The arteriovenous system

Part three – veins

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This article looks at venous dysfunction and related medical management and nursing care. It is the third and final part in this series on the arteriovenous system and should be considered in conjunction with the previous *NT* series on the heart.

**Chronic venous insufficiency**

Leg veins return deoxygenated blood to the heart through a mechanism called the venous pump – muscles squeeze the vein and push blood up through one-way valves – first via the iliac veins and then inferior vena cava (Tortora and Grabowski, 2002) (Fig 1). With age, these veins usually stretch, which in turn reduces their competence and ability to pump blood effectively – a condition known as chronic venous insufficiency (CVI) (Eberhardt and Raffetto, 2005).

Signs and symptoms of CVI include (Eberhardt and Raffetto, 2005) (Table 1):

- Lipodermatosclerosis (may appear as a rash on the skin of the calves or ankles);
- Varicose veins;
- Leg and ankle swelling leading to tight calves;
- Tired and heavy sensations in the legs.

A primary cause of CVI is high blood pressure inside veins (venous hypertension) that persists over time, but it can also be caused by deep vein thrombosis or phlebitis (inflammation of a superficial vein resulting in a small blood clot). People who are very overweight, sedentary or elderly may develop CVI because all these factors can lead to venous valve dysfunction.

However, the condition is also thought to have a hereditary component and is more common in females over 50 years of age (Eberhardt and Raffetto, 2005). Moreover, the effects of cigarette smoking on the venous system are not yet fully understood, but it is thought to be a major contributory factor – hypothesised to be mediated by the resultant hypoxaemia. Patients who smoke should therefore be educated on the harmful effects of their habit and given health promotion on smoking cessation.

CVI is generally not life-threatening, but it does have an impact on the patient’s quality of life and can be socially restrictive due to movement being...
Varicose veins

Varicose veins are swollen superficial veins on the leg. They usually appear on the calf and are more obvious when the patient is standing up (Lurie et al, 2003). Patients will usually be able to see varicose veins before they report symptoms of discomfort and will often describe them as ‘wriggly blue lines’ on the legs, and report that they ache late in the day with associated ankle swelling. When veins become varicose the valves often stop working efficiently and blood can flow backwards (Fig 2). When the patient stands, it creates a head of pressure that makes the veins prominent at the skin surface. It is this pressure that can lead to symptoms such as aching, skin discoloration and skin breakdown issues. Treatment for chronic venous insufficiency usually includes compression stockings initially, surgery (vein-stripping and valve replacement), and treatment of skin symptoms with creams. Good patient education on physical exercise is also important (Nicolaides, 2000). The treatment goals are to:

- Provide the nursing, medical and technical interventions that return patients to their normal daily living;
- Minimise pain and increase the patient’s ability to manage their own condition.

### Leg ulcers

Leg ulcers are a common problem in patients with CVI (Fig 3). Usually ulcers form on the lower leg, next to the ankle. Venous dysfunction – usually the connecting valves – creates raised pressure in the surface veins, which in turn leads to tissue damage and an increased risk of ulcers forming (Marshall et al, 2001). This, combined with trapped white blood cells, leads to isolated biochemical and tissue changes. The ulceration is initially a darkening and thickening of the skin with localised oedema (Fig 4). Leg ulcers are often slow to heal, impede mobility and are painful (Nelson, 2004).

For those patients identified as being at risk, prevention and health education are critical. However, patients who develop ulcers need careful wound care. The main treatment options are non-adhesive absorbent dressings (initially, but depending on fluid leakage and presence of infection), pressure stockings and surgery to correct the underlying problem (Marshall et al, 2001).

Patients should be advised to avoid minor abrasions and knocks to the lower legs where possible. They should be encouraged to achieve a suitable weight (ulcers take longer to heal in obese patients) and to elevate their affected leg to reduce swelling (Marshall et al, 2001).

Pressure bandaging or elastic stockings have been shown to speed healing and improve cost effectiveness if properly applied and, in general, higher pressures have been found to be more effective (Nelson, 2004).

### TABLE 1. PREVALENCE OF SYMPTOMS AMONG CVI PATIENTS

<table>
<thead>
<tr>
<th>Symptom</th>
<th>% men affected</th>
<th>% women affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain (light to moderate)</td>
<td>80</td>
<td>78</td>
</tr>
<tr>
<td>Heaviness (light to moderate)</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>Paresthesia (light to moderate)</td>
<td>66</td>
<td>69</td>
</tr>
<tr>
<td>Cramps (light to moderate)</td>
<td>65</td>
<td>63</td>
</tr>
<tr>
<td>Varicose veins (light to moderate)</td>
<td>86</td>
<td>70</td>
</tr>
<tr>
<td>Oedema</td>
<td>65</td>
<td>76</td>
</tr>
</tbody>
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### REFERENCES


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