

Sudden death less likely in exercise related cardiac arrests

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People who have a cardiac arrest during or shortly after exercise are three times more likely to survive than those who have a cardiac arrest that is not exercise related, according to research presented at the ESC Congress 2012 today, August 26. The findings from the Amsterdam Resuscitation Study (ARREST) were presented by Dr Arend Mosterd from the Netherlands.

"Although physical activity is the best way to promote [cardiovascular health](#), exercise can also trigger an acute cardiac event leading to death," said Dr Mosterd. "These dramatic and often high profile events, for example in [soccer players](#), invariably lead to concerns and cast a shadow over the overwhelmingly positive effects of regular exercise."

The ARREST research group maintains a prospective database of all resuscitation efforts in the greater Amsterdam area (i.e. the Dutch province of North Holland, covering approximately 2671 km² and a population of 2.4 million). In case of a medical emergency in the Netherlands, one dials the national emergency number (112), where an operator connects the call to a regional ambulance dispatch center. If a [cardiac arrest](#) is suspected, the dispatcher sends out two ambulances of a single tier. The standard Emergency Medical System consists of ambulances manned by a team equipped with a manual defibrillator (a). Also, the dispatcher sends out a first responder – fire fighters or police officers – equipped with an automated external defibrillator (AED) (b). Many public areas like supermarkets, sport centers and office buildings have an AED onsite. Trained lay rescuers can attach this AED prior to

arrival of the dispatched first responders or ambulance team.

The researchers used data from ARREST to determine the occurrence and prognosis of exercise related out of hospital cardiac arrests (OHCA) in the greater Amsterdam area from 2006 to 2009. The number of exercise related OHCA's was low at just 48 per year, which equated to 5.8% of all OHCA's.

During the 3 year study period, 145 of the 2,517 OHCA's were in people who were exercising during or within 1 hour before the arrest, predominantly bicycling (n = 49), tennis (n = 22), workouts at the gym (n = 16) and swimming (n = 13). Only 10 of the 145 exercise related OHCA's were in women. Just 7 (including 1 woman) exercise related OHCA's occurred in subjects aged 35 years or younger.

Almost half (65) of the 145 patients who had an exercise related OHCA survived the event. Patients suffering an exercise related OHCA had a much better prognosis (45% survival) than cardiac arrests that were not exercise related (15% survival) (see table 1).

Table 1: Characteristics of the study subjects according to exercise

| | Out of hospital cardiac arrest | |
|----------------------------|--------------------------------|----------------------------------|
| | Exercise related (N=145) | Non exercise related (N=2372) |
| Mean age in years | 58.8 ± 13.6 | 65.5 ± 15.8 |
| Men | 135 (93.1%) | 1768 (71.9%) |
| Public location | 144 (99.3%) | 623 (25.3%) |
| Bystander witnessed arrest | 129 (89.0%) | 1863 (76.7%) |
| Bystander CPR initiated | 125 (86.2%) | 1584 (64.4%) |
| AED use | 51 (35.2%) | 545 (22.2%) |
| Survival | 65 (45%) | 367 (15%) |

CPR = cardiopulmonary resuscitation; AED = automated external defibrillator.

"Patients persons suffering an exercise related OHCA are three times more likely to survive the event than persons whose arrest is not exercise related," said Dr Mosterd. "None of the survivors of exercise related OHCA suffered serious neurologic damage, which was not the case for those surviving a non exercise related OHCA."

Patients who had an exercise related OHCA were younger (mean age 58.8 ± 13.6 vs 65.5 ± 15.8) and more likely to be male (93.1% vs 71.9%) than those whose arrest was not exercise related. In addition, exercise related OHCA occurred more frequently in public places (99.3% vs 25.3%), were more frequently witnessed (89.0% vs 75.7%) and had higher rates of bystander cardiopulmonary resuscitation (CPR) (86.2% vs 64.4%) and AED (35.2% vs 22.2%) use.

Dr Mosterd said: "The remarkably good survival of victims of exercise related out of hospital cardiac arrest can partially be ascribed to the fact that they are younger and more likely to suffer the arrest in a public location, leading to bystander cardiopulmonary resuscitation, often with the use of an [automated external defibrillator](#). Taking these factors into account exercise per se also contributes to a better outcome."

The only other prospective study of sports related OHCA and sudden death in the general population to date was conducted in France. "The survival rate to hospital discharge of exercise related OHCA victims was three times higher in our study group than was observed in the French study (45% vs 16%)," said Dr Mosterd. "As most exercise related events are bystander witnessed (89% in the Netherlands vs 93% in France) the most likely explanation for the remarkably better survival in the Netherlands relates to the high rate of initiation of bystander CPR (86%) compared to 31% in France. It is of note that the highest survival rates (around 50%) in France are found in two regions where bystanders initiated CPR in 90% of cases (compared to 86% in our population)."

Dr Mosterd continued: "More research is needed to determine why, after taking into account favourable factors such as age, location of the event and initiation of CPR, persons who exercise during or shortly before having a cardiac arrest still have a better prognosis than people who have a cardiac arrest that is unrelated to exercise."

He added: "The number of exercise related out of hospital cardiac arrests in the general population is low, particularly in women and in those aged 35 years or younger. We demonstrated for the first time that cardiac arrests occurring during or shortly after exercise carry a markedly better prognosis (45% survival) than cardiac arrests that are not exercise related (15% survival)."

Dr Mosterd concluded: "Prompt bystander initiation of CPR with the use of an AED is likely to be the key to improving outcome, an observation that should have direct implications for public health programmes aimed at preventing exercise related sudden death."

Provided by European Society of Cardiology

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