



EVALUATION OF THE AUTOPSY FINDINGS IN FATAL DIVING ACCIDENTS IN TURKEY

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INTRODUCTION

Diving is an activity that possesses risk of accidents that can result in deaths or injuries, since it is performed in different physical conditions. It is important to investigate the diving accidents to find out contributing factors and preventive measures. The largest data was reported by Divers Alert Network (DAN). Two other reports were published by the British Sub Aquatic Club (BSAC) and DAN Asia-Pacific with lesser data.

The forensic medicine has a critical part to determination of the cause of death. It's need to some information like that the fatal dive profile, the diving history, the past medical history, the diving experiment, the circumstances of the dive, the reports of equipments testing, use of alcohol or drugs before and after the fatal incident of deceased in order to correctly interpret to autopsy findings.

MATERIAL and METHODS

The records of fatal diving accidents were reached in the archives of last 7 years, by screening drowning cases at the forensic medicine units in Turkey and Turkish Underwater Sports Federation. Subsequently the records are evaluated according to the cases in terms of age, sex, reason of death, preexisting medical problem, types of diving, aim of diving, distribution according to years and months, and the techniques of autopsy

RESULTS

A total of 52 autopsy reports regarding diving fatalities were reached. Out of the dives resulted with accidents, 28 dives were breath-holding, 2 dives were snorkelling (The snorkelling deaths are considered of breath holding death), 20 dives were SCUBA and 2 dives were surface supplied (Figure 1). Majority of the cases (49/52, 94%) were male and the average age was 38,6. Only three of the scuba divers were female (2/20) and one of the breath-hold divers was female 1/30). The age range was found 22-68 for scuba divers and 15-74 for breath-hold divers. The majority of cases were between 30-39 years both of them (Figure 2). The information on the age was missing for two cases because of putrefaction. Most of the accidents (%75) were recorded between May and October

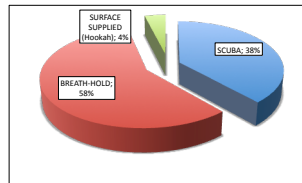


Fig. 1.

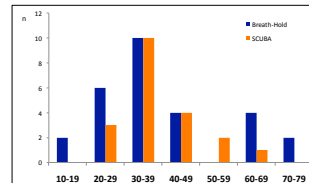


Fig. 2

The most frequent reported cause of death was drowning each groups. This rate was %60 (12/20) for scuba fatalities and %83 (25/30) breath-hold fatalities. The other reported causes of death in scuba fatalities were “a common effect air embolism and drowning” (2/20, %10), “air embolism” (1/20, %5), “trauma” (1/20, %5), “carbonmonoxide poisoning” (1/20, %5), “pulmoner odema due to decompression” (1/20, %5) and “decompression and asphixia due to remain within water” (1/30, %3), “pulmoner odema, chronic congestion findings, emphysema and hence respiratory insufficiency” (1/30, %3) in breath-hold fatalities. The cause of death could not be determined three cases because of putrefaction.

There were the information that case was dive or there were diving equipments, in the autopsy reports of 34 (%65) cases. There was short diving history in the autopsy reports of only 4 cases. Aim of diving was identify 28 cases. 18 of breath-hold fatalities were determined that occurred while performing spearfishing.

The special autopsy techniques that should be performed in diving fatalities were done in 17% of the cases. Only 4 of all cases were used radiological imaging prior to autopsy. Preexisting medical history was available was found only 2 cases.

It was found to contain that all of the autopsy reports had external and internal inspection and toxicological examination.

Coronary arteriosclerosis detected in %38 of the cases and different alcohol levels in the bloods were found in %19 of the cases.

The autopsy was performed 6 days later in a case and within 24-48 hours in other case. It was performed within 24 hours after the body recovered from water in other cases.

DISCUSSION

The majority of cases (%58) were breath-hold diving related deaths. In these groups the mean of age was 39,5 and ranging from 15 to 74. In all groups the majority of cases were male 94(%). This result can have been explained that the number of men divers is higher than women divers. In the reports published by DAN and Denoble et al, it has been determined that %70-75 of men and %80-85 of women were above the age of 40. In our study the majority of cases were found between 30-39 years and cases were lower in the higher age groups. However it's not known the actual information about diver population in Turkey. Therefore the risk of fatal diving accident couldn't be associated with age.

The most frequently reported cause of death among all groups in our cases has been drowning. The second frequency cause of death was reported gas embolism in scuba diving deaths.

Drowning is a terminal event. Any problem which arise underwater will likely result drowning. Therefore it's important that detailed investigation to explore and identify potential underlying causes. Among our cases only one case were search with carbonmonoxide (CO) poisoning suspicion and cause of death was determined as CO poisoning. In other cases had not any investigation toxicological or equipment tests for CO poisoning. Otherwise the cause of death of one case in breath-hold dive related fatalities was reported as “decompression and asphixia due to remain within water” in the autopsy report. Whereas decompression sickness don't expect in breath hold dive. Our opinion is the autopsy was performed by a specialist who doesn't know enough information with diving physics and physiology to properly interpret the findings of a post-mortem examination. Prior to autopsy the specialist who, must have information about dive profile, the diving history, the past medical history, the diving experiment, the circumstances of the dive, the reports of equipments testing, use of alcohol or drugs before and after the fatal incident of deceased, but in our cases these informations were not enough. There were the information that case was dive or there were diving equipments, in the autopsy reports of 34 (%65) cases. There was short diving history in the autopsy reports of only 4 cases. This situation can lead to incorrect diagnosis as cause of death. In our cases that reported “gas embolism” especially the diving history didn't find in the among records that reaching specialist who performed autopsy, this diagnosis may be wrong. Because gas in the body cavities can also be due to decomposition, resuscitation, postmortem decompression or off gassing. Also the special autopsy techniques that primary opening the elevated chest and aspiration of the heart dissection underwater, pneumothorax tests and radiological imaging should perform for diving fatalities. These techniques were in 17% of the our cases and Only 4 of all cases were used radiological imaging prior to autopsies.

The autopsy should be achieved as soon as possible for avoiding misinterpretations. In our cases the autopsy was usually performed within 24 hours after the body recovered.

CONCLUSION

The documents we reached were not sufficient enough to be able evaluate the fatal diving accidents. The forensic physician who performs autopsy when there is a diving fatality, should be informed about the details of eventful diving, investigation of diving gears and diving accident scene. Establishing a standard archiving system and database about fatal diving accidents will enable to perform such studies in an easy way.

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