory polyp. The manifestations before the operation: hemorrhage in 26 patients, pain in 23 patients, prolapse of anal lumps in 19 patients (some patients had more than one manifestations).

1.2 Treating Methods The epidural-sacral anesthesia was used in 25 patients during the operation, and local anesthesia was used in 15 patients, wherein local infiltration anesthesia in 8 patients, and mucosal surface anesthesia in 12 patients.

The method of DG-HAL was adopted (the devices were supplied by MDA company). The operation was carried under left recumbent position. Doppler ultrasonic anoscope was placed into the rectum, with the Doppler ultrasonic probe located 2 to 3 cm above the dentate line. Rotate the whole instrument along with the rectum to look for the artery needed. The 2-0 absorbable sutures and the firm 1/2 curved needles were used to carry “8” like suture above the Doppler ultrasonic probe where the Doppler ultrasonic signals received. After the first session of suture, the anoscope was withdrew 0.5 cm back, and a second session of suture was carried to insure the accuracy of the operation. We should implement new suture whenever a artery ultrasonic wave was received, however, we should also try our best to leave at least 1 cm of distance from the dentate line. After the second session of suture has been completed, the Doppler ultrasonic anoscope was exited, and the location of the suture was examined using finger.

Generally, the observation should be that the volume of the external hemorrhoids has shrunk significantly, and the internal hemorrhoids has retracted into the anus. To external hemorrhoids patients with acute thrombus, haemostatic forceps were used to lift the top of the external hemorrhoids, a small “V” like incision was made, the thrombus was stripped, and scissors were used to prune the skins on both sides of the incision, in attention to achieve linear occlusion of the wound. For the patients accompanying with anal fissure, methylene blue solution was local injected. Rectal polyps were removed after suture and ligation. Oil gauze was placed in the trauma

after the operation, covered with sterile dressings, and fixed with adhesive tape.

1.3 Results All the major symptoms of patients have been ameliorated after the operation. We used analgesics on need during the post-operation stage. There were only 3 patients who had used analgesics for once during the immediate day after the operation, and no analgesic was used after that. No analgesic was used in all the other patients. Oral antibiotic was routinely used for 3 days. No side effect (for example, fever, urine retention, and nausea) was found in any of the patient. When the patients felt that their situation has restored enough to leave the hospital, they were prescribed discharge the hospital. The mean postoperative hospital stay was 1.15 days (among which 4 patients were out-patient operated). The mean time of returning to work was 2.15 days. 94.2% of patients were satisfied with the results.

2 weeks to 3 months of follow up showed that there were no stenosis of anal canal, faecal incontinence and other defecation problems. 6 weeks after the operation, we evaluated the follow up results by the occurrence of pre-operation manifestation and the recurrence of hemorrhoids prolapse. Symptoms disappeared in 36 cases. In 2 patients, minor hemorrhage still existed 3 days after the operation, but disappeared after external suppository was used. Perianal thrombotic hemorrhoids formed 2 weeks after the operation in one patient, but cured after conservative treatment. Another patient presented second prolapse hemorrhoids in some direction (significant smaller than pre-operational size), and no further treatment was given.

## 2. Discussions

The theory of downward displacement of anal cushions was proposed by Thomson in 1975, and has been accepted by people gradually. The opinion of surgery treatment of hemorrhoids tended towards consensus since then. Asymptomatic hemorrhoids need no therapy. The aim of the treatment of symptomatic hemorrhoids is to alleviate and eliminate symptoms, correct the pathological and physiological changes, rather than radical cure of the pathological anal cushions. Doppler-guided hemorrhoid artery ligation (DG—HAL) engendered right under the idea of painless and minimally invasive surgery.

The mechanisms of DG-HAL can be explained in following facets: (1) After the artery is ligated, blood entering the internal hemorrhoids is blocked, therefore the inflow/outflow ratio decreases. Hence the hemorrhoids will fall off, and hemorrhage and pain will disappear. (2) Connective tissues will regenerate going with the decline of the tension, which promotes the shrink of the hemorrhoids, and leads to the final drop of the hemorrhoids. (3) After the ligation, local chronic inflammation induced will produce fibrosis of the tissues, which renders adhesion and fixation of the mucous membrane and submucous layer, thus hemorrhoids will shrink and disappear, and leads to the final significant reduce of the hemorrhoids prolapse. This whole process supports the “hypertensive anal cushions” theory<sup>[3]</sup> <sup>[4]</sup>. (4) After the ligation, the suspension and reposition effect on the prolapsed anal cushions still exists, the ligation location is high, and most anal cushions are preserved, thus post-operational reactions are significantly reduced.

The results of our data show that DG—HAL has superiorities such as simple maneuvering, rapid duration, shorter hospital stay, minor post-operative pain and earlier recovery et cetera. The trauma brought by this operation is very small. It can be carried under local anesthesia even surface anesthesia, which further reduced the possible post-operation side effects and post-operation hospital stay<sup>[5]</sup> <sup>[6]</sup>. Attila Bursics and his colleagues<sup>[7]</sup> reported in 2004 that no difference existed in the results after 1 year follow up of DG-HAL and of conventional closed

hemorrhoids scissors excision, while its shorter hospital stay, lower complications occurrence, and minor post-operation pain make it more alluring for 1-day surgery, and it fulfills also the requirements of minimally invasive surgery.

According to our experience, following points should be noticed during the operation: (1) Suture should be done 1 to 3 cm above the dentate line. Insufficient suspension of the anal cushions and incomplete shrink of the hemorrhoids will be produced by too large of this distance, while anal cushions can be damaged, pain may present with too near of the distance. (2) The suture depth should be submucous layer and muscular layer. If the suture is too shallow, insufficient ligation and inadequate anal cushions suspension should be produced, therefore hemorrhage and hemorrhoids protrusion will still exist. If the suture is too deep, sphincter can be harmed to engender spastic pain, and even great vessels may be injured to induce hemorrhage. (3) Stitch space should not be too wide, otherwise mucous membrane might be prone to form agulation and pileup, which carries the risk of inflammation. (4) When the prolapse is too heavy, double “8” like suture can be used. The suspension effect will be better through this method. From the short-term effect view, we think that DG—HAL can be adopted in symptomatic hemorrhoids, which is a safe procedure with good results. However, long-term effect is still needed to be investigated for the short-term observation.

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