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## RESEARCH ARTICLE

### MICROSURGERY FOR VARICOSE VEINS USING VARADY HOOK TECHNIQUE.

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#### Abstract

The classical high ligation and saphenous vein stripping requires hospitalization. General anaesthesia, long convalescence, loss of income, unacceptable scarring and possible permanent nerve injury. This report describes the technique of invaginated axial stripping in conjunction with tributary stab avulsion (Varadyhook) phlebectomy. Using femoral block anaesthesia with supplemented local infiltration or spinal anaesthesia. the varicose tributaries are avulsed, through multiple stab incisions only 1.5-3 mm long, with specially designed hooks. This is performed in an ambulatory (office) setting, making varicose vein surgery a minimally invasive procedure. One hundred and sixty eight patients with 203 involved limbs were operated on during a two years period. Postoperative pain and complications were minimal. All patients immediately resumed normal daily activities. Cosmeses were excellent. There have been no recurrences in up to 2 years follow up. This procedure adheres to strict hemodynamic principles. Elimination of hospitalization, reduced postoperative morbidity, immediate ambulation, minimal nerve damage, excellent cosmeses and finally, obvious cost efficiency should make this form of varicose vein surgery appealing to surgeons and patients alike by making the future surgical care for varicose veins available today.

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#### Patients and methods:-

One hundred and sixty-eight patients with primary varicose veins with a total of 203 limbs were seen in Fallujah Teaching hospital between April 2012 and December 2014. All patients were evaluated by physical examination and non-invasive continuous wave (cw) Doppler ultrasound venous studies. Of these patients 147 (87.5%) were female and 21 (12.5%) were male; 119 (70.8 %) were less than 50 years old, 49 (29.2%) were 50 years or older; 133 (79.2%) had unilateral and 35 (20.8%) bilateral involvement; 95 (46.8 %) were right, and 108 (53.2 %) were left legs for a total of 203 involved limbs. From those 23 (10%) patients needs sclerotherapy that had been done at time of surgery.

#### Three major groups of varicosities were identified:-

Group I. 125 (61.6%) legs had varicose veins in the territorial distribution of the long saphenous vein. A saphenofemoral junctional (SFJ) escape was found in 120 (59%) limbs. It was associated with concomitant saphenous trunk incompetence exhibiting various degrees of reflux in only 80 (39 %)limbs. In 30 (15 %) limbs the main saphenous trunk was found normal and competent with varicosities limited to the medial and lateral accessory

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veins. Non- junctional escape points were detected in the remaining 52 (26 %) limbs.

Group II .20 (9.9 %) legs had short saphenous varicosities and saphenopopliteal junction (SPJ) incompetence was found in all of them.

Group III. 58 (28.6 %) legs had nonsaphenous varicosities. The varicose veins were mainly limited to the lateral thigh venous system.

#### **Preoperative assessment:-**

A careful preoperative examination was mandatory in order to tailor the procedure appropriately to the hemodynamic pathology of each patient. The clinical examination alone (observation, percussion wave, Trendelenburg test, etc.) may not accurately identify all the components of the regurgitated circuit<sup>3</sup>. Therefore, a continuous wave (cw) bidirectional Doppler ultrasound examination performed with the patient standing, is mandatory in all cases to detect venous flow, pathway of incompetence and the most proximal escape point accurately. Duplex imaging (Biosound Phase 2, Biosound, Indianapolis, IN) was only used in cases in which it was believed that the clinical and Doppler examination failed to provide the required information. It was also used for mapping the long saphenous vein in cases where stripping was contemplated. The detailed clinical and noninvasive examination protocol has been published elsewhere<sup>2,4</sup>

#### **The Technique:-**

##### **Special instrumentation: -**

The operation is designed to be performed in an ambulatory or office setting, to cause minimal trauma, little or no convalescence, and result in maximal cosmeses. Specially devised hooks in different sizes have been introduced by different practitioners such as ( Varady )Muller. These hooks permit removal (avulsion) of varicosities via minute incisions, not longer than 1.5-3 mm, which do not require sutures. The surgical tray should also have the 'mini strippers' introduced by Varadyphlebotomist(s), straight and curved baby Kocher's or Halsted's to assist in grasping the veins, and regular mosquito forceps. And numbing solution that contains 500 ml normal saline, adrenaline one ampule, lidocaine 2% 20 ml and sodium bicarbonate 20 ml all mixed and injected around the vein for easy dissection and to decrease the ecchymosis after avulsion.

##### **Preoperative marking:-**

With the patient standing in a warm room all veins are marked with a permanent marker. A successful procedure demands precise and accurate marking; therefore the operating surgeon should do it in person. The most proximal escape point is revalidated with Doppler ultra- sound and marked too. If stripping is contemplated, duplex mapping of the long saphenous vein is helpful to mark the entry sites of its tributaries precisely.

##### **Varady Hook phlebectomy:-**

Due to their superficial location, i.e. just below the skin and above the membranous fascia, tributary varicose veins are easily amenable to avulsion by hook phlebo-extraction. With an 11 blade tip held in a Kelly or a mosquito forceps, or even with an 18 or 16 gauge needle, a small 1-3 mm long stab (puncture) wound is made along the border of the previously marked varicosities, making sure that the dermis is split as well. Due to the small openings, no special effort is made to stay in the Langer's lines. Whenever possible, however, the skin incisions should be made along the longitudinal axis of the leg. The exception is the area surrounding the knee where the stab wound should be placed transversally parallel to Langer's lines.

Patients leave the office 30-45 min after the procedure.in case of regional anesthesia and after 4 hours in case of spinal anesthesia. Post-surgical discomfort is usually minimal and 1-2 tablets of 500 mg panadol suffice for pain control in the evening after surgery. No leave of absence from work is necessary. All patients are permitted to resume normal daily activities, including returning to work, on the same day of the surgery. Patients are permitted to resume all sporting activities as well, except heavy exercise , on the first post operative day. Showering is permitted 24 h after surgery with proper leg coverage. Obligatory follow-up visits are at 1week, 2-3 weeks and 2-3 months after surgery.

##### **Complications:-**

Transient neurologic complications from the loco- regional anaesthesia can occur. Motor fibers of superficial mixed nerves (femoral, peroneal) may be affected, especially when higher concentrations of anesthetic are used. After femoral block anaesthesia, the tone and strength of the ipsilateral quadriceps muscle should be checked before the

patient is asked to stand up. Nerve palsies are invariably transient, clearing within several hours. Permanent nerve damage can occur only if a nerve is inadvertently hooked and avulsed.

Bleeding from the wound sites might occur. This is likely to manifest itself immediately following surgery when the patient stands up. As a precaution, patients are asked to walk in the office 1&15 min after surgery and are re-examined before leaving. If bleeding does occur, it can be readily controlled by additional pressure with reinforcement of the pressure dressing.

A phlebotic reaction may occur days or weeks after surgery and is due to a retained and clotted vein that was partially avulsed or missed. Incision and drainage of a fresh clot, local compression, 1200 mg ibuprofen (Motrin) qd for 3-5 days, will resolve the symptoms.

Lymphatic accumulations (lymphocele) or fistulas, wound infection, hypertrophic scarring, have been reported.

#### **Relative contraindications:-**

Veins encased in dense fibrotic tissue or previous scar may be difficult to avulse. These include varicose veins in the gaiter or ankle area with liposclerotic skin, post sclerotherapy veins, post surgery residual veins, post phlebotic veins, as well as prepatellar and pretibial veins that may be closely attached to the fascia. In these cases, compressive sclerotherapy may be indicated.

#### **Results:-**

All 203 varicose limbs were operated on in an office setting and under loco regional anaesthesia or spinal anaesthesia as described.

106 patients ( 63%) of patients operated under local anaesthesia or femoral regional block while 62 patients (37%) requires spinal anaesthesia .

Neurologic complications were detected in three patients. In form of transient nerve palsies as a result of the loco-regional anaesthesia. In one patient quadriceps palsy occurred after a femoral 3-in-1 block. All symptoms resolved within 1-2 days.

Five patients develop bleeding when they stand after operation and all of them treated by enhance pressure overdressing.

Localized superficial phlebitis occurred in 4 patients, 1-2 weeks following surgery, and presumably caused by a clotted vein segment left in situ. The reaction resolved within 5-7 days following therapy with ibuprofen (Motrin) 80&1200 mg day, compression, and continued ambulation. Seven patients had residual varicose veins which were obvious 1-2 weeks following surgery. Three patients with larger varicose segments had avulsion under local anaesthesia when they were detected. Four patients with smaller residual varicosities were treated by compressive sclerotherapy, with total obliteration.

No patient developed lymphatic collection or lymphocele. Prophylactic antibiotics were used for one day, and there were no wound infections. No deep phlebitis or pulmonary emboli was encountered. As of yet there have been no recurrent varicose veins identified.

#### **Discussion:-**

Since the beginning of the century, stripping of the long (and short) saphenous vein has been widely used in the surgical management of primary varicose veins. Keller<sup>14</sup>, Babcock and Mayo<sup>1</sup> are among the early pioneers. The techniques used subsequently can be summarized by the following four steps: (a) division of the saphenous vein and ligation of the junction(s); (b) stripping (internal) of the entire saphenous vein; (c) excision and ligation of the varicose tributaries and (d) division and ligation of all incompetent perforators.

Unfortunately, the rationale for this procedure, even today, is based on the assumption that all varicose vein patients have a junctional valve escape, i.e. saphenofemoral (SFJ) or saphenopopliteal (SPJ) incompetence, and that the entire saphenous vein trunk is incompetent. This makes high ligation and routine ankle-to-groin (or to the popliteal fossa) stripping mandatory for all forms of truncal varicosities. However, the recently accumulated hemodynamic and topographic data on varicose veins clearly contradict most of these assumptions<sup>4,10,11</sup>

Bjoridal' clearly demonstrated that haemodynamically significant distal perforator systolic (deep-to-superficial) outflow is nonexistent in uncomplicated primary varicose veins, making the search and the wholesale ligation of perforators a futile surgical exercise in varicose vein surgery. Moreover, the distal ankle perforators connect with the posterior arch vein, which is a tributary, rather than with the infrapopliteal segment of the main saphenous vein. Avulsion of the varicose tributaries in the calf will, therefore, automatically disconnect any outflowing distal perforator. Additionally, the infrapopliteal segment nerve injury to the long saphenous or sural nerve. Of the saphenous vein, in many instances, was not The selective high ligation and invaginated axial strip-found to be involved in the variceal processes.

his relatively new topographic and haemodynamic data, coupled with the quests for maximal preservation of the main saphenous trunk as possible vascular graft material, make the classical routine and blind ankle-to-groin stripping 'overkill'. The limited groin-to-knee stripping that we usually perform is haemodynamically satisfactory in most forms of primary varicose disease". The detailed haemodynamic principles of surgical care for primary varicose veins have been the subject of previous communications<sup>2-4,19</sup>.

The principles of stab avulsion were independently introduced by Muller<sup>20,21</sup> and Rivlin<sup>9</sup>. Muller coined the term 'phlebectomie ambulatoire' or ambulatory phlebectomy and Rivlin named the procedure 'multiple cosmetic phlebectomy'. Both used small existing or makeshift instruments to grab and avulse the varicosities through small skin openings. While Muller was the first to introduce his modified crochet hooks that facilitated the removal of the varicosities through even smaller (1.5-3 mm) incisions, it was Rivlin, in 1975, who reported an excellent 10 year recurrence rate of 7% in 1993 operated varicose limbs. Oesch<sup>22, 23</sup> ('mini-incision phlebectomy') and Varady<sup>24,25</sup> ('micro-surgical varicectomy or phlebextraction'), designed different hooks. Large<sup>26,27</sup> in 1985 coined the term 'stab avulsion venectomy'. Thus the 'ambulatory stab avulsion phlebectomy' is a combination of already existing terminology that seems to us to correctly reflect the true character of the procedure.

In the face of recently published evidence that sclerotherapy, in any of its forms, is not a definitive therapeutic alternative for truncal varicose veins due to the high recurrence rates<sup>28-31</sup>, surgery remains the treatment of choice for primary varicose veins. The invaginated form of stripping in conjunction with tributary stab avulsion (hook) phlebextraction does not necessitate any haemodynamic compromise. On the contrary, it is a haemodynamically correct procedure, provided the preoperative examination is judiciously executed. Using loco-regional (femoral 3-in-1 block) anaesthesia and performed in an ambulatory (office) setting, the method has placed varicose vein surgery in the realms of minimally-invasive procedures.

Elimination of hospitalization, reduced postoperative morbidity, immediate ambulation, lack of nerve damage, excellent cosmeses and finally, obvious cost efficiency should make this unique form of varicose vein surgery appealing to surgeons and patients alike.

### **Summary:-**

The treatment of varicose vein become much easier and having better results and cost effective with the use of Varady hook technique especially cosmetically speaking. In comparison with old traditional blind ligation and stripping that was associated with longer hospitalization, general anesthesia, long convalescence, loss of income, unacceptable scars and sural nerve injury.

The selective hook method sounds haemodynamically sound procedure as accurate Doppler mapping always precedes it. Postoperative pain is minimal. Convalescence is short and rapidly patients restore their daily activities. It is cost effective with excellent cosmeses. From above it is highly recommended for hook surgery to replace traditional varicose stripping.

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