

Production of Gel with Menthol, Benzocaine and Procaine HCl for Topical Application in Rheumatoid Arthritis Patients

B. Angelovska¹, S. Maleska-Stojadinovikj², E. Drakalska¹ and B. Gjorgjeska¹

1. Faculty of medical sciences, University "Goce Delcev"-Stip, Stip 2000, R. Macedonia

2. Public Hospital-Ohrid, R. Macedonia, -"Dimitar Vlahov" Ohrid, 33- 6000, R.Macedonia

Abstract: Antirheumatic and analgesics drugs are the most commonly prescribed medications for treatment of acute and chronic pain. Frequent application of these agents often causes adverse effects. So, in order to avoid the incidence of side effects, topical analgesics are treatment of choice for localized muscle pain. Topical analgesics offer the potential to provide the same analgesic relief provided by oral analgesics but with minimal adverse systemic effects. The aim of this study is to present the preparation and characterization of topical analgesic gel named "Russian water". Gel is composed of Menthol, Benzocaine, Procaine HCl as topical analgesic agents indicated for temporary relief of pain. Obtained results showed prolonged analgesic effect compared with liquid ethanol solution composed of the same components.

Key words: Pain, gel, Russian water, antirheumatic, analgesic.

1. Introduction

Antirheumatic and analgesics drugs are the most commonly used agents to treat diseases of the musculoskeletal system and to alleviate all sorts of pain caused from different origins [1, 2]. However, oral application of these agents often causes side effects [3, 4]. So combined therapy with systemic and local effect agents intended for topical use wherever possible, especially in physical therapy, would be treatment of choice [2, 5, 6, 7, 8].

Various formulations of dosage forms, by composition and consistency, allow different therapeutic approach, which is suitable for achieving the desired therapeutic effect and for being capable to adapt to the physiotherapist treatment [9, 10].

According to the regulations of the pharmacopoeia or to other regulations, galenic drugs are made in small batches in a galenic laboratory intended for direct administration.

According to the health requirements, the preparation of pharmaceutical dosage formed in a galenic laboratory, mainly aims to provide a dosage form, which is designed as an opportunity for changes in the composition and consistency of the product. The usage of this drug, immediately after the preparation, reduces the need for adding more funds to stabilize and to ensure longer shelf life.

Obtaining the quality of this drug product satisfies the standards, maintains or enhances the therapeutic properties, requires appropriate conditions for a preparation and knowledge of all the components properties, technological process and requirements for the finished product as well.

The usage of the traditional liquid, a pharmaceutical product known as "Russian water", which contains: alcohol, menthol, procaine hydrochloride and benzocaine, is well received and accepted by the patients and the physiotherapists, but it also has some negative sides, such as short effect, it is easily volatile, it acts on the surface and cannot be recommended as a

Corresponding author: B. Angelovska, PhD, research fields: pharmaceutical technology, social pharmacy.

massage supplement. On the other hand, gels are a dosage forms for external use that can be applied easily to tie up to the skin and to enable the drug to heal the affected area, and it can realize deep action, such as the ability to quickly penetrate multi-layers on the skin, to be easily rinsed from the site of application and generally does not irritate the skin, which is largely satisfying for our requirements.

The aim of this study is to present the production of a gel named “Russian water”, composed of Menthol, Benzocaine, Procaine HCl, in the form of a gel. Gel was prepared for Specialists Services of Physiotherapy Department, in General Hospital in Ohrid.

2. Materials and Methods

For the formulation and preparation the following active substances were used: Menthol (Alkaloid), Benzocaine (Sigma Aldrich), Procaine HCl (Sigma Aldrich) at the recommended doses and ingredients: Carbopol 940 (Sigma Aldrich) Glycerol, (Alkaloid) Triethylenetetramine (Sigma Aldrich) and Aqua distillate. Gel with menthol, benzocaine and procaine HCl was prepared in the galenic laboratory in Ohrid -General Hospital. Used ingredients and a compounding procedure are presented in Table 1.

Production of the base gel I was represented on Fig. 1.

In the step 1, preparation of base gel, Carbopol 940 and aqua distillate 50 mL, were left to bulge. Then glycerolum was gradually added and mixed to achieve good homogenization. After that, triethylenetetraamin was added and mixed again until thick gel was obtained.

In the step 2, preparation of healing gel, the menthol was grinded through a sieve, and it was measured in the prescribed amount.

3. Results and Discussion

The obtained gel is a homogeneous product with milk appearance. The high degree of pulverization of the components should improve solubility and ensure uniform distribution of insoluble components in the mixture. The process of mixing equal amounts of the basic mixture and pulverized substance also provides uniform distribution of the components, and the high density of the base gel reduces the possibility of

Table 1 Analgesic components of “Russian water”.

| Agent | Dose |
|--------------|-------|
| Menthol | 4 g |
| Benzocaine | 2 g |
| Procaine HCl | 2 g |
| Base gel | 192 g |

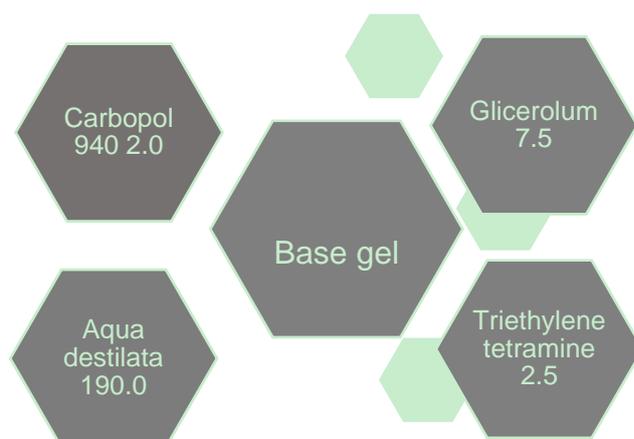


Fig. 1 Components of base gel.

sedimentation [1, 9, 11, 12, 13]. Menthol is practically insoluble in water and because of its sole distribution in the preparation is pulverized for its incorporation into the system. Benzocaine is poorly soluble in water with an appropriate pulverization, mixing improved solubility and its uniform distribution in the product. The procedure of mixing and gradual addition of a small amount concentrated procaine hydrochloride solution reduces the possibility of decomposition of the gel structure under the influence of the potential ionic solution [8, 14].

The obtained gel is packaged in plastic recipients of 200 mL, closed with a suitable stopper and signed with red signature marked "For external use" [15]. It is used topically by applying to the affected area and/or with good rubbing in physical therapy. The product has a short shelf life and is prepared immediately before use, and to ensure the quality of the product it is recommended to be kept at a room temperature in well-closed recipients. During application it gives pleasant cooling sensation and pain relief, and easily rinse out with water. It is not toxic and does not cause skin irritation.

The product can be prepared in galenic laboratory. The easy application and efficiency makes it acceptable to patients [16]. This agent forms film on the place of application and compared with alcohol solution represents prolonged analgesic activity [1, 17].

4. Conclusions

Topical analgesics are a promising class of agents for treatment of chronic pain. They can be used to supplement or replace systemic analgesics, and improve clinical outcome while reducing the side effects and morbidity associated with systemic agents. The obtained results of the treatment of patients according to the investigation of the staff that operated and the practical patients show that this gel is with a prolonged analgesic activity compared with the liquid preparation, with an easy and safe application, a

pleasant cooling sensation and a pain relief, also an easy flushing and an increased satisfaction of therapists and patients.

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