

**IS THE USE OF EXTERNAL DEFIBRILLATORS ON
MERCHANT SHIPS
JUSTIFIED ?
Commentary from the Editorial Office**

The Authors of the paper on the automated external defibrillators discusses the improvement of safety of life and work at sea of crews of merchant ships, as well as the possibility of reduction of mortality caused by sudden heart diseases among seafarers. No doubt, this is an important and actual problem facing the managers of maritime health services. The Authors refers the results of studies of some scientists who indicated that the acute myocardial infarction at sea is one of the important causes of sudden death on ships. The actual practice of treating such cases has not been effective, and has not improved the prognosis for the patient.

The Authors rightly indicated that the mean age of crew members (over 40 years) will expose them to this disease, with a chance for possibly 1-2 such events a year occurring in a population of 1000 seafarers. It is a pity that he has not discussed other contributing risk factors, as obesity, smoking tobacco, lack of physical exercise on board ship, unhealthy dietary habits etc. which are to a greater extent affecting the health of seafarers as compared to other groups of workers on shore.

Considering all such factors could lead to introducing more effective methods of reducing the incidence of acute myocardial infarction among seafarers at sea, not necessarily by the use of the automated external defibrillators on ships. He has not mentioned other methods of prevention proposed by some authors, as Saarni and Jaremin: for instance the change of life style, health education and medical training in the work place.

The Authors indicated for data from the literature, particularly papers of Scandinavian scientists (Alfredsson, Knudsen, Tuchsén), who reported that the incidence of acute myocardial infarction among seafarers, and also among drivers, pilots, air traffic controllers, was higher than among the general male population.

According to the opinions of Roberts and Jaremin, published in the International Maritime Health in the past, the acute myocardial infarction is one of the important

causes of sudden death of seafarers at sea. But there are also other causes, as drowning, accidents and serious injuries during the ship's voyage. This was not mentioned by the Authors. The reader of his paper might be left under the impression that the incidence of infarction is higher than the incidence of deaths of seafarers due to all other causes, and this is not correct, according to literature data.

Among the causes of the acute myocardial infarction, arteriosclerotic changes of arteries being the most important of them, the Authors mentioned the electrocution, which occurs rather rarely.

Defibrillation in a case of electric disorders of the work of heart accompanying the infarction has been introduced as a routine procedure in the pre-hospital management of such cases. This has proved to be a useful method, it helps to save time before the other necessary methods could be introduced (thrombolytic treatment, PTCA, by-pass). Only on shore, after the successful defibrillation these interventions are possible, and they save life. The Authors has not mentioned that such interventions are not possible on board ship.

The Author wrote that defibrillation on land has been practiced in such public places as airports, railway stations, and also on large passenger ships-cruisers and in similar places. One could add also that it has been practiced on air planes (of Delta and British Airways) during their flight.

There is a risk of a case of acute myocardial infarction occurring in such places, because large numbers of people gather there. The idea of placing AED in such places and operating them by trained and always present personnel (as well as by not trained bystanders) is slowly getting support of people responsible for security of crowds of people present there. But not all of them have accepted this new idea.

The title of this paper suggests, although the interrogation mark is put there, that AED might also be carried on merchant ships. Such a suggestion has been made and discussed in several meetings, also at the time of the 8th International Symposium on Maritime Health which was held in May 2005 in Rijeka, Croatia, in which the Author participated.

He convincingly presents the idea that technically it is possible to operate the AEDs on merchant ships, and link them to the system of telemedical assistance to crews of ships at sea (as TMAS in Cuxhaven) by satellite communication, although some difficulties and limitations could be expected. The Author also is of the opinion that crew members are able to make use of them, even without special training, provided that some modifications in the AED operating instructions would be made. This can be accepted.

The Authors write also that the use of AED could be a proper way for declaring the decease of the patient, by indicating the absence of effective action of his heart.

Here some doubts could arise whether this method may be acceptable from the legal point of view. On the other hand, the old methods for making this diagnosis, as the demonstration that there is no pulse on the carotid arteries, that there are no sounds on the auscultation of the heart and there is the rigidity of iris, are the methods which simply could be used on ships at sea.

There are also other serious doubts regarding the cost/effectiveness of this innovation.

The economic justification of placing AED on merchant ships, and the cost of saving a patient with an acute myocardial infarction by the use of defibrillation at sea, would be rather difficult. The cost of installing an AED would be about 2,5 – 4 thousand dollars per ship.

Now, the average number of crews on such ships is about 20-30 seafarers. The Author gives the figure of 5-6 cases of fatal acute myocardial infarction at sea recorded among seafarers in the German merchant marine. Taking into account the large number of employed seafarers, the statistical chance of such a case occurring on a certain ship is rather small.

On the majority of ships, AED would be never used, and the costs of their installation, maintenance and periodical control and certification would be high. They would rather be not acceptable, if the ALARP (As Low As Reasonable Practical) principles are to be followed.

Now, the decision where to place the AED on a ship: on the bridge? at the ship's hospital? The majority of infarction cases occur not in the work place of a seafarer but in his cabin, in his free time, when he is alone (in about 40% of cases). In such a situation, the use of the AED will be delayed and practically not effective.

The next consideration: after a successful defibrillation of a case of an infarction on a ship at sea, thrombolytic therapy, or cardiosurgical intervention cannot follow, because the ship is sailing far from shore, and the immediate evacuation of the patient from ship to a hospital on shore is usually not possible.

According to recommendations in the text of the WHO International Medical Guide for Ships, only such drugs as MF, aspirin and nitrates are available in the ship's medical chest. They may be given to a patient without previously making him the ECG examination or without defibrillation.

The opinions presented by the WHO and ILO, and also by ship owners, while expressed in accordance with the international conventions on the protection of health of seafarers and the safety of their lives and work at sea, would probably not support the idea of introducing the AEDs on all merchant ships in the nearest future.

Not every method, although technically feasible, could and should be introduced in medical practice.

Of course, the above comments do not refer to the cruise ships with large numbers of crews and passengers, and with other than in the merchant fleet system and organization of health services on them. And they do not refer to large air planes.

The readers of this journal are invited to discuss the subject of the paper of Dr Neubauer and my comments.

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