

Use of Hirudotherapy in Various Diseases and its Benefits

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Annotation. Hirudotherapy (HT) is the application of medicinal leeches (*Hirudo medicinalis*) for therapeutic use. HT involves the attachment of cultured leeches onto the affected areas. Leech therapy involves an initial bite, which is usually a painless bite, followed by the sucking of 5 and 15 ml of blood. Its major therapeutic benefits are not only due to blood sucked during the biting, but also from the various bioactive substances, such as Hirudin, calin, Hyaluronidase, and Histamine-like substances, to name a few. It has been successfully used in plastic and reconstructive surgeries, cardiovascular complications, varicose veins, hemorrhoids and various joint ailments..

Keywords: hirudotherapy, leech, hirudin, inflammatory diseases, osteoarthritis, varicose veins, anticoagulant.

Introduction

Complementary medicine methods have a long history, but modern medicine has just recently focused on their possible modes of action. Medicinal leech therapy (MLT) or hirudotherapy, an old technique, has been studied by many researchers for possible effects on various diseases such as inflammatory diseases, osteoarthritis, and after different surgeries. *Hirudo medicinalis* has widest therapeutic usage among the leeches, but worldwide, many different species were tested and studied. Leeches secrete more than 20 identified bioactive substances such as antistasin, eglins, guamerin, hirudin, saratin, bdellins, complement, and carboxypeptidase inhibitors. They have analgesic, anti-inflammatory, platelet inhibitory, anticoagulant, and thrombin regulatory functions, as well as extracellular matrix degradative and antimicrobial effects, but with further studies, the spectrum of effects may widen. The technique is cheap, effective, easy to apply, and its modes of action have been elucidated for certain diseases.

Leech saliva contains a Factor Xa inhibitor, and also hyaluronidase. These two agents enhance the viscosity of the interstitial fluid. The vasodilator acetylcholine, along with histamine-like substances and also carboxypeptidase A inhibitors, increase blood flow by dilating constricted vessels. These are just some of the health-promoting components of leech saliva. The substances listed above work synergistically (possibly in conjunction with other bioactive substances that have not yet been identified) to decrease the viscosity of the blood, making its consistency thinner and promoting a more efficient blood circulation. Blood that has a thick consistency is prone to clot formation and can result in increased blood pressure. Blood clots or thrombi can travel to different parts of the body and can cause of strokes (i.e. cerebrovascular accidents, or CVAs) and heart attacks (i.e. myocardial infarctions, or 'coronaries').

The hirudin in the leech saliva opposes the process of blood clotting. Hirudin is a polypeptide, which has highly potent antiprotease activity with a strict specificity for thrombin, meaning it is able to inactivate fibrin-bound thrombin. Other factors can also stabilize the blood clotting system, produce a beneficial effect

on the vascular wall, and improve microcirculation which leads to improved blood circulation and oxygen supply of all internal organs. The enzymes leeches deposit with their saliva prevent blood from becoming thick, thereby promoting better blood circulation not only in the heart but to other parts of the body. Leeches prompt some blood loss and thus prompt the body to make new blood cells which are more flexible than older blood cells. Hirudotherapy can clean veins and make them stronger and more flexible. Hirudin helps to prevent blood clots and also improves the blood circulation. Improved circulation results in less pressure on the heart and blood vessels. Better circulation of blood assists with all healing processes, which can be severely impaired in diabetic patients.

Hypertension – high blood pressure – is a measurement of the force against the walls of your arteries as your heart pumps blood through your body. You are more likely to be told your blood pressure is too high as you get older. This is because your blood vessels become stiffer as you age. When that happens, your blood pressure goes up. High blood pressure increases your chance of having a stroke, heart attack, heart failure, kidney disease, and early death. In the treatment of hypertension with leeches, the effect is twofold. First, there is a decrease in the volume of blood circulating in the bloodstream and that directly lessens the pressure along blood vessel walls. Second, the bio-active agents in the saliva exert significant hypotensive (pressure reducing) effects. With hirudotherapy, it is often possible to reduce the dose of prescription drugs, and sometimes end their use. For treating hypertension, the leeches are generally placed on body parts like upper back, neck, and chest.

Varicose veins are unattractive, but the disease can give rise to the dangerously threatening complication of thrombophlebitis. Surgery is a common treatment, but often the varicose veins return. People have become to understand the value of hirudotherapy as a very effective treatment. Hirudotherapy does not preclude other treatments, but the use of leeches for varicose veins dramatically reduces the need for surgery, post surgical complications, and the downtime of recovery.

Sufferers from osteoarthritis (OA) usually complain of pain, stiffness and swelling of the joint. This results in immobility and difficulty with activities of daily living (ADLs). People who have undergone leech therapy have reported a significant reduction in all three major symptoms of osteoarthritis. This improvement has been demonstrated in several recent randomised controlled trials (RCTs), published in peer-reviewed scientific journals. RCTs are considered the ‘gold standard’ of medical effectiveness. As shown in the RCTs carried out to date, a marked reduction in OA-associated joint pain and stiffness is often noticed on the day following leech therapy. The reduction in pain and its associated symptoms results in a long-term increase in mobility, wellbeing and quality of life. Leech therapy for OA is usually repeated every 6–8 months. It is a safe and (in most patients) a very effective way to treat the symptoms of arthritis.

In conclusion, for treatment of some diseases, MLT is not an alternative, but is a complementary and/or integrative choice. MLT is a part of multidisciplinary treatments, and secretes various bioactive substances. These substances vary among species and different species should be evaluated for both treatment capability and their particular secreted molecules. There is huge potential for novel substances and these could be future therapeutics.

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