Chronic Venous Ulcers An End Of Long Term Suffering
R Hussein

Citation

Abstract
Chronic venous leg ulcers still represent a problem for an increasingly number of population. Many of patients usually undergo several operations without remarkable improvement over a long time. Post phlebitis ulcers accompany the post phlebitic Syndrome represent one of the problematic cases. In this study the authors tried to know the real reasons of development of these ulcers, then they could find out an easy solution for treating them.

Patients:
This study included 65 cases of chronic resistant venous ulcers.

Place: These cases were treated over the period from September 2001 until September 2007 in three places, University Malaya Medical Center, UniMAS (Sarawak General Hospital), and University Technology Mara (Selayang Hospital), Malaysia.
The technique which we used was based upon venous hypo-vascularization of the skin of the leg before any attempt to deal with the ulcer.
Results: Results showed very good and successful healing of these ulcers in a short time evaluated by 2 to 3 weeks after surgery.
Most of the cases had very long history of having these ulcers ranging from 3 to 9 years and of average 4 years.
Surgery for Chronic venous leg ulcers now facilitated the perfect and effective closure which is sound and complete without recurrence if compared with other techniques as compression bandage and other methods.

INTRODUCTION
Chronic venous insufficiency and its accompanying venous hypertension have been termed the post-thrombotic syndrome, but it is now known that primary valvar incompetence, not just prior thrombosis, is an important cause of venous leg ulcer. Lees et al 1993, and Labropoulos et al 1994 related development of ulcer to presence of reflux of blood from the deep system to the superficial system through incompetent perforators.
Ahmad et al 2007 studied deep vein thrombosis and its consequences on development of ulceration as a part of post thrombotic syndrome.

Figure 1
Figure 1: Massive huge ulcer 6 years in 80 years old lady with failed previous 6 operations.
OBJECTIVES

Some varicose veins cases are not associated with ulcer while some others are accompanied with ulcer, majority of cases of venous ulcers are not associated with revealed varicose veins, high failure of bandage and simple closure of ulcers and other methods of treatment and multiplicity of surgery procedures used to close the ulcer without remarkable success.

Review of Literature:

Post thrombotic syndrome is a late complication of DVT occurring in up to two-thirds of patients with subsequent ulceration. Possible signs and symptoms are pain, edema (accumulation of fluid), hyperpigmentation (increase in skin color), and skin ulceration. Severe manifestations and ulceration occur in 7–23% and 4–6%, respectively, of people with DVT. Post-thrombotic syndrome may result from some obstructions that remain in the vein or from reflux (backflow of blood) or both (more likely). Obstruction may in turn contribute to reflux. Rate of reflux is highest during the 6 to 12 months after acute DVT. It may occur transiently in up to 23% of DVT patients and may resolve during the follow-up period.

The extent of the thrombus may have some part in causing post-thrombotic syndrome, but other factors, too, may be determinants. These are rate of recanalization (formation of new pathways or blood vessels), recurrent thrombotic events, extent of reflux, and venous valve function.)

A venous ulcer in the leg occurs mainly from reflux and not usually from persistence of the original obstructive process.

One of sequale of DVT is varicose of the venular structures giving telangiectasias which may receive their pulse of venous hypertension directly through minute incompetent perforating veins.

Telangiectasias may receive venous hypertension from subdermal reticular network associated with reflux demonstrated by Doppler study.

Most perforating veins are thin-walled varying in diameter from less than 1 mm to 2 mm in diameter, and containing one or several valves.

The number of perforating veins per leg varies greatly, with individual reports ranging from 64 to more than 15,000. The perforating veins are more densely concentrated in distal leg and foot. (8 perforators in distal leg for every one in the thigh). For a typical patient there are 20 perforators above the knee and 200 below the knee.

Not all symptomatic patients will complain of pain; venous symptoms may be so insidious that after treatment, patients are surprised to realize how much chronic discomfort they had accepted as “normal”.

Approximately 1 million persons in the United States have ulceration due to superficial venous disease, and about one out of ten are functionally disabled.

Incidence and prevalence of venous disease also depends on the age and sex of the population. In the Tecumseh community health study for example, varicosities were observed in 72 % of women aged 60-69, and in 43 % of men. (Between 40-49 years of age the incidence was 41 % for women and 24 % for men).

Bleeding from lower extremity varicosities can be fatal, especially in elderly or debilitated patients. There were 23 such fatalities reported in England and Wales in 1971. Treatment for these bleeding varicosities is a medical emergency.

Kistner et al 1996 studied the normal anatomy of veins and normal venous circulation and post thrombotic syndrome features and complications.

MATERIAL AND METHODS

Patients: 65 patients with 75 chronic resistant venous ulcers were involved in this study. The age range was between 40 and 80 years. The duration of these ulcers ranged from one
to 9 years. See tables Patients were from the three races in Malaysia Indians, Malay and Chinese with a higher incidence among the Indian population. Indians equal to 30 patients, Malay were 18 and Chinese were 17 patients. 54 patients had single ulcer and 11 patients had two ulcers.

**Figure 3**
Table 1: ulcer period in years: 3 years=15, 4 years=11, 5 years =21, 6 years =16, 8 years =1, 9 years= 1

<table>
<thead>
<tr>
<th>Ulcer in years</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.000000</td>
<td>15</td>
<td>23.1</td>
<td>23.1</td>
<td>23.1</td>
</tr>
<tr>
<td>4.000000</td>
<td>11</td>
<td>16.9</td>
<td>16.9</td>
<td>40.0</td>
</tr>
<tr>
<td>5.000000</td>
<td>21</td>
<td>32.3</td>
<td>32.3</td>
<td>72.3</td>
</tr>
<tr>
<td>6.000000</td>
<td>16</td>
<td>24.6</td>
<td>24.6</td>
<td>96.9</td>
</tr>
<tr>
<td>8.000000</td>
<td>1</td>
<td>1.5</td>
<td>1.5</td>
<td>98.5</td>
</tr>
<tr>
<td>9.000000</td>
<td>1</td>
<td>1.5</td>
<td>1.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4**
Table 2: Prevalence of Varicose ulcers: Varicose veins are seen in 17 patients while in 48 cases no apparent varicose veins

<table>
<thead>
<tr>
<th>Varicose Veins</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>48</td>
<td>73.8</td>
<td>73.8</td>
<td>73.8</td>
</tr>
<tr>
<td>yes</td>
<td>17</td>
<td>26.2</td>
<td>26.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 5**
Table 3: Prevalence of DVT: 9 patients had DVT and history is not clear, majority of patients 56 had a clear history of DVT

<table>
<thead>
<tr>
<th>DVT</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>non</td>
<td>9</td>
<td>13.8</td>
<td>13.8</td>
<td>13.8</td>
</tr>
<tr>
<td>yes</td>
<td>56</td>
<td>86.2</td>
<td>86.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

In Investigations:
Preoperative investigations: first are the diagnostic investigations as Doppler ultrasound, duplex scanning and phlebography. Other routine investigations as complete blood count, coagulation profile, and other assessments for cardiac and renal functions.

**Figure 6**
Table 4: Number of operations: Number of operations before coming to the author: One Op=1 Patient, Two Op=6 Patients, 3 Op=28 Patients, 4 op=26 Patients, 5 op=3 Patients, 10 op=1 Patient?

<table>
<thead>
<tr>
<th>Operations</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.000000</td>
<td>1</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>2.000000</td>
<td>6</td>
<td>9.2</td>
<td>9.2</td>
<td>10.8</td>
</tr>
<tr>
<td>3.000000</td>
<td>28</td>
<td>43.1</td>
<td>43.1</td>
<td>53.2</td>
</tr>
<tr>
<td>4.000000</td>
<td>26</td>
<td>40.0</td>
<td>40.0</td>
<td>93.2</td>
</tr>
<tr>
<td>5.000000</td>
<td>3</td>
<td>4.6</td>
<td>4.6</td>
<td>97.8</td>
</tr>
<tr>
<td>10.000000</td>
<td>1</td>
<td>1.5</td>
<td>1.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Figure 8
Figure 4: Calf perforator causing superficial varicosities

Figure 9
Figure 5: Multi-valve destruction in deep and superficial system
Figure 6: Venogram shows valve incompetence in deep system and in perforators.

The long saphenous vein is removed below the knee. Ulcer is cleaned and well curetted with effective homeostasis, then a skin graft is applied to the ulcer with back slab is placed to limit movement of the foot and leg. Dressing is little under pressure bandaging.

Postoperative: leg is placed in elevated position to decrease edema and swelling. Patient is given proper antibiotics for 10 days. Patient is advised to keep leg elevated and don't walk early. Hyperbaric Oxygen sessions were given to some of our patients who were able to spend some money for that.

RESULTS

Figure 11
Case 1: 50 years old Chinese with a 6 years ulcer operated 5 times before, then author did this flap showed some infection in (A) and after complete healing in (B).

Figure 12

The results were shown to be outstanding as all ulcers nearly were closed effectively with different healing periods in different patient with average range of 2 to 3 weeks. See cases where patient had 6 surgeries before coming to the

Other investigations:
Culture and sensitivity testing know types of bacteria and always come as MRSA, Pseudomonas, some other types. Routine preoperative investigations as any patient undergoing surgery as coagulation profile, ECG, and chest X-ray.

Operative techniques: General anaesthesia and supine position. Longitudinal incision is made along the medial side of the leg along the great saphenous vein. Great saphenous is exposed and dissected and perforators are exposed and ligated and disconnected from the long saphenous vein.
author and was operated twice by him in the second operation was treated by reversed anterior tibial artery flap. She had around 4 to 5 weeks for complete healing after due to pseudomonas infection of the tip of the flap.

In Case 2 the patient was 80 years old with her ulcer shown measured 12 cm by 20 cm in the right leg and she was operated before 6 times also and every time failed. Operated by the author and was supported also with hyperbaric oxygen for 2 weeks after surgery and healing was perfect.

**Figure 13**
Case 2: 80 years old Malay lady with a 6 years ulcer and was operated 5 times before and all failed in (A ) and after operation by author in (B)

**Figure 14**

In case 3 the patient was around 45 years old with two ulcers in the left leg. Her right leg had the same problem before and developed gangrene after many trials to close by free flap or grafts around 5 times and ended by amputation. Her left leg was operated other 5 times but all failed to achieve healing, and finally operated by the author in the same way and was healed completely.

In case 4 patient was 65 years old Malaysian Indian was treated in UMMC and was operated also more than 5 times before coming to the author.

The picture of case 4: is her picture after operation by the author.
Figure 17
Case 4: 60 years old Malaysian Indian with a chronic (5 years) resistant ulcer operated 4 times before and shown pictures after treating by authors in University Malaya Medical Center.

Figure 18
Case 5: a 43 years old Malay obese male with a 3 years ulcers on his left leg operated twice before in (A) and after operating by the author in (B)

Case 5 was a 40 years old Malay male was treated before in many centers and came to the author. He had multiple ulcers mainly due to obesity and post thrombosis. After operation the ulcers started to decline and heal very well.
After long time suffering from the resistant wounds for different types of treatment as compression bandages, topical applications and many surgeries, they became happy and smiling when became released from dressings and bad smell of the chronic wounds.

The cure period range was from 2 to 4 weeks but some cases needed a longer period up to one month for complete healing the author used during it the compression bandage in some cases and hyperbaric or both in some other cases.

**DISCUSSION**

Classic Methods of Treatment: Compression treatment – high efficacy with multiple layers and calculated pressure. Medications - such as pain-killers, and oral antibiotics if infection is present also are used.

Supplements - there is evidence to suggest that leg ulcers may heal faster with mineral and vitamin supplements, but only if the person suffers from a deficiency. Zinc, iron and vitamin C may be used.

Skin grafts - a surgical procedure, where healthy skin is grafted onto the prepared wound site.

Hyperbaric oxygen - this is now an accepted management option for ulcers that resist other methods of healing for example, diabetic ulcers.

Options can include treatment for varicose veins, quitting cigarettes, improving the diet and taking regular exercise (such as 30 minutes of walking every day). The person should avoid hot baths, and sitting still for too long. Keeping the affected leg elevated above the level of the heart was advised to all patients. 21

Different levels of compression has been reflected in the current British Standard for compression hosiery (BS 6612:1985) which describes three different classes of stocking providing levels of compression ranging from 14 to 35 mmHg at the ankle. (Table 1)
Chronic Venous Ulcers An End Of Long Term Suffering

Figure 21
Table 7: Recommended pressures for the treatment of venous disorders Bandage Classification

<table>
<thead>
<tr>
<th>Clinical indications</th>
<th>Recommended pressures(mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial or early varices</td>
<td>14 - 17</td>
</tr>
<tr>
<td>Varices of medium severity, ulcer treatment and prevention of mild oedema</td>
<td>18 - 24</td>
</tr>
<tr>
<td>Gross varices, post-thrombotic syndrome, gross oedema, ulcer treatment and prevention</td>
<td>25 - 35</td>
</tr>
</tbody>
</table>

TYPE 1:

Type 1 bandages frequently contain lightweight elastomeric threads which impart a high degree of elasticity but little power to the bandage. Examples include Slinky, Stayform and J-Fast.

Figure 22
Figure 7: Huge varicose veins in (A ) without ulcer and early ulceration without varicose veins in (B)

Figure 23

TYPE 2:

LIGHT SUPPORT BANDAGES:

Examples of Type 2 light support bandages (including short stretch bandages) include Elastocrepe, Leukocrepe, Lenkelast and Comprilan.

TYPE 3: Compression Bandages

Compression implies the deliberate application of pressure and is most commonly employed to control edema and reduce swelling in the treatment of venous disorders of the lower limb. Within the classification system, compression bandages have been divided into four groups according to their ability to produce predetermined levels of compression.

Type 3a: Light compression bandages and maintain low levels of pressure, up to 20 mmHg on an ankle of average dimensions. This helps to manage superficial or early varices, and varicosis formed during pregnancy.

Type 3b: Moderate compression bandages to generate a pressure of 30 mmHg on an ankle of average dimensions. They are indicated for the treatment of varicosis during pregnancy, varices of medium severity, the prevention and treatment of ulcers and the control of mild oedema.

Type 3c: High compression bandages may be used to apply high levels of compression in the order of 40 mmHg on an ankle of average dimensions. Indications for these bandages include the treatment of gross varices, post-thrombotic venous insufficiency, and the management of leg ulcers and gross oedema in limbs of average circumference.

Type 3d: Extra-high performance compression bandages are
capable of applying pressures in excess of 50 mmHg. The power in the bandages is such that they can be expected to apply and sustain these pressures on even the largest and most oedematous limbs for extended periods of time. This group includes Elastic Web Bandage BP (Blue Line Webbing) and Varico Bandage.

Sub-bandage pressure: effect of application technique.

Sockalinngham S et al1990, Backhouse et al1987 tried to measure the pressure under the bandage: In order to achieve the pressures described in the classification system described above, it is assumed that the bandages in question will be applied in the form of a spiral with a 50% overlap between turns, effectively producing a double layer at any point on the limb. Different application techniques such as a figure of eight bandage will produce larger numbers of layers at any one point and therefore higher sub-bandage pressures. 23,24,25

Leg should be elevatied higher than your hip. This is particularly important if your leg is swollen. The aim is to let gravity help to pull fluid and blood in the right direction - towards the heart. This reduces swelling in the leg, and reduces the pressure of blood in the leg veins.

What is the outlook (prognosis)?

Up to 7 in 10 venous ulcers heal within 12 weeks if treated with compression bandaging which is re-applied every week or so. If compression is not used and an ordinary dressing or compression stockings alone are used, the chance of healing is less.

Preventing a recurrence of venous skin ulcers

Venous leg ulcers commonly recur after they have healed. To prevent this, your should wear a support (compression) stocking during the daytime for at least five years after the ulcer has healed. This counteracts the raised pressure in the veins that causes venous leg ulcers. You should get a new stocking about every six months as the elastic tends to 'go' after a while. 26,27

Draw backs of classic treatment

Bandage treatment takes 8 to 24 weeks to give effective healing. Long time treatment is making the patient boring and not complying to it. The recurrence is a major problem if compression is stopped. It needs always compression life long. 26,27,28

Treatment of leg ulcers is expensive. It costs an estimated £5000 per patient for three months of conventional treatment. 29

One trial (166 patients) found no statistically significant difference in recurrence between two types of medium (UK Class 2) compression hosiery (relative risk of recurrence with Medi was 0.74, 95% confidence interval 0.45 to 1.2). Both trials reported that not wearing compression hosiery was strongly associated with ulcer recurrence and this is circumstantial evidence that compression reduces ulcer recurrence. 33

Comparing of our results to the previous results we did not record any recurrences which indicates permanent cure of our patients in relation to the classic treatment which recorded high recurrence rates.

Augmentation of conventional treatment with hyperbaric oxygen reduces ulcer healing time and should allow earlier, successful skin grafting of clean wounds. 31,32

The use of hyperbaric oxygen is appreciated in our study.

Varicose ulcer versus venous ulcer: The term varicose ulcer is not a correct name as they develop as a component of post thrombotic syndrome not with varicose veins.

What we have done in this study? What are the benefits of the new treatment?

It is a very simple technique to hypovascularize the skin of leg by removal of the long and or short veins below the knee and ligation of perforator veins. This allowed good drainage of venous blood by muscle pumping and no chance for reflux to the superficial system.

Both aims will be there decreasing the venous load to the skin below knee and improving the venous return by muscle pumping through the deep system.

All perforators below the knee should be located and ligated after removal of long saphenous below the knee. Upper segment of long saphenous above the knee is kept for any subsequent cardiac angioplasty.

Long term follow up. Improved function and shape of the limb have been seen and realized in our patients.

CONCLUSION

Venous ulcer is caused primarily by chronic valvular disease of the deep system and perforators

Varicose veins alone is not a direct cause of venous ulcer
Majority of venous ulcers are associated with normal caliber or even attenuated superficial veins.

The direct approach to ligate perforators and strip the superficial system below the knee is the main step to treat chronic venous ulcers.

Problems of veins may be limited to the superficial system, deep system or both. It is superficial phlebitis, deep phlebitis, or both superficial and deep.

For an ulcer to develop there should have destruction of valves in perforators and deep veins. Superficial valve destruction alone or with perforator veins may not produce an ulcer.

ACKNOWLEDGEMENT

To all staff members in Selayang Hospital Sarawak General Hospital and University Malaya medical center I say thank you for all.

 Appreciate very much Dato Professor Dr Khalid Yusoff dean of Faculty of Medicine University Technology Mara who had supported the authors in this study.

 Appreciate Dr Siti Zalehah Mohd Saleh the director of Hospital Selayang and all clinicans in surgery department in Selayang Hospital as well as anaesthesia department headed by Dr Arbayah.

References

Author Information

Rahoma Ahmed Hussein
Associate Professor, Cons.Plastic Surgeon, University Technology Mara, and Selayang Hospital