

**Мыльникова Е.С., Уфимцева М.А., Береснева Т.А.  
СОСУДИСТЫЕ ПОРАЖЕНИЯ КОЖИ У РАБОТНИКОВ  
ЭЛЕКТРОЛИЗНОГО ПРОИЗВОДСТВА АЛЮМИНИЯ**

Кафедра дерматовенерологии и безопасности жизнедеятельности  
Уральский государственный медицинский университет  
Екатеринбург, Российская Федерация

**Mylnikova E.S., Ufimtseva M.A., Beresneva T.A.  
VASCULAR SKIN LESIONS IN WORKERS AT AN ELECTROLYSIS  
DEPARTMENT OF THE ALUMINIUM PLANT**

Department of dermatology and venereology and life safety  
Ural state medical university  
Yekaterinburg, Russian Federation

E-mail: shadael96@mail.ru

**Annotation.** The article presents the issues of epidemiology, etiology and clinical symptoms of the skin lesions in workers at an electrolysis department of the aluminum plant. The clinical cases are presented.

**Keywords:** workers, electrolysis department of the aluminum plant, telangiectasia

**Introduction**

Vascular skin lesions in workers at an electrolysis department of the aluminum plant are the specific skin changes manifested as telangiectasias and occurred on the upper part of the body.

Skin lesions on workers at an electrolysis department of the aluminum plant were first described in the late 1970s and early 1980s by researchers from USSR [1], Poland [8] and Canada [10]. Rash occurred among workers in the Soderberg electrolysis process and was more common among workers with longer seniority. The hypothesis has been raised that this eruption is related to ischemic heart disease. Nevertheless, the association between skin lesions and IHD is non-significant which suggests that this rash is an only dermatological problem [9]. The clinical significance of this pathology still needs to be defined. The mentions of the skin lesions are rare so far apparently due to a change in the technological process and conversion to the EcoSoderberg technology which reduces fluoride and gaseous hydrocarbon emission.

There are following groups of professional vascular skin diseases according to classification suggested by Fedorov et al. (1991) [6]:

1. Professional vascular skin diseases caused by the effects of chemical factors.

1.1. Professional angiopathy caused by the halogenated ethylene (polyvinylchloride, perchlorvinyl) in workers of leather substitute manufacture, plastics industry, paintwork material, and glue production.

1.2 Professional vasculitides caused by the aromatic hydrocarbons.

1.3 Professional vasculitides from the effects of antitumor antibiotics and cytostatics.

1.4 Professional vasculitides caused by the phytoallergens.

2. Professional vascular skin diseases caused by the effects of physical production factors such as local and general vibration, ultrasound, elevated atmospheric pressure, and lower temperature.

According to the authors, the primary cause of skin lesions is the overall impact of fluoride, hydrocarbon, and heat radiation. The morbidity of this rash among the workers at an electrolysis plant is about 40% [3, 5, 7, 9]. Moreover, the lesions among anode workers are detected more often (up to 49%). The eruption among electrolysis workers is found in 25% of all the cases [2, 4].

The lesions are located on the upper part of the body (chest, back, shoulders and less frequently neck and face). They are round or oval macules with sharp borders. The color of the lesions varies from pink to cyanotic. Macules disappear during diascopy. The patients have no subjective sensation [4].

Microscopically, nonspecific changes were found: dilatation of the capillaries, swelling of the endothelium, the presence of a ring of mononuclear cells around the vessels and fragmentation of the elastic fibres in the dermis. The changes affected the arteriolar, capillary, and postcapillary venular segments of the terminal vessels.

**The research purpose** is a literature review and presentation of the clinical cases of skin lesions in workers at an electrolysis department of the aluminum plant.

**Materials and methods.** The examination of patients at Ekaterinburg Medical Research Center for Prevention and Health Promotion in Industrial Workers of Rospotrebnadzor was held. The certifications of the working place were studied.

### **Results and discussion**

**Case 1.** A-48-years-old man had a medical check-up at Ekaterinburg Medical Research Center for Prevention and Health Promotion in Industrial Workers of Rospotrebnadzor. The patient was presenting a rash located on the back, chest, abdomen and upper limbs.

The patient noticed the eruption more than 10 years ago after 7 years of working at the electrolysis department. There was no subjective sensation. The patient did not consult a dermatologist. After close-down 5 years ago no new elements appeared. The patient was diagnosed with hypermetropia, presbyopia, retinal angiopathy, and obesity. An x-ray revealed no skeletal fluorosis.



*Fig. 1. Purpuric macules on the skin of the back.*

Status localis (fig. 1): the lesions are diffused and symmetric. They are painless purpuric macules whitening on pressure, with sharp edges, and irregular shape, ranging in size from 0.5 to 5 cm.

**Case 2.** A-55-years-old-man had a medical check-up at Ekaterinburg Medical Research Center for Prevention and Health Promotion in Industrial Workers of Rospotrebnadzor. The patient was presenting an eruption located on the back, chest, abdomen and upper limbs.

The patient noticed the rash more than 10 years ago after 10 years of working at the electrolysis department. There was no subjective sensation. The patient did not consult a dermatologist. After close-down 5 years ago no new elements appeared.

The patient was diagnosed with presbyopia, retinal angiopathy, vasomotor rhinitis. An x-ray revealed the signs of skeletal fluorosis.

*Fig. 2. Purpuric macules on the skin of the upper and lower limbs, chest, stomach.*

Status localis (fig. 2): the lesions are diffused and symmetric. They are painless purpuric macules whitening on pressure, with sharp edges, and irregular shape, ranging in size from 0.5 to 5 cm.

**Working condition assessment.** Main airborne contaminants at the electrolysis department were sodium fluoride, aluminum fluoride, fluorine hydride (maximum concentration limit excess 1,2-4.4 times), tarry materials (maximum concentration limit excess 7.5-16.5 times). The significant temperature drop is typical for a space microclimate from 0.0°C to +15.0°C during the cold season and from +10.0°C to +35.0°C during the warm season.

**Conclusion.** The possible cause of the vascular skin lesions in workers at an electrolysis department of the aluminum plant could be the overall impact of fluoride, hydrocarbon, and heat radiation. The connection between vascular skin lesions and somatic pathology is not defined. It could be explained by the lack of long-term prospective studies.

#### **References:**

1. Базыка А.П. Взаимосвязь профессиональных сосудистых поражений кожи с функциональными нарушениями сердечно-сосудистой системы у рабочих электролизного цеха алюминиевого завода / А.П. Базыка, В.П. Логунов, В.Г. Селивоненко, В.В. Козленко // Вестник дерматологии и венерологии. – 1977. – № 7. – С. 73–77.

2. Петренко О.Д. Распространенность кожных заболеваний у работников электролизного производства никеля и алюминия / О.Д. Петренко // Экология человека. – 2008. - №10. – С. 37-39.

3. Сюрин С.А. Цена крылатого металла. Условия труда состояние здоровья рабочих алюминиевой промышленности в кольском Заполярье / С.А. Сюрин // Медицина труда. – 2012. - №4. – С. 63-65.

4. Сюрин С.А. Сосудистые поражения кожи у рабочих электролизного производства алюминия / С.А. Сюрин, А.Н. Никанов, В.В. Шилов // Медицина труда и промышленная экология. – 2012. - №11. – С. 25-29.

5. Уфимцева М.А. Анализ результатов периодического медицинского осмотра дерматовенерологом рабочих, занятых на металлургических предприятиях Свердловской области / М.А. Уфимцева [и др.] // Здоровье населения и среда обитания. – 2018. - №12. – С. 19-23.

6. Федоров, С. М. Профессиональные сосудистые заболевания кожи – отдельная нозологическая форма профдерматозов / С.М.Федоров, Г.Д.Селицкий, А.А.Антоньев // Вестник дерматологии и венерологии – 1991. – N 7. – С. 37- 41.

7. Balić J, Kansky A. Skin telangiectasia in workers of an aluminium processing plant. / J. Balić, A. Kansky // *Dermatosen in Beruf und Umwelt.* – 1988. - №36(1). – P. 20-22.
8. Lejman K. Skin lesions in workers of the electrolysis department of the aluminium plant in Skavina Poland. / K. Lejman, K. Szwarc, F. Szydowski // *Prezeglądu Dermatologicznego.* – 1976. - №6. – P. 117-120.
9. Rossignol M. Skin telangiectases and ischaemic disorders in primary aluminium production workers / M. Rossignol, G. Theriault // *British Journal of Industrial Medicine.* – 1988. - №45. – P. 198-200.
10. Theriault G.P. Skin telangiectases in workers at an aluminum plant / G.P. Theriault, S. Cordier, R. Harvey // *The New England Journal of Medicine.* – 1980. - №303. – P.1278-81.
11. Theriault G.P. Telangiectasia in aluminum workers: a follow up / G.P. Theriault, S. Gingras, S. Provencher // *British Journal of Industrial Medicine.* – 1984. - №41. – P. 367-72.

УДК 614.0.06

**Обласова Д.С., Старикова А.Я., Емельянова Л.А.  
АНАЛИЗ ОРГАНИЗАЦИИ ЭВАКУАЦИОННЫХ И МЕДИЦИНСКИХ  
МЕРОПРИЯТИЙ ПОТЕРПЕВШИХ ОТ АВАРИИ НА ЧЕРНОБЫЛЬСКОЙ  
АТОМНОЙ ЭЛЕКТРОСТАНЦИИ В СВЕТЕ СОВРЕМЕННЫХ  
ПРЕДСТАВЛЕНИЙ ТИПОВОГО СОДЕРЖАНИЯ ПЛАНА  
МЕДИЦИНСКОГО ОБЕСПЕЧЕНИЯ НАСЕЛЕНИЯ В СЛУЧАЕ  
РАДИАЦИОННОЙ АВАРИИ**

Кафедра дерматовенерологии и безопасности жизнедеятельности  
Уральский государственный медицинский университет  
Екатеринбург, Российская Федерация

**Oblasova D.S., Starikova A.Y., Emelyanova L.A.  
THE TYPICAL CONTENT OF THE MEDICAL PLAN FOR THE  
POPULATION IN THE EVENT OF A RADIATION ACCIDENT. ANALYSIS  
OF THE EVACUATION AND MEDICAL EVENTS OF THE CHERNOBYL  
ACCIDENT**

Department of dermatovenereology and life safety  
Ural state medical university  
Yekaterinburg, Russian Federation

E-mail: anna.starikova.1996@mail.ru

**Аннотация.** В статье описаны совершенные во время эвакуационных мероприятий, проведенных на месте аварии на Чернобыльской атомной электростанции, ошибки и их анализ в соответствии с нормативными