Structure of short paroxysmal disorders of consciousness in the Civil Aviation specialists and the approaches to medical-flight examination

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Abstract

The article presents the clinical observations of short episodes of losses of consciousness among the Civil aviation specialists, which make a threat to the flights safety. From 2000 to 2011 192 episodes were recorded. In 29.17 % of cases epileptic seizures were diagnosed, in 70.83 % - transient disorders of consciousness of non-epileptic origin. Results of a comprehensive survey showed features of clinical manifestations among the various categories of aviation professionals. At the deciding a question on the professional serviceableness at the medical-flight examination an individual and a balanced approach is necessary that takes into account gender, age, etiology, previous medical examination, etc.

Keywords: aviation specialists, seizures, short-time paroxysmal disorder of consciousness, safety, expert decision.

Introduction

Many diseases of neurology system, as well as the episodes of short-term loss of consciousness (seizures, faint, stroke, any acute cerebrovascular diseases, etc), in aviation personnel represent a threat for safety of flights.

The determination of characteristic episodes of loss of consciousness – epileptic seizure or not, faint or seizure and risk of recurring are very actual for the correct adaptation of the expert decision in each concrete case in Central Flight Medical Expertise Commission [2, 3, 7, 14, 16].

The symptom common to seizures and faints is loss of consciousness which, by definition, is of rapid onset and brief duration. There is not one classification of loss of consciousness disorder, because there are many various genesis mechanisms in each case [1, 9, 20].

By definition the word “faint” means a loss of consciousness due to a temporary failure of the cerebral circulation of a postural of reflex causation, not the result of heart diseases. This definition word excludes from our consideration attacks caused by heart block or other cardiac disorders and also those due hypoglycemia. The word “convulsive seizure” may be used to indicate that the loss of consciousness is accompanied by convulsions, or in a largest sense to include attacks or seizure of any kind that is epileptic. The first symptom is local discharge from epileptic centre of nerve tissue in brain. There for, seizure semiology is usually combined with EEG (not one EEG) and other neuroimaging data to localize the seizure focus [4-6, 8-17].

It is very difficult problem of differential diagnosis in clinical practice to determine characteristic episodes of loss of consciousness. The value of etiology, clinic of paroxysmal loss of consciousness definition of prognostic results are very actual for the correct adaptation of the expert decision in each concrete case [1, 3, 12].

Many researches devoted to epidemiology, clinical picture, differential diagnostics episodes of loss of consciousness which continue to be actual to the present are conducted. The results published in works of different authors, don’t differ uniformity that dictates need of further works on studying of different aspects of a problem.

This research deals with determining the structure of paroxysmal short-term loss of consciousness disorders among aviation personnel of civil aviation.

Materials and methods

The studying the cases of paroxysmal loss of consciousness disorders among aviation personnel of Civil aviation from long time are presented. Aviation personnel included: entrants, cadetts, stewards; licensed aviation personnel: aircraft commanders, pilots, aeronavigators, flight engineers, flight mechanics; from other - air traffic controllers. In all cases of paroxysmal loss of consciousness patients have clinical observation in neurological department in Civil aviation Hospital and expert decision in each concrete case in Central Flight Medical Expertise Commission [10, 14, 16]. In some cases it took years and repeated complex instrumental examinations for clarifying courses of disease. Instrumental examinations included: EEG, neuroimaging (CT, MRI), psychology tests, etc. [13, 16].

Results and discussions

During the period from 2000 to 2011 192 episodes of loss of consciousness among aviation experts were observed. After a careful assessment of the preclinical period, the description of an attack and the subsequent obligatory stationary inspection of registered persons in examination and rehabilitation office all episodes of short-term loss of consciousness were divided on: epileptic attacks – 56 (29,17%) and cases of short-term loss of consciousness of not epileptic character - 136 (70,83%).

Among employees and students of CA with short-term frustration of consciousness 150 (78,25%) men and 42 (21,87%) women were observed. Average age of patients at the time of a debut of an attack of loss of consciousness made 34,8 ± 5,45. All women with short-term frustration of consciousness were from among stewards, cadets and entrants. Distribution on official categories among an aircrew and students was the following: the aircrew (the aircraft commander, pilots, navigators, flight engineers, flight mechanics) was included in the 1st group - 48,96% of cases, dispatchers of the Department of Internal Affairs in the 2nd - 18,23%, to the 3rd group, we designate, stewards, entrants and cadets - 32,81% are carried.

From an aircrew with paroxysms of frustration of consciousness of 53,33% (40 people) pilots, 20% (15 people) the aircraft commander; 14,66% (11 people) flight mechanics, 6% (8 persons) navigators and 3% (4 people) flight engineers.

If to speak about type of paroxysmal frustration of consciousness at aviation experts of CA, they were distributed as follows (tab. 1). In total number of epileptic attacks the share of an aircrew made 57,14%, on the second place – dispatchers of the Department of Internal Affairs – 23,21%, a share of the other contingent – 19,64%. Among frustration of consciousness of other genesis the aircrew share (45,59%) took also the 1st place, the 2nd place at other – 38,23% and on the 3rd place of the dispatcher of the Department of Internal Affairs - 16,18%.

Table

Structure of paroxysmal loss of consciousness disorders among Civil aviation specialists,

abs. number (%)

Consciousness disorders	Category of the CA specialist			
	Aircrew	Air traffic controllers	Other	Total
All paroxysms	94 (48,96)	35(18,23)	63 (32,81)	192 (100)
Epileptic seizures	32 (57,14)	13 (23,21)	11(19,643)	56 (100)
Short-time paroxysmal disorder of consciousness of non-epileptic origin	62 (45,59)	22 (16,18)	52 (38,23)	136 (100)

In this study, for the first time surveillance of paroxysmal episodes of consciousness disorders in the Civil aviation specialists for a long of time was conducted. The carried-out monitoring showed that at structure of short-term losses of consciousness there were epileptic attacks and frustration of consciousness of other genesis.

According to the International antiepileptic league, epilepsy takes the third place on prevalence in the general population of the population, making 0,8-1,2%. Prevalence of faints in the same population makes 3% among man's and 3,5% among a female [10,11]. In our research among aviation experts less than 1/3 made epileptic attacks, more than 2/3 episodes of losses of consciousness of other genesis. It significantly doesn't differ on ES ratio to paroxysmal frustration of consciousness of other genesis from given in data.

Requirements of the Flight Medical Expertise (FME) which is carried out among aviation experts, dictate discharge of the persons who have transferred a single epileptic attack from professional activity. Return to a profession and diagnosis specification, determination of character of ES (symptomatic epileptic, provoked single) is possible only after the long period (not less than 2 years) discharges. Lack of recurrence of an attack, in the absence of the found tool changes in dynamics, allows to assume, the provoked character of an epileptic attack, instead of formation of an epileptic illness.

As it was already spoken, owing to specifics of a profession in our research of women there were only 21,87% (42 people) and all of them belonged to the other contingent (stewards, cadets, entrants).

Prevalence of the paroxysmal frustration of consciousness of non epileptic genesis (1,9:1), in group of other structure is probably connected with a variety of reasons. In this group of 6,6% (42 people) women, the age structure of this group is much younger, than in other structures (from 16 to 39 years) as entrants and cadets here entered. It is known that at young age immaturity of vegetative functions is most presented. FME in these cases uses temporary discharges for up to 3 months and carrying out treatment-and-prophylactic actions [3,6,11] more often.

Prevalence of ES over paroxysmal frustration of consciousness in group of dispatchers of the Department of Internal Affairs makes 1,4: 1. In group of an aircrew these ratios make 1,2: 1 . The age structure of the observed contingent in these groups is more senior, than in group other, i.e. it is possible to assume a maturity of vegetative structures. The category of the working personnel already passed preliminary elimination in these groups at a study stage. Control supervision over this professional structure rather strict that forces professionals to watch the

reasons of functional violations and the reasons which can provoke faints. It is much more difficult to prevent EP. As appears from our previous publications the organic reasons of short-term frustration of consciousness (a consequence of craniocerebral injury, cerebrovascular disease, intoxication and etc.) here prevail. FME in these cases demands more frequent acceptances about discharge from professional activity [2,3,19,20].

Conclusion

Short-term paroxysmal frustration of consciousness represents an important medical and social problem. Faints can be the first and, on a certain time point, the only manifestation of various pathology. The range of the diseases leading to short-term paroxysmal frustration of consciousness is very wide. The forecast varies from widespread, having favorable a current to heavy states menacing to life.

Short paroxysmal disorders of consciousness pose a threat to safety, both to the life of passengers, and from an economic position, in case of intermediate landing, the cause of which is an acute illness of one of the crew members. As a result of the conducted research among aviation specialists groups of short-term paroxysmal frustration of consciousness of epileptic and non epileptic genesis are distinguished. Epileptic attacks made 29,17%, paroxysmal frustration of consciousness of other genesis made 70,83%. These ratios don't differ from those in the general population of the population. Taking into account the specified structure of attacks the FME principles are made assuming the maximum preservation of safety conditions of flights. After the transferred attack of epileptic genesis discharge from professional activity follows. After paroxysmal frustration of consciousness of other genesis probably short-term discharge is necessary for the purpose of specification of genesis of an attack and carrying out medical and rehabilitation actions. Carrying out an expert assessment of professional suitability right after the first registered episode and, often, lack of possibility of selection of medical actions and the preparations, dictated by requirements of preservation of safety of flights, is feature of diagnostics at aviation experts.

After carrying out inspection and physical examination of FMEC, Central Flight Medical Expertise Commission 40,8% of staff are detached (completely or with an individual assessment) from professional activity, 45,2% (62 ps) are left in a profession. From the students 42% (8) were recognized unusable to training.

At the analysis of short-term paroxysmal frustration of consciousness structure among various categories of aviation experts different ratios of ES to paroxysms of other genesis are revealed. Among an aircrew this ratio is 1,2:1, among dispatchers of the Department of Internal Affairs – 1,4:1, among the other - 1: 1,9 . It is connected with the variety of reasons, including sex, age, an etiology, the previous medical supervision, etc. and, demands further studying.

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