

The first experience of the using plasma radiations at prevention and treatment of the complications in patients with critical conditions and at postoperative period

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Founded on materials, of the first experience of the treatment pneumonia, including respirator-associated, infected wounds after gynecological operations, as well as decubital ulcers in patients with critical conditions, author recommends new methods of the preventive maintenance and treatment with use of the plasma. The more favorable outcome of these pathological processes, reduction in intensity of clinical manifestations and intoxication, reliable improvement of the condition in patients and reduction of average length of the treatment prove the advantage of given method. Significant economic effect is also received to take into consideration the reduction of the average cost of in hospital stay days, reductions of the expenses to medicinal and diagnostic facilities. The received results allow us to recommend usage of plasma flow during treatment of patients with inflammatory diseases, infected postoperative wounds and bedsores. Expressed efficiency, simplicity, reliability and essential economic effect are an important sign of given methods.

Key words: plasma flows, critical conditions, pneumonia, infected wound, and bedsore.

Introduction. One of the most important problems in modern medicine is a prevention and treatment of different suppurative and infectious complications during treatment of patient with critical conditions and at early postoperative period. The most important place amongst them occupies the intrahospital pneumonia, including respirator-associated, postoperative infected wounds and trophic decubitus ulcers. The problem of the treatment of infected wounds in modern conditions, is exceedingly actual in connection with increasing resistance of microflora, reduced efficiency of antibiotic therapy, increased number of allergic reactions to different preparations, small efficiency of the local facilities for treatment of suppurated wounds, duration of the therapy, sometimes during several months [2; 11; 13].

One of the most widespread forms of pneumonia in this category of patients is respirator-associated pneumonia. It often appears in patients residing on artificial ventilation and the risk of the disease increases on 1% each daytime after 3 days of intubation. Different authors show development of similar complications in 70 - 90% patients with polytraumas, cerebro-vascular accident, endotoxic shock, polyorgan insufficiency and other critical conditions [1; 9; 12].

In patients who undergo an operation in planned order, development of the different complications is less, but it also brings deterioration of the health condition of patient, significant increasing length of the treatment, material and financial expenses. Infected wounds after gynecological operation on different data appears to be from 0,2 - 0,3% to 5 - 7%, depending on heaviness of pathology, presence of the accompanying diseases and a lot of other factors. Particularly great risk of the development of the septic process is in women after gynecological operation, when the wound and perineum is infected, "small forms" suppurative-inflammatory complications develop [2; 3; 10].

During last years reconsiderations were made concerning the ways of the treatment and care for wound. Need of searching for of the new methods of the treatment in this category of patients, particularly in combination with heavy accompanying pathology, is insufficient result of the treatment, high factor lethality and invalidity. At present in medicine broad varied physical methods were found, founded on thermal and laser radiations. The Experience of their using has shown perspective of these methods in different type of pathology. However these methods, alongside with positive characteristic,

possess negative characteristics as well - insufficient efficiency and reliability of the methods and equipments, difficulty of the using, high cost and others One of the most perspective ways of admission of heat energy to centre of the pathological changes, as well as biologically active zone and point is an use the temperature plasma flow. The Plasma - the most wide-spread, the most power-consuming and very sloppy from four conditions of material. The Plasma consists of ion of any element of the periodic system. The Material moves over to condition of the plasma under expense of the greater energy from outside. In view of instability of the plasma in the process of destruction is accompanied by a big splash of energy (light, gravitating to ultraviolet spectrum, and heat – up to 15000⁰C) [2; 5; 8].

Using of the plasma in critical medicine and in patients with heavy pathology became urgent during the last years, when one of the priority directions of the technical advances in developed country was usage of plasma complex. Alongside with flow of the plasma they radiate such components, as ultraviolet rays, ozone and nitric oxide. Plasma plant is compact, reliable and technically simple; easy for functioning (working) and service, but flexible design allows working practically in any area. The Flows of the plasma do not render the negative effect on patient and medical personal. Using the plasma presents itself essential breakout in the field of physical methods of the influence on biological fabrics and many author confesses perspective of use of the plasma in modern medicine [1; 4; 5; 6; 7; 9].

Also important is the possibility of the reduction of the overall expenses of the treatment most important is reduction of the expenses of expensive medication, particularly antibiotic, and reduction the length of the treatment. Given problem is more urgent for such expensive areas of medicine as is the critical conditions. Authors in developed country noticed the rise of cost of the treatment for period from 1985 to 2000 on 75 - 125%, 1750 - 2700\$ for one day of stay in I.C.U [6; 7; 10].

Reasons and problems of the study. The reason of the study was to show the first experience of the using plasma flow in purpose of the improvement of the results in treatment of critically ill patients with intra-hospital pneumonia, suppurative-septic diseases and bed sore wounds.

The following problems were set in accordance with the purpose of the study:

- conduct the preliminary comparative estimation of the result of the efficiency of external irradiations by plasma of pulmonary field in patients with intra-hospital pneumonia;
- value healing of wounds in serious cases of bedsores when using the plasma;
- define perspective of using the plasma in treatment of infected wounds in patients with gynecological pathology.

Material and methods. We studied the influence of plasma radiations on pulmonary projection zone in patients with pulmonary complications in critical conditions, who were on treatment in Institute of critical medicine at period 2007 - 2008. New methods were approved on 40 sick (the group 1).

Infected wounds treatment in patients with gynecological pathology was conducted in republic antiseptis center, gynecological branches. The methods were applied to 40 patients(the group 2).

Also given methods have been used in Institute of critical medicine during bed sore treatment by in patients with critical conditions, at present time method was applied to 5 patients only (the group 3).

Device used, was based on argon plasma radiation (the patent - P 2075 31. 03. 98. «Материалы лечения патологических процессов»). The methods used in patients with pulmonary diseases were founded on 5 or 10 times irradiation of the zones of projection on front, lateral and back surface of the thorax in mode "plasma irradiation" daily, during 5 - 7 minutes. The temperature plasma ray on skin surfaces cover was safe and was in the range of 40 - 42⁰C, methods itself did not require preliminary preparation and did not depend on heaviness of the pathology .

In patients with infected post operational wounds and bed sore wound methods was concluded on 5 - 10 times direct wound irradiations with plasma flow in similar mode.

As control groups were considered patients who were on treatment during 2006 - 2007, with critical conditions and diseases cognate with patients under investigation group.

All patients were conducted different types of the examination and treatments, according to installed standard of the treatment.

Results and discussion. In under investigation group 1 patients passed 335 sessions of plasma irradiations, to 13 of them - 5 sessions were conducted and to 27 of them- 10 sessions were conducted.

2 Subgroups were chosen:

- twenty four patients, to whom plasma irradiation was conducted immediately on arrival there was suspicion of already existing pneumonia.

-to the rest sixteen patients plasma irradiation was conducted on 3 - 5 day, after pneumonia signs appearance .

Among patients to whom plasma irradiation was conducted right after arrivals, in 9 events pulmonary complications did not develop and, accordingly, there was no need for an antibacterial therapy. In checking group such events have not been revealed.

In this group of patients under investigation we noted several positive phenomena, as follows:

- Illness was taking a benign course, with smaller degree of the clinical manifestations and intoxication;

- a reduction of lethality amongst patients with critical conditions by 15%;

- a reliable improvement in general and biochemical factors in blood;

- a reduction of average length of the treatment on 5 - 7 days and more;

- a reduction of the average cost of every day of on in hospital stay by 20 - 25 \$ and the overall value of the treatment by 15 - 18% by reduction of the expenses to antibiotic, immunomodulators and reduction of in hospital stay days.

In under investigation group 2 patients passed 250 sessions of plasma irradiations, of them 30 – passed 5 sessions, but 10 – passed 10 sessions.

In this group of patients under investigation we noted several positive phenomena:

- a quick healing of wound because of bactericidal and drying effect of the plasma;

- more swift regenerative processes in wound;

- wounds do not complicate with sepsis;

- a reliable improvement of the laboratory factors of blood;

- improvement by reduction the intensity of post operational pain, during postoperative period;

- a reduction of average length of the treatment by 5 - 7 days;

- a reduction of the average cost of in hospital stay days by 35 - 50 \$ and the overall value of the treatment by 25 - 27% by reduction of the expenses on medication and of in hospital stay days .

In under investigation group 3 patients passed 30 sessions of plasma irradiations, of them 2 - passed 5 sessions and else 2 - opassed10 sessions. The Preliminary totals of the treatment allow confirming that plasma flows have brought about significant improvement of heavy complication, reducing length of the treatment, improvement of the general condition of patient. Also significant economic effect is noted from using given methods, at the average on one patient approximately 30 \$ at day.

In conclusion it is necessary to note that in conducted study positive experience of the use of plasma radiations for prevention and treatments of pulmonary complications, in treatment of infected wounds in patients with gynecological pathology, as well as in patients with bedsores was generalized for the first time.

Preliminary data received by us during this investigation are indicative of perspective of using plasma flow in these areas of medicine, it requires the further study of given problem and broader introduction of the methods.

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კრიტიკულ მდგომარეობაში მყოფ ავადმყოფებში და აღრეულ
ოპერაციის შემდგომ პერიოდში ბარტულელების პრევენციასა და
მეურნეობაში პლაზმური ნაკადების გამოყენების პირველი გამოცდილება

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რეზიუმე

მასალაზე, რომელიც ეყრდნობა პლაზმური ნაკადებით პნევმონიების, მათ შორის რესპირატორ-ასოცირებულ, გინეკოლოგიური ოპერაციების შემდგომ ინფიცირებული ჭრილობების და აგრეთვე კრიტიკულ მდგომარეობაში მყოფ ავადმყოფებში ნაწოლების მეურნეობის პირველ გამოცდილებას, ავტორების მიერ რეკომენდირებულია აღნიშნული პათოლოგიების პლაზმის გამოყენებით

პროფილაქტიკისა და მკურნალობის ახალი მეთოდთა. ამ პათოლოგიური პროცესების უკეთესი მიმდინარეობა, კლინიკური გამოვლინებებისა და ინტოქსიკაციის ხარისხის შემცირება, ავადმყოფთა მდგომარეობის სარწმუნო გაუმჯობესება და მკურნალობის საშუალო ხანგრძლივობის შემცირება ამტკიცებს აღნიშნული მეთოდის უპირატესობას. აგრეთვე მიღებულია მნიშვნელოვანი ეკონომიკური ეფექტი საშუალო საწოლ-დღის შემცირების, სამკურნალო და დიაგნოსტიკური საშუალებების ღირებულების შემცირების ხარჯზე. მიღებული შედეგები საშუალებას იძლევა რეკომენდირებულ იქნას პლაზმური ნაკადები ავადმყოფთა მკურნალობაში ფილტვების ანთების, ინფიცირებული ოპერაციის შემდგომი ჭრილობების და ნაწოლების დროს. გამოსატული ეფექტურობა, სიმარტივე, საიმედოობა და საგრძნობი ეკონომიკური ეფექტი არის აღნიშნული მეთოდის მნიშვნელოვანი მახასიათებლები.

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