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APPLICATION OF INNOVATIVE TECHNOLOGIES FOR MANUFACTURING INFUSIVE SOLUTIONS IN DRUGSTORES OF FIELD MEDICAL INSTITUTIONS

Miroshnichenko J.V., Russia

The purpose: a theoretical substantiation and development of innovative technologies for manufacturing infusive solutions for intravenous introduction in drugstores of field medical institutions.

Results: using the systemic approach and adequate modern methods of research technological schemes of manufacturing infusive solutions in field conditions are proved and developed; the new basic scheme of getting cleaned water and water for injections in field conditions from natural sources; medical-technical requirements to means of packing infusive solutions made in field conditions, to a complex for manufacturing infusive solutions in field conditions, water treatment equipment for injections in field conditions, as well as basic schemes of the above product devices and means are protected by Patents of the Russian Federation.

Conclusions: introduction of innovative technologies for manufacturing infusive solutions in field conditions will promote the improvement of system of providing the field medical institutions with infusive solutions in wartime and peace time disasters.

COST BENEFIT OF SHELF-LIFE EXTENSION TESTING ON STRATEGICALLY IMPORTANT PHARMACEUTICALS

Maneval K.W., Williams F.T., Kavanagh E.M, USA

For nearly twenty years, the Department of Defense (DoD) and the U.S. Food and Drug Administration (FDA) have jointly operated the DoD/FDA Shelf-Life Extension Program (SLEP) to reduce the overall cost of maintaining a strategic pharmaceutical deterrence. Over the past two years participation in SLEP has expanded to other non-DoD governmental agencies. A common interest to all these participants is their expected return on investment (ROI).

The U.S. spends millions of dollars each year to maintain and expand its stockpiles of strategically important pharmaceuticals. These medications are a key component of the medical defense countermeasures for chemical, biological, radiological, and nuclear threats. All of these drugs possess a finite period of potency and usefulness as well as a more conservative product expiration date that is part of the item’s labeling. The expiration dating on these labels are intentionally conservative to ensure product integrity and to minimize product recalls for deterioration.

Many of these pharmaceuticals remain potent past their labeled expiration dating. Under SLEP, the FDA tests specific lots of selected pharmaceuticals with the goal of certifying them with an expanded expiration date. Executive management of the program resides with the Defense Medical Standardization Board (DMSB). Prior to the initiation of testing, the DMSB and FDA jointly evaluate the nominated candidates to determine the expected ROI that each testing project should yield. Projects are cancelled if their expected ROI is insufficient to warrant the expense of testing. This presentation examines those variables that are considered when calculating a project’s ROI.

DEFINITION OF REQUIREMENT IN INFUSIVE SOLUTIONS OF CHEMIST’S MANUFACTURING AND THEIR SUPPLY OF FIELD MEDICAL INSTITUTIONS IN MODERN CONDITIONS

Miroshnichenko J.V., Umarov S.Z., Russia

The purpose: the solution of an organizational problem of development of modern manufacturing infusive solutions techniques in field conditions.

Results: from the point of view of the theory of processes, using a standard method and a method of expert estimations, being based on objective parameters of size and structure of wounds (the injures, diseases), and also on the optimized nomenclature of infusive solutions, forecasting of needs of field medical institutions in infusive solutions of chemist’s manufacturing in modern conditions has been developed. They turned out to reach the maximal values in surgical hospitals structure. Field medical institutions experience the greatest need in infusive solutions during mass casualty occurrence. The need in infusive solutions of chemist’s manufacturing in burn hospitals makes not less than 400 ltr a day, traumatologic - not less than 330 ltr a day, thoracoabdominal - not less than 300 ltr a day, surgical - not less than 200 ltr a day. It is established, that supply of field medical with infusive solutions of chemist’s manufacturing, as a rule, does not meet the requirements. Sometimes the requirement exceeds supply in two and more times.

Conclusions: The indices of the requirement in infusive solutions of the chemist’s production and the supply of the field medical establishments with the above solutions may be considered to be the basic data for solving an organizational problem of development of modern manufacturing techniques of infusive solutions in the field.
TECHNIQUE OF AN EXPERT ESTIMATION OF CLINICAL EFFICIENCY OF ANTIALLERGIC PREPARATIONS

Kostenko N.L., Solodukhin V.A., Russia

Research in studying distribution and specific features of some allergic diseases has been done in the organized military community among persons of young age (18-35 years), and servicemen of middle age (35-55) with general clinical, immunological and allergological inspections of patients. It has been established that intensive parameters of morbidity have made up 59,0±4,9, in allergic dermatitis 25,0±4,2, allergic urticaria 13,5±2,7, angio-neurotic edema 4,1±1,3 in 1000 patients.

For an optimization of the nomenclature of drugs for the treatment of allergic diseases, an expert estimation of efficiency of the basic anti-allergic drugs has been used.

For an estimation of efficiency of preparations used against allergic diseases 27 experts from allergists, therapists, immunologists have been involved. The experts have been asked to fill out the questionnaires where they have been offered to estimate medicinal substances according to the following parameters:

• efficiency was supposed to estimate pharmacological ability to eliminate symptoms of allergic disease (a 5-mark estimation);
• safety was supposed to estimate the patient tolerance of medicinal substances, the quantity of side effects and contraindications (a 5-mark estimation scale);
• convenience of application on frequency of dosage: preference has been given by the experts to medical substances with the prolonged action and minimal necessary frequency of reception (a 3-mark estimation scale);
• convenience of application based on the assortment of produced medicinal forms and dosages: a variety of assortment of produced preparations has been estimated, with medicinal substances with the greatest quantity of the registered medicinal forms and dosages having received the maximal estimation (a 3-mark estimation scale).

Key parameters in the estimation of clinical efficiency were safety and efficiency, therefore the estimation has been done according to a five-point scale, and of auxiliary parameters (for the convenience of application) according to the three-point scale.

THE BASIC DIRECTIONS OF PERFECTION OF SYSTEM OF SUPPLY OF ARMED FORCES OF THE RUSSIAN FEDERATION MEDICAL OXYGEN

Golubenko R.A., Kononov V.N., Morgunov V.A., Russia

Existing in the medical service of Armed forces of the Russian Federation the centralized system of oxygen supply of field units and the establishments, based on production of oxygen by way of cryogenic division of atmospheric air does not allow to provide anaesthesiological and resuscitative care to all wounded men and the patients in a critical condition in necessary volume on different stages of medical evacuation.

The problem of oxygen supply on different stages of medical evacuation can be solved by realization of a high level principle of decentralization of manufacturing oxygen by the independent field generators created on the basis of application of non-cryogenic technologies of its production. Thus the most perspective technologies for application in field conditions are those of division of atmospheric air with a method of short cyclic cool heating adsorptions on synthetic zeolites, as well as thermo-chemical and water decomposition of composites on the basis of chlorates, perchlorates and supra-peroxides of alkaline and alkaline ground metal.

Requirements to means of oxygen production for functional field medical divisions supply cannot be met by application of uniform technology in the generator of uniform type. A technical basis of the solution of a problem of oxygen supply of field divisions, units and establishments of medical service is the creation of system of means in which the various technologies can be combined thus providing full performance of requirements of the modern concept of oxygen therapy application in extreme peace the and wartime conditions.

THE USE OF FIELD BLOOD BANKING IN EAST TIMOR

Robert Perri, Stephan J. Rudzki, Australia

On 4 December 2002 riots erupted in the centre of Dili, capital of the newly independent nation of East Timor. Police responded by firing a mixture of warning and aimed shots. As a result of these actions 17 people received gunshot wounds and two died.

The Dili National Hospital put out an urgent request for blood donations to deal with these shooting victims. Eighteen UN Policemen (17 Australian, 1 Ghanaian) volunteered to donate, but were not prepared to use the blood transfusion service at the Dili National Hospital.

Approval was then sought from the Force Commander and the Commander of the Australian Contingent to deploy the Australian blood banking capability from the Australian Battalion (AUSBATT) Moleana, to the UN Hospital Dili. The blood bank team arrived in the UN Hospital at 1745 hrs .

Donations commenced at 1900hrs. and were completed at 2100hrs. The bleeding teams were a combination of Thai and Australian medical staff. The first 8 units were grouped and fully screened by 2200 hrs and were delivered to Dili National Hospital at 2230 hrs. The
most serious patient, a hemopneumothorax with a haemoglobin of 6 g/L was transfused with 2 units of fresh whole blood that evening and survived. The remaining units of blood were screened and delivered to Dili National Hospital the next morning.

We believe there are a number of advantages to be gained from establishing and implementing a field blood banking capability and using fresh whole blood for transfusion. In particular, where the blood volume of a patient has to be replaced totally within a matter of hours (massive blood transfusion). Whole blood contains platelets and clotting factors not provided in packed cells, which are critical in emergency scenarios involving major trauma such as motor vehicle accidents or battle casualties.

The difficulty in storing platelet concentrates and their short shelf life, as well as the additional equipment required for frozen plasma storage makes their use impractical in a field setting. The logistical problems of transporting blood, from a major capital city in Australia to an isolated area overseas, where continuous controlled refrigeration and increased lead times are required, shortens the shelf life of blood components and adds to an already increasing logistical burden.

This paper will discuss the risk management strategies employed to minimise the risk of blood borne disease in this emergency setting.

THE USE OF MODERN TECHNOLOGIES FOR GETTING WATER FOR INJECTIONS IN FIELD CONDITIONS

Ved V.P., Solodukhin V.A., Russia

The purpose: the theoretical substantiation and development of modern technology of getting water for injections in field conditions from natural sources.

Results: it is established that for getting water for injections in field conditions the most effective is the complex use of filtration, retro-osmotic, absorption and ion-exchanging processes. The technology of getting water for injections from natural sources includes a rough mechanical filtration, ultra-filtration, return osmosis, absorption on carbon sorbents, ion-exchanging, clearing, and also sterilizing filtration. It provides the unity of constructive and other features of used methods of treatment of initial water. The way of obtaining water for injections in field conditions from natural sources and the equipment design for its realization are protected by the Patent of the Russian Federation.

Conclusions: the modern technology of obtaining water is developed for injections in field conditions from waters of natural sources which use provides an opportunity of getting water of necessary quality in one phase with high adaptability to manufacture, profitability and ecological compatibility.

USE OF FIELD LABORATORY OF INJECTION SOLUTIONS FOR THE IMPROVEMENT OF SUPPLY OF VICTIMS IN WAR CONFLICTS AND EXTREME SITUATIONS EXTEMPORAL INFUSIVE RASTER

Slobodenyuk A.V., Kostenko N.L., Russia

The purpose: the substantiation and development of mobile means for manufacturing infusive solutions in field conditions.

Results: it is shown that the most perspective direction of improvement of the organization of manufacturing infusive solutions in field conditions is the use of mobile means. The design of field laboratory of infusive solutions (FLIS) which is a highly mobile and an independent means of field pharmacy has been developed. Time of full readiness FLIS to the beginning of work is 2,5 - 3,5 hrs ; staff is the chief, the qualified pharmaceutical chemist, two pharmacists, the hospitals attendant, the driver-hospital attendant. Technical opportunities of FLIS provide the development of all technological operations on manufacturing infusive solutions in polymeric containers irrespective of seasonal, meteorological and other conditions. Living work conditions of FLIS meet the established hygienic standards and is incomparably better than in drugstores of field medical institutions. The brigade of two persons and pharmacist for 16 hrs of works can make 500 - 600 liters of infusive solutions as well as all the stipulated research on control of their quality. Design FLIS is protected by the Patent of the Russian Federation.

Conclusions: the application of FLIS will promote the improvement of supply with infusive system solutions in a wartime and extreme situations of peace time. The most rational variants of applications FLIS are inclusion in staff of some parts and establishments of medical service and use as means of strengthening filed medical institutions extreme situations or sudden mass casualty occurrence.

USE OF POLYMERIC CONTAINERS FOR INFUSIVE SOLUTIONS, MADE IN FIELD CONDITIONS

Umarov S.Z., Ved V.P., Slobodenyuk A.V., Russia

The purpose: the development of new packing means (polymeric containers) for infusive solutions of intravenous introduction made in drugstores of field medical institutions, suitable for use on a battlefield, in the center of an accident, disaster, natural calamity.
Results: polymeric containers of an special design for infusive solutions have been offered for use. They are made of polyvinyl chloride for medical purpose and in the unfilled condition represent a flat package with a system of tubes. One tube is supplied by a bulk plastic filling needle; the second - a metal injecting needle, a dropper and a regulator of solution filling speed. Two reserve units to the container with necessary components are provided. Containers are deprived of the majority of drawbacks of traditional means of packing solutions for parental use and possess following advantages: small weight and volume in the unfilled and filled condition they do not have fragility; containers are delivered sterile. Besides they can be put under the patient, and the solution will act in an organism under the action of a person’s body weight. The design of the container is protected by the Patent of the Russian Federation.

Conclusions: the use of polymeric containers as packing means for infusive solutions will allow to begin carrying out infusive therapies to the wounded and injured just on a battlefield (in the center an accident, disaster) and the advanced stages of medical evacuation, and also to lower work, energy, and time expenses in manufacturing infusive solutions in field conditions.