Hyrudotheapary method in addictology protected by the patent of Ukraine

I. Sosin, N. Burmaka, O. Volkov, O. Vereshchak, V. Skobelev, O. Kiosev

Kharkiv Medical Academy of Postgraduate Education, Kharkiv, Ukraine

Article info
Received 17.06.2017
Accepted 14.08.2017

Keywords: addictology; hirudotheapy; microcirculation; pharmacological and physical stimulation; nicotinic acid; leech application.

The utility model is referred to medicine, namely addictology, and can be used to improve the method of medicinal leech (Hirudo medicinalis) application by creating certain conditions which promote their rapid and effective fastening upon the patient’s body, activate and increase blood sucking, for example, in treatment of drug addicted patients. It is known that hirudotheapy medical effect results from several constituents. First, it is mechanical activity of a leech, which bites the skin and fastens on the patient’s body, causing reflexogenic effects similar to those of acupuncture (the so-called ‘reflexohirudotherapy’) (Sosyn, Volkov, 2004).

Secondly, leech produces a huge amount of useful biologically active substances that enter the human body. Saliva of medicinal leech, in particular, contains hirudin, which prevents coagulation of blood.

Thirdly, leech provides purely hypovolemic discharge of hemodynamic system (blood and lymphatic system).

Fourthly, due to ‘artificial hirudotheapeutic bloodletting’ (exfusion), toxic substances and metabolites are intensively extracted out, that provides detoxification effects.

Technological implementation of hirudotheapy procedure in current medical practice, especially in addictology, faces the problem of quick and effective application and fastening medicinal leech on the patient’s body.

Various approaches to implement hirudotheapy method and receive the mentioned effects are available. Thus, according to Pharmacopoeia article and Pharmacopoeia Committee requirements, in order to achieve optimal therapeutic activity of a leech, it should be used only hungry.

The longer its fasting period, the quicker it fastens on the patient’s body, the more actively it secretes biologically active substances, the more it sucks blood. Starvation period should be several months. In this case, to fasten rapidly, the leech must present marked contractile reflex (Ivanov, 1955; Isakhanyan, Tumasyan, Barsegyan, & et al, 1992). To receive the desired therapeutic effect, it is necessary to consider other numerous technological factors. The right choice of sites for medicinal leech application and appropriate preparation of these sites are very important.

At the same time, it is important to solve two main tasks: a) to make sterile skin in the site where medicinal leech will be applied; b) to create conditions under which medicinal leech quickly (within a few seconds) fastens upon the skin, stably and quickly “works out” as much as possible to fill itself with the patient’s blood, after which it (leech) either spontaneously drops from the skin, or is being removed with purposive manual movements (manipulations) of hirudotheapist.

Skin in the site of application should be clean, free of foreign smells and substances, which prevent ‘work’ (‘treatment’) performed by very sensitive medicinal leech. Experience has proved that leeches better fasten upon the skin, if redness (hyperemia) of skin in the site of application, one way or another, has been achieved. Therefore, an opportunity is not always given to apply leeches on thick skin areas without the prior special manipulations. Scientific literature and practical tips concerning hirudotheapy technique elucidate different methods for local preparation (treatment, warming, massage, bait, devices for application) of hirudo-application area.
We chose the following sources as analogues to the proposed method. According to actual recommendations (Bakayeva, Zavalova, 2003), the leech ‘bait’ techniques are used. These include hot compresses with 50-55 °C water or poultice with hot milk applied on skin. After that, the skin is washed with hot water, wiped dry, and then the leech application procedure should be followed.

Another way (Kamenev, Kamenev, 2004) is to rub the body in the site of attachment with a soft flannel till redness of skin and sense of warmth appear. If leeches don’t fasten for a long time to the skin due to the body evaporation, coldness, sweating, hairiness, various side odors, the skin is thoroughly treated with water, using no alcohol. The skin is washed with warm water using neutral (flavor-free) soap. Places with traces of ointments, plaster, drugs are treated, then wiped off with burdock oil (olive-kernel oil), washed again and wiped with cotton wool dry. If these measures fail to attach the leech, the so-called methods of ‘bait’ for leeches are used; for this the patient’s skin is treated with milk, fresh cream, egg yolk, the patient’s blood. If even these remedies do not give the desired result, those irritating for leeches solutions (wine, beer, kvass, apple juice) are tried - the leech is immersed in them for 5 minutes before applying, and then it is washed with less than 19°C water and again applied on the skin.

To bait leeches, the place for application is moistened with sugar water (Gerashchenko, 2005). But all these analogues have significant disadvantages, because they often do not provide rapid leech blood suction. Numerous various complicated methods of leech attachment indicate absence of simple, reliable and effective technique.

As a prototype, we chose the method (Nikonov, 1998), which involves local pre-treatment of the patient’s skin just before hirudotherapy by massaging manual movements using medical alcohol 70% solution, overlapping considerably the area of leech attachment.

In the sites of expected attachment of medicinal leeches, microcirculation artificial increase is observed, hyperemia and congestion appear, which are irritating factors for leeches. To improve the fastening of medicinal leeches, the area treated with alcohol is immediately wiped off with sterile cotton wool soaked in hot distilled water, changing cotton wool 2-3 times up to further redness of the skin appear.

Thus, the prototype method involves comprehensive preparation of hirudoaapplication area: a) external pharmacological effects of ethanol (cleansing, disinfection, hyperemia); b) manual-massage effects of hyperemia, increased blood flow; hyperemic effects of thermal applications.

But this method also has the same disadvantages as other routine techniques practiced to date. Namely: 1) mechanical rubbing the skin with medical alcohol does not always cause the necessary rush of blood to the required area; 2) leeches may not fasten to blood sucking even after these manipulations; 3) due to anatomical or both physiological and anatomical features, skin rubbing is not always possible in the target place.

These and other disadvantages prove the need to improve technology of hirudotherapy method. Extremely strikingly these disadvantages are revealed in practice of addiction therapy in drug addicted patients, whose blood toxicity is very high and specific. The utility model is based on the task to improve hirudotherapy method in addictology in which due to technological improvement of conditions and fail-safe technique of leech application on the patient’s skin, fast and effective leech attachment for blood sucking is achieved.

The given problem is solved in hirudotherapeutic method in addictology, that consists of leech application upon the patient’s body, which is directly preceded by local mechanical (manual), local superficial pharmacological (alcohol) and physical (thermal) stimulation of microcirculation of the skin, according to the utility model, additional intravenous administration of 1-2 mL nicotinic acid 1% solution, and in 1-3 minutes, after the marked skin hyperemia appears, application of leeches procedure according to the formulation corresponding to the patient’s state is performed.

Similar to the prototype method, comprehensive approach included external hyperemic effects of nicotinic acid due to dilated peripheral vessels, improvement of peripheral microcirculation, blood circulation, redness of the skin, accompanied by characteristic sensations of heat, tingling in hyperemic areas of the body. After nicotinic acid injection, hyperemia may develop totally, that facilitates search of the places for leech application. It is also important that nicotinic acid as a vitamin medication has very scarce contraindications (Mashkovsky, 2003).

The proposed method is as follows: after the drug addicted patient passed general clinical and laboratory examination, determination of indications for hirudotherapy and exclusion of contraindications for nicotinic acid intake, just before the hirudotherapy procedure, he/she is additionally administered, besides the traditional prototype preparation, 1-2 mL nicotinic acid 1% solution intravenously. A few minutes after the patient’s skin evident redness appeared, tingling and heat are felt (that indicates dilated peripheral vessels and increased skin blood flow), leeches are applied on hyperemic areas according to the intended local prescription.

Our research has shown that this way significantly increases probability of rapid leech blood suction. According to the proposed method, we have treated 17 opiate addicted patients under withdrawal syndrome (males, mean age 29 years old), totally 68 hirudotherapy treatments. These hirudotherapy treatments, performed by the proposed method, were compared to the traditional prototype method (also 17 patients and 68 treatments), and this analysis proved that the former of these is significantly more safe and effective, as it is illustrated in the table below.

Thus, the proposed method allowed 3.2 fold reduced term of leech attachment, 1.3 fold shortened time of procedure until full blood-filling of leeches (due to activated process of blood-filling extracted from the addicted patient), 7.0 fold reduced number of leeches "worked" slowly, with pauses and detached itselfs before complete blood-filling, 15.0 fold reduced number of leeches, which did not fasten on the patient’s body at all. No complications or side effects were observed (Sosyn, Volkov, & et al, 2006; Sosin, Chuyev, 2014).
Table 1

Average values of leech application efficiency depending on the method used

<table>
<thead>
<tr>
<th>№</th>
<th>Average values of biological activity of native material (leeches)</th>
<th>Proposed method (n=17)</th>
<th>Prototype method (n=17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Duration of leech fastening (sec)</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>Duration of the procedure up to the leech full blood-filling (min)</td>
<td>35</td>
<td>47</td>
</tr>
<tr>
<td>3</td>
<td>Number of leeches 'worked' interrupted by pauses (detached before full blood-filling) (n)</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Total number of leeches which did not fasten to blood sucking (n)</td>
<td>1</td>
<td>15</td>
</tr>
</tbody>
</table>

References

Sosin, I., Volkov, A. (2002). Hyrudotherapy in narcology. Ukrainian herald of psychoneurology, 10 (1), 275. [In Ukrainian]


Life of animals (1968). Invertebrates, 1, 580. Moscow, Prosvechenie. [in Russian]


