

Research Article

Occupational eye traumatism of members of vessel's crews of the Northern Water's Basin

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Annotation

Introduction: Occupational eye traumatism of members of vessel's crews of the Northern Water's Basin are relevant, but little studied medical problem.

Material and methods: The analysis of a continuous sample of various eye traumatism in 79 patients, working on the vessels of the basin was carried out. Analytical and statistical methods were used for the analysis.

Results: In water transport, eye traumatism was found in men from among of members of vessel's crews significantly more often than in women ($P < 0.001$). Every second injury occurs to sailors aged 20-29. In 30-39 and 40-49 years - their number is reduced by half. Individual cases of eye damage were observed in persons under 20 years and over 50 years. In every second case of an injury to the eye, of members of the technical operation service ("machine command") received; operation - 47.3%; production - 2.7%. Among the injured there were no representatives of the radio-technical service, product processing, household, medical and sanitary. Outcomes of eye injuries of members of vessel's crews of the Northern Water's Basin during the study period should be considered good. Most sailors return to work in their speciality. Disability group III is set in 2.7% of cases.

Conclusions: 1. The socio-economic significance of the industrial eye traumatism of the transport and fishing fleets of the Northern Water's Basin allows to classify members of vessel's crews as a group at increased risk of this occurrence of injuries.

2. In the general structure of this type of occupational traumatism, members of vessel's crews of ocular organ damage constitute 3.6% of cases and occupy the sixth rank position.

3. During the voyages on ships, workers' eyes were injured by 40.2% of observations and foreign bodies (34.6%; $P < 0.05$). Contusions (18.2%; $P < 0.05$) and burns (7.0%; $P < 0.01$) are significantly inferior to them.

4. Ordinary composition: motorists and sailors are most vulnerable to eye injuries ($P < 0.05$). Mechanics, navigators and other ship specialists made up only one fourth of the victims.

5. Most of the eye damage on ships occurs during the maintenance and repair of machinery in the engine room; maintenance of deck machinery ($P < 0.01$); repair of electrical equipment ($P < 0.001$); general ship works associated with ramps and decks. Eye injuries occur when working with hatch closures, cleaning of holds, mooring operations, plumbing work.

6. Foreign bodies enter during the transportation of bulk cargo (sand, gravel), grain, work on the cleaning of holds, scrapping the hull in the absence of protective equipment. Foreign bodies of the organ of vision - the predominant injury of the seamen of the transport fleet ($P < 0.001$).

7. Based on the obtained results, a database of occupational eye traumatism on water transport is formed to describe professional features, algorithmically predictable structure depending on the area of navigation, features of the transported cargo, climatic and geographical factors.

Introduction

The frequency of occupational eye traumatism depends on the level of development of the marine industry as a whole, the automation of processes on modern sea and river transport, as well as fishing vessels. Its share in the structure of general occupational injuries depends not only on the quality of accounting for accidents, but also on the attitude to eye injuries in a particular industry [1-3]. The widespread introduction of preventive measures to reduce eye traumatism in major industries has led to a significant decrease. However, to date, no special studies have been carried out on the medical and social rehabilitation of members of vessel's crews with damage to the organ of vision [4-6]. In the works devoted to the overall incidence of water workers, there are only a few references to the frequency of traumatic eye damage on ships. In terms of the number of initial appeals among members of the lower vessel's team, the injuries of the organ of vision are in fourth place [7]. Eye traumatism in seafarers are especially dangerous for their complications, occurring in 6.3% of patients, including 5.6% - persistent corneal clouding developed, which caused a decrease in vision, and 0.7% - traumatic cataract that caused blindness in one eye [8,9].

Material and Methods

The analysis of a continuous sample of various injuries of the organ of vision in 79 patients from members of vessel's crews of the Northern Water's Basin was carried out. When working on the material used methodological approaches: systemic, integrated, integration, functional, dynamic, process, regulatory, quantitative, administrative and situational. Analysis methods included: analytical and comparison. For the analysis, the following techniques were used: grouping, absolute and relative values, average values, detailing and generalization. The reliability of the results obtained was estimated by calculating the student coefficients. Methodical approaches were used: system, integrated, integration, functional, dynamic, process, regulatory, quantitative, administrative and situational, as well as methods: historical, analytical and comparison. The following techniques were used: grouping, absolute and relative values, average values, detailing and generalization. The results were processed statistically on a personal computer. The arithmetic mean and standard deviation with the normal type of distribution of variables were used as the main characteristics of descriptive statistics. Qualitative features were presented in the form of relative frequencies with the definition of a confidence interval. The significance of differences in quantitative traits between groups with a normal distribution of quantitative variables was calculated using Student's t-criteria for independent samples. The error threshold for statistically significant differences was set at 0.05.

Results

In the general structure of traumatism of members of vessel's crews of the Northern Water's Basin, damage to the organ of vision was 3.6% of cases and was in the sixth ranking place (5.7 per 1000 workers) after injuries to the hand, foot,

leg, head and forearm. 40.2% of observations and foreign bodies (34.6%; $P<0.05$) prevailed among them. Contusions (18.2%; $P<0.05$) and burns (7.0%; $P<0.01$) were significantly inferior to them.

On water transport, eye injuries are found in men from among the floating composition significantly more often than in women ($P<0.001$). Every second injury occurs to sailors aged 20-29. In 30-39 and 40-49 years - their number is reduced by half. Individual cases of eye damage were observed in persons under 20 years and over 50 years.

The design features of the ships, the nature of the goods being transported, the methods of their loading and unloading are of great importance in the mechanism of injury. Two thirds of injuries of the organ of vision in the northern basin were received on vessels of the transport fleet. On river, fishing, technical and port vessels, they occurred 5-7 times less.

In every second case of an injury to the eye, a floating personnel of the technical operation service ("machine command") received; operation - 47.3%; production - 2.7%. Among the injured there were no representatives of the radio-technical service, product processing, household, medical and sanitary. The distribution of occupational ocular injuries of the floating composition on vessels according to the specialties of the victims is presented in table 1.

Table 1: The structure of occupational eye traumatism among ship specialists of the Northern Water's Basin (%).

Ship specialists / Type of injury	Eye traumatism	Wounds	Foreign bodies	Contusions	Burns
Sailors	33,2±1,6	35,6±1,6	41,6±2,1	17,8±1,6	50,0±2,7
Motorists	41,6±2,1	35,6±1,6	49,9±2,4	48,7±2,5	--
Navigators	8,4±0,7	7,2±0,8	8,5±1,0	16,9±1,6	50,0±2,7
Mechanics	8,4±0,7	14,4±1,1	--	16,6±1,5	--
Other	8,4±0,7	7,2±0,8	--	--	--
Total:	100,0	100,0	100,0	100,0	100,0
Average duration of disability (in days)	19,5	29,8	11,4	11,8	19,6

Ordinary composition: motorists and sailors are most vulnerable to ocular trauma ($P<0.05$). Mechanics, navigators and other ship specialists made up only one fourth of the victims. Most eye damage on ships occurs during maintenance and repair of machinery in the engine room; maintenance of deck machinery ($P<0.01$); repair of electrical equipment ($P<0.001$); general vessel's works associated with transitions on ladders and decks. Eye injuries occur when working with hatch closures, cleaning of holds, mooring operations, plumbing work. Damage caused by blunt objects is 4.4 times more likely than acute ($P<0.001$).

The distribution of eye injuries by specific weight during the weekly cycle was as follows: the maximum number of traumas occurs on Monday and Thursday - 22.1% each; on Tuesday and Saturday - 16.7% each. On Wednesday (8.5%), Sunday (8.2%)

and Friday (5.7%), the number of injuries to the organ of vision among members of vessel's crew was significantly reduced.

The increased danger of ship works in the summer and spring compared with the winter period ($P < 0.001$).

41.6% of injuries happened on flights, including 11.2% in the Arctic; moderate - 24.9%. The rest occurred at parking with the same frequency in the home port and other ports.

Damage to the organ of vision of members of vessel's crews of water transport are monotrauma ($P < 0.001$) and are predominantly monofocal ($P < 0.001$). Treatment of seafarers in most cases is carried out on an outpatient basis, and only 36.0% of patients are hospitalized in a specialized hospital, where treatment lasted an average of 13.4 days.

Eye wounds members of vessel's crews receives at the age of 20-29 years ($P < 0.05$) on vessels of the transport and river fleets when working in the engine room, on the upper deck and repair of electrical equipment ($P < 0.01$).

Foreign bodies enter during the transportation of bulk cargo (sand, gravel), grain, work on the cleaning of holds, scrapping the hull in the absence of protective equipment. Foreign bodies of the organ of vision - the predominant injury of the seamen of the transport fleet ($P < 0.001$). The frequency of this type of eye injuries of members of vessel's crews have a wind speed, in conjunction with abrupt changes in atmospheric pressure and humidity.

Eye contusions in every second case occur with members of vessel's crews of 30-39 years on ships of the transport fleet. Ship specialists receive them in the maintenance and repair of the main and auxiliary engines, work associated with the movement of ladders and decks ($P < 0.05$).

Burns of the eye members of vessel's crews gets more often on transport and river vessels; than fishing ($P < 0.05$). Motorists and sailors predominate among the victims. The severity of injury is determined by the degree and extent of the burn. In severe cases, disability reaches 39.8 working days. Therefore, in the prevention of industrial chemical burns of the eye in the transport fleet, the provision of mechanization and sealing of transfusion of caustic liquids is of decisive importance.

Emergency care for injuries to the organ of vision is provided by ship medical personnel. They master the fundamentals of urgent ophthalmology during the passage of targeted training in ship medicine and on improvement cycles. The treatment begins at the ship medical center, after arriving at the port - the specialized department of the basin hospital. In the absence of a medical officer on board the ship, the first aid must be provided by authorized persons who have undergone special training. Usually this function is assigned to the senior assistants of the captains. Outcomes of eye injuries of the floating structure of the northern basin during the study period should be considered good. Most sailors return to work in their specialty. Disability group III is set in 2.7% of cases.

Discussion

The causes of eye traumatism are: weakening of control

by the ship administration and supervisors during safety briefings; violations of safety regulations and labor discipline, violations of the correct implementation of techniques, disregard for the use of protective equipment, negligence or excessive haste in the work. It is impossible not to point out the low mechanization of dangerous and labor-intensive work in conditions of limited ship spaces, especially of old buildings and, therefore, insufficient provision of production equipment with necessary protective and safety devices.

Insufficient illumination of the workplace on some types of vessels causes visual fatigue and causes excessive approach of the person working to the object of labor or the machine, which increases the risk of injury to the eyes. Therefore, the general lighting of the workplace, the production area of the vessel must be supplemented by rational additional local lighting of the workplace. It should be sufficient, but not too strong and not giving brilliance. [1,2,4]

Among the general health measures that help reduce eye injuries in the workplace is a well-functioning ventilation system that prevents excessive dust or air pollution.

In the Northern Water's Basin, the frequency of traumatism to the organ of vision is directly dependent on the production experience. With the growth of professional skills, the development of production processes, the amount of damage decreases sharply: among water workers who have worked on ships for more than 15 years, the frequency of eye injuries decreases by 2.4 times compared with the crew of the first year of work. That is, occupational injuries of the eye on marine and fishing vessels are more often observed in young and (or) inexperienced workers. Therefore, it is paramount for them to learn all the details of the work or production process. At the same time, a young specialist should be thoroughly trained in all the safety regulations associated with this type of work. And admitting to a new and unsafe type of work is possible only after checking her knowledge. [1,4,6].

It must not forget about individual eye protection with numerous types of goggles, visors, masks and half masks. Among the means of collective eye protection, glass screens have become widely used, which, attached to the machine, deflects the flow of small objects or metal fragments.

However, the main method of preventing occupational eye traumatism is it's carefully set-up accounting of absolutely all (including minor) injuries of the organ of vision. Since only in this case the necessary conditions arise for the timely clarification and quick elimination of the causes of eye injuries at the relevant production site, the workplace of members of vessel's crews. It is necessary to take into account not only serious injuries of the organ of vision, which are drawn up by the act of occupational injury or lighter injuries of the eyes, causing disability, obtained during the performance of production tasks with disability, but not related to production, but also minor injuries of the eyes, not causing disability [1,3,9].

Prevention of occupational eye traumatism on transport and fishing vessels of the Northern Water's Basin should be considered as one of the forms to prevent industrial injuries

of members of vessel's crews as a whole. In the process of sanitary-educational work on its prevention in water transport, it is necessary to include the full range of differentiated, targeted sanitary-educational measures that provide for the hygienic education of various contingents of floating personnel. Sanitary-educational work should be carried out in accordance with the local specific conditions of each ship, specific work collective, ship crew and the working conditions and tasks facing them. Sanitary-educational work among members of vessel's crews should be based on the principles of scientific nature, planning, mass character, purposefulness and availability of the presentation of the material [2,3,6].

Conclusions

1. The socio-economic significance of the industrial eye traumatism of the transport and fishing fleets of the Northern Water's Basin allows to classify members of vessel's crews as a group at increased risk of this occurrence of injuries.

2. In the general structure of this type of occupational traumatism, members of vessel's crews of ocular organ damage constitute 3.6% of cases and occupy the sixth rank position.

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