

ORGANIZATION OF ADMISSION OF THE INJURED IN RADIATION ACCIDENTS: EXPERIENCE OF THE SPECIALIZED ADMISSION DEPARTMENT OF THE OCCUPATIONAL PATHOLOGY CENTER OF THE FEDERAL STATE INSTITUTION "STATE RESEARCH CENTER – A.I. BURNAZYAN FEDERAL MEDICAL BIOPHYSICAL CENTER" OF THE FMBA OF RUSSIA

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Abstract. The main algorithms of actions for the medical personnel of the specialized admission department of the Center for Occupational Pathology at the A.I. Burnazyan Federal Medical and Biological Center of the Federal Medical and Biological Agency when admitting patients injured in radiation accidents and incidents are presented. The authors describe in detail issues of decontamination and priority of medical care, routing of patients within a specialized hospital, problems of sanitary and hygienic safety of personnel.

Key words: algorithm of actions, routing, medical personnel, medical aid rendering, admission of injured, radiation accidents, radiation incidents, sanitary processing, sanitary-hygienic provision, specialized admission department, specialized hospital

Conflict of interest. The authors declare no conflict of interest

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ОРГАНИЗАЦИЯ ПРИЁМА ПОРАЖЁННЫХ ПРИ РАДИАЦИОННЫХ АВАРИЯХ: ОПЫТ РАБОТЫ СПЕЦИАЛИЗИРОВАННОГО ПРИЁМНОГО ОТДЕЛЕНИЯ ЦЕНТРА ПРОФПАТОЛОГИИ ФГБУ «ГНЦ – ФЕДЕРАЛЬНЫЙ МЕДИЦИНСКИЙ БИОФИЗИЧЕСКИЙ ЦЕНТР ИМ. А.И.БУРНАЗЯНА» ФМБА РОССИИ

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Резюме. Представлены основные алгоритмы действий медицинского персонала специализированного приемного отделения Центра профпатологии «ГНЦ – Федеральный медицинский биофизический центр им. А.И.Бурназяна» ФМБА России при поступлении пораженных в радиационных авариях и инцидентах. Подробно рассмотрены вопросы санитарной обработки и приоритетности оказания медицинской помощи, маршрутизации пациентов внутри специализированного стационара, проблемы санитарно-гигиенического обеспечения безопасности работы персонала отделения.

Ключевые слова: алгоритм действий, маршрутизация, медицинский персонал, оказание медицинской помощи, приём пораженных, радиационные аварии, радиационные инциденты, санитарная обработка, санитарно-гигиеническое обеспечение, специализированное приемное отделение, специализированный стационар

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The main task of the specialized radiological clinic is diagnostics and treatment of the injured in radiation accidents. The specialists of Federal State Institution "State Research

Center – A.I. Burnazyan Federal Medical Biophysical Center" of the Federal Medical and Biological Agency of Russia have vast experience in providing medical care to the injured

in radiation accidents. In 1949-2020 they were involved in elimination of consequences of 405 radiation accidents which affected 846 people.

The gained experience is realized by maintaining constant readiness to receive the injured in radiation accidents. And also in a clear system of organization of specialized medical care in radiation accidents in the following directions:

- organization of the work of the specialized admission department and the corresponding sanitary and admission regime;
- organization of the work of the department of acute radiation pathology with an intensive care unit;
- organization of the department for the treatment of local radiation lesions in order to ensure the performance of reconstructive-plastic surgical interventions;
- organization of laboratory-diagnostic support;
- organization of physical dosimetry of patients and control of medical personnel.

A special role is played by the specialized admission department, which is a permanently functioning subdivision of the hospital. Its specialists organize primary admission of the injured, perform dosimetry and decontamination, and, if necessary, provide emergency medical aid.

The radiological team, including 2 doctors, 2 dosimetrists and 6-8 average medical personnel, conducts reception of the patients.

The layout of the premises of the specialized admission unit is shown in Fig. 1.

The head of the specialized admission unit supervises the work of admission and determines the priority of care for in-

coming patients. The order of priority depends on the presence of conditions that require urgent medical care. If the patient's condition is satisfactory, the priority depends on the level of skin contamination — the higher the level of skin contamination, the higher is the priority in the priority list.

Dosimetrists are called to the specialized admission ward to perform radiation monitoring at the entrance to and at the exit from the specialized admission ward. Instruments with γ -radiation, β - and α -particle detection units are used for radiation monitoring. Individual radiation doses of medical personnel are monitored with dosimeters, which are in the stowage kit permanently stored in the specialized admission ward.

When entering the specialized admission ward, the patient takes off his/her clothes (first the shoes, then the clothes of the lower and then the upper belt). The staff packs the clothes in plastic bags and labels them with the owner's name and the date of admission. An inventory of the property handed over by the patient for storage in room 1A of the specialized admission department is made. If necessary, contaminated clothing is submitted for measurement in the clinic's laboratories, for special decontamination treatment, or burial.

Patients are swabbed from the conjunctivae of the eyes, mucosa of the nasal passages, external auditory passages and the scalp.

Sanitation is performed at any level of radioactive contamination of patients' bodies. In room N^o2 affected people get soap and special detergents (paste "Protection", foaming emulsion "Radez"). Sanitary processing, which begins with a hand wash lasting up to 2 minutes at 30 ° C water

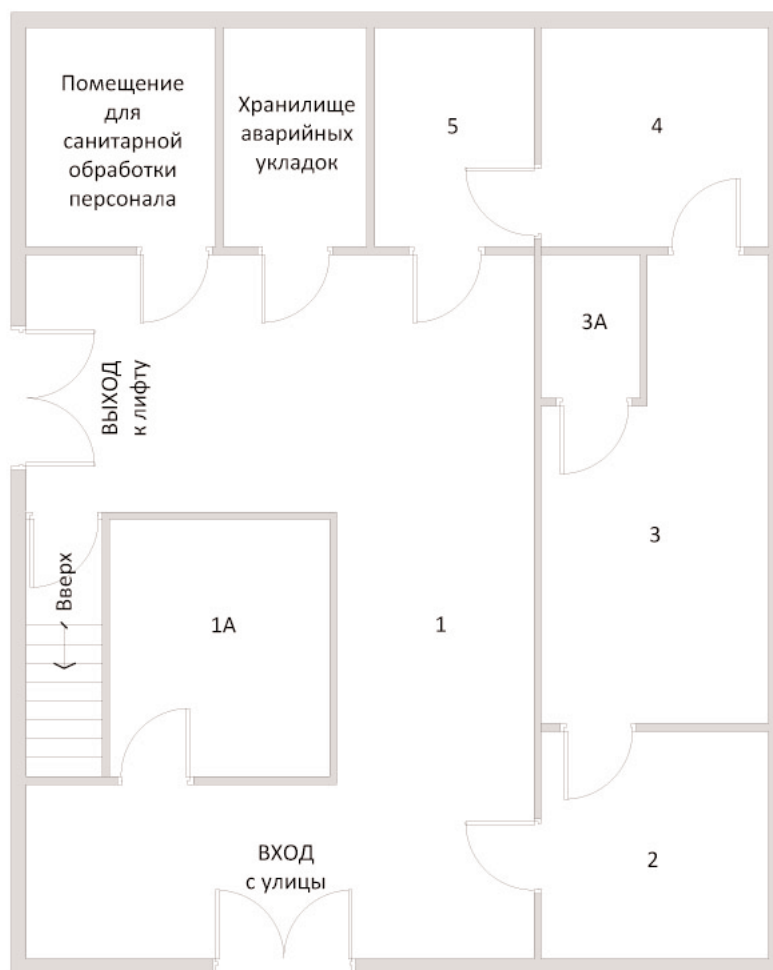


Рис. 1. Схема помещений специализированного приемного отделения
Fig. 1. Scheme of a specialized admission department

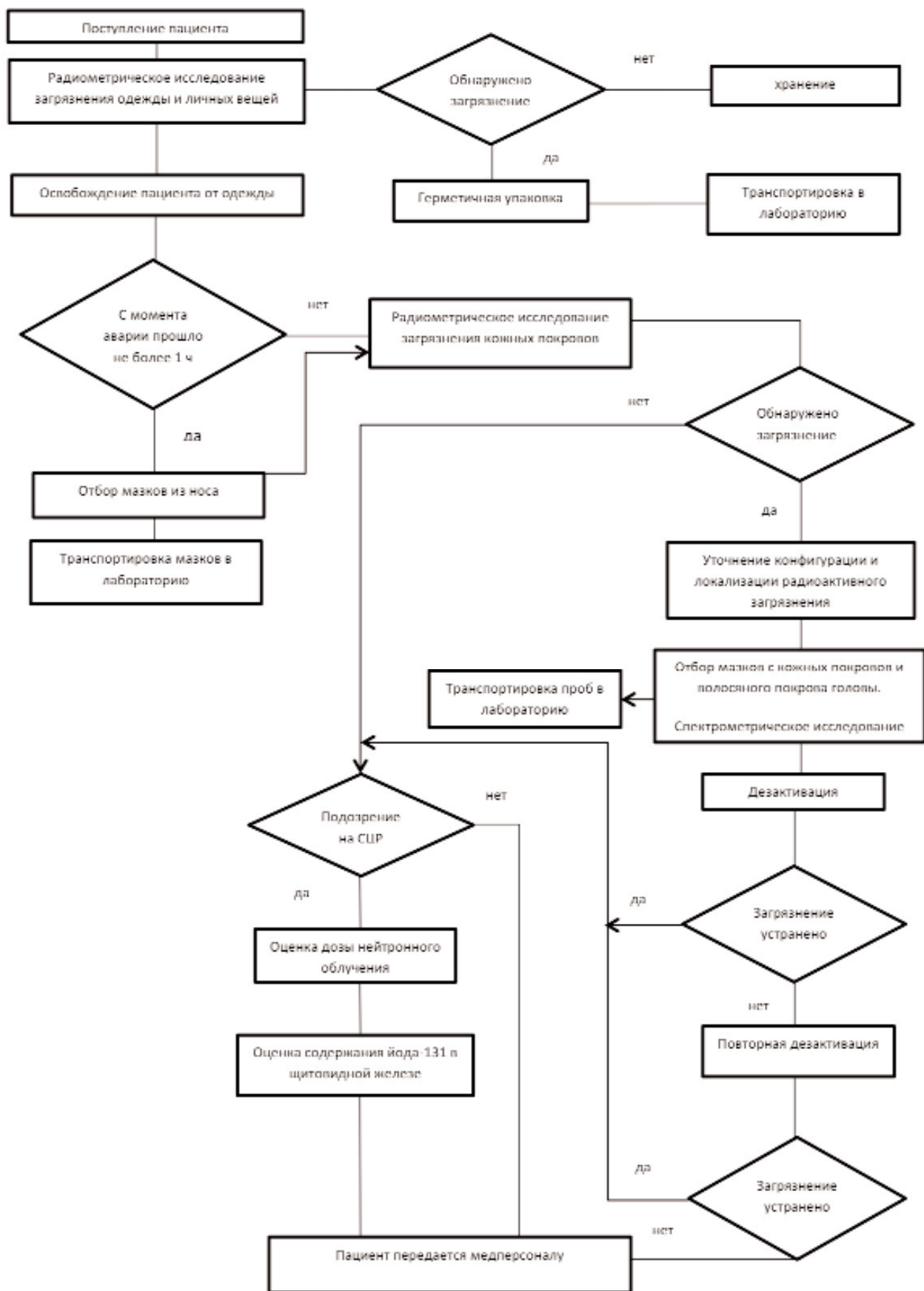


Рис. 2. Схема приема в специализированной клинике пораженного при радиационной аварии
 * СЦР – самоподдерживающаяся цепная реакция

Fig. 2. Scheme of admission of the injured in a radiation accident in a specialized clinic

temperature with a sponge or soft brush, carried out in the washing room number 3. Then the head (three times soaping and rinsing) and other body parts are washed for no more than 8 min. If necessary (residual radioactivity) — the hair is shaved off. Freshly prepared 2% sodium bicarbonate solution is used to rinse the mouth, eyes and external auditory passages.

After the decontamination, a control measurement of the surface contamination of the skin is carried out when the patient leaves the decontamination area and enters the clean area of the specialized admission unit. If residual radioactivity remains (contamination above 100 beta and/or 1 alpha particles/(cm²*min)) the sanitization is repeated, but no more than 3 times. The data obtained are recorded in the measurement protocol and subsequently in the medical records of the subject. Patients with compromised skin integrity (wounds, punctures, abrasions, burns) are sent to the dressing room of the specialized admission department for special surgical treatment of wounds, which is carried out under constant radiometric control. All dressing material and biosubstrates obtained during wound treatment are collected in containers, labeled and sent for radiometric investigation to the appropriate laboratories.

The toilet room (3A) is used to collect the excreta.

After sanitizing and radiometric skin testing, patients go to room 4, where they wear clean hospital clothes.

Then, the initial registration, patient examination, and medical history are performed. In addition, blood is drawn in room 5 for further radiometric and cytogenetic examination. In the case of emergency intake of radionuclides into the body of the affected people, they are examined on the Human Radiation Spectrometer. The conclusion on the content of radioactive substances in the patient's body and preliminary assessment of the radiation dose to critical organs and systems is sent to the attending physician.

Then the affected patients are admitted to the wards of specialized admission department for further observation and additional examinations — final determination of absorbed dose, and in case of radionuclide incorporation — for specific complexon therapy. For this purpose, the department is equipped with special stacks (Fig. 2).

In case of predicted development of acute radiation disease of II-IV stages of severity, patients are admitted to aseptic wards of the Department of Acute Radiation Pathology (Hematology). There they receive the whole complex of necessary treatment measures — bone marrow stimulation (betaleukin, granulocytic colony-stimulating factor), autologous or allogeneic stem cell transplantation, antibacterial, antiviral and antifungal therapy, blood component replacement therapy.

Patients who are predicted to develop acute radiation sickness of severity I may be under outpatient observation for three weeks before the onset of the period of major clinical manifestations of acute radiation sickness.

When carrying out works on the admission, examination and treatment of the affected people a set of measures on the organization of the personal protection of the personnel is carried out. Particular attention is paid to the protection of the respiratory organs from inhalation of radioactive aerosols, as well as the protection of the skin from radioactive contamination.

A set of personal protective equipment recommended for medical personnel working in the area of radioactive contamination includes:

- "Lepetok-200" respirator;
- overalls of mixed fabric;
- cap;
- special decontaminating shoes;
- medical gloves (2 pairs each);
- additional means of personal protection in plastikas (laminated):
 - gown
 - dungarees
 - apron
 - armbands
 - shoe covers.

After completing the work, all personnel of the team undergo radiometric monitoring, remove personal protective equipment at the boundary of the dirty area of the specialized admission unit (room #1) and undergo a complete sanitary treatment.

Radiation conditions in the premises of the specialized admission department are monitored by the radiation safety department after the end of hospitalization of patients.

When decontaminating rooms and surfaces:

- treat with decontaminating solution and then with water the identified places of radioactive contamination of surfaces;
- repeat radiometric control, if necessary — repeat washing of contaminated areas.

During decontamination works, liquid waste is collected in special containers (containers, flasks, barrels), and solid waste — in film bags. Then the radioactive waste is sent by special transport to the processing and burial points.

Thus, the presented algorithm of work of specialists of the specialized admission department allows timely and effective reception and sorting of victims of radiation accidents. It regulates the whole necessary complex of diagnostic and therapeutic measures, which as a result significantly improves the prognosis for this pathology [1-5].

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