

Cough CPR as the treatment for cardiac arrest: Myth or fact?

Ivana P. Dewi^{1,2,3}, Irma Maghfirah^{1,3}, Louisa F.K. Wardhani^{1,3}, Fatimah Alzahra^{1,3}, Ni P.A. Laksmi^{1,3}

¹Faculty of Medicine, Airlangga University, Surabaya, Indonesia

²Faculty of Medicine, Duta Wacana Christian University, Yogyakarta, Indonesia

³Department of Cardiology and Vascular Medicine, Dr. Soetomo General Hospital, Surabaya, Indonesia



This work is licensed under a
Creative Commons Attribution 4.0
International License

Received: 2020-05-22

Accepted: 2020-06-17

UDC: 616.1

J Clin Med Kaz 2020; 4(58):15-18

Corresponding Author: Ivana Purnama Dewi, MD.

Address: Jl Mulyosari Utara no 28 Surabaya, East Java, Indonesia 60112. Tel.: +62 81 328 098 200

E-mail: dr_ivanapd@staff.ukdw.ac.id

Abstract

Heart attack or acute coronary syndrome is a serious heart disorder that occurs due to obstruction of blood flow to the heart muscle. Cardio Pulmonary Resuscitation is a first-aid measure for people who experience cardiac arrest and/or breathing. Some time ago, there was an article "How to survive a heart attack alone". It was stated that patients might be able to help themselves by coughing vigorously and repeatedly when having a heart attack. This technique is often called "cough cardio pulmonary resuscitation". The British Heart Foundation, the British Resuscitation Board, and the American Heart Association issued recommendations against the use of cough cardio pulmonary resuscitation for the heart attack conditions. There is the fact that an article about cough cardio pulmonary resuscitation may pose a severe risk to people with acute coronary syndrome because it can cause delays in contacting emergency services, thus causing worse conditions.

Key words: cough cardio pulmonary resuscitation, cardio-pulmonary resuscitation, acute coronary syndrome, heart attack, emergency

ЖӨТЕЛ - ЖҮРЕК ТАЛМАСЫ КЕЗІНДЕГІ ЖҮРЕК-ӨКПЕ РЕАНИМАЦИЯСЫ: МИФ НЕМЕСЕ ДӘЙЕК?

И. Деви^{1,2,3}, И. Маджифира^{1,3}, Л. Вардхани^{1,3}, Ф. Альзахра^{1,3}, Н. Лакшми^{1,3}

¹Медицина Факультеті, Airlangga Университеті, Сурабая, Индонезия

²Медицина Факультеті, Дут Вакан атындағы Христиан университеті, Джокьякарта, Индонезия

³Кардиология және тамырлы медицина кафедрасы, Доктор Соетомоның жалпы ауруханасы, Сурабая, Индонезия

ТҮЖКЫРЫМДАМА

Жүрек талмасы немесе жедел коронарлық синдром - жүрекке қан ағымының бітелуі кезінде пайда болатын ауыр жүрек ауруы. Жүрек-өкпе реанимациясы - бұл жүрек және/немесе тыныс апуды тоқтатқан адамдарға алғашқы көмек көрсету шарасы. Осыдан біраз уақыт бұрын «Жалғыз жүргенде инфаркттан қалай аман қалу керек» атты мақала жарияланды. Мақалада пациенттерге инфаркт кезінде қатты және бірнеше рет жөтөлу арқылы өздеріне көмектесе алатындығы айтылды.

Бұл әдіс кебінесе «жөтөл - жүрек-өкпе реанимациясы» деп аталады. Британдық жүрек ауруларымен күрес қоры, Британдық реанимация жөніндегі кеңес және Американдық кардиологтар қауымдастыры инфаркт кезінде жөтелді жүрек-өкпе реанимациясы ретінде қолдануға қарсы нұқсаулар шығарды. Жөтөл - жүрек-өкпе реанимациясы туралы мақала өткір коронарлық синдромы бар адамдар үшін үлкен қауіп туғызыу мүмкін деген дәйек бар, өйткені бұл жедел жәрдем қызметтерімен байланыста кідірістер тұдышты мүмкін, бұл жағдайды нашарладады.

Негізгі сөздер: жөтөл - жүрек-өкпе реанимациясы, жүрек-өкпе реанимациясы, жіті коронарлық синдром, жүрек талмасы, шұғыл көмек

КАШЕЛЬ - СЕРДЕЧНО-ЛЕГОЧНАЯ РЕАНИМАЦИЯ ПРИ СЕРДЕЧНОМ ПРИСТУПЕ: МИФ ИЛИ ФАКТ?

И. Деви^{1,2,3}, И. Маджифира^{1,3}, Л. Вардхани^{1,3}, Ф. Альзахра^{1,3}, Н. Лакшми^{1,3}

¹Факультет медицины, Университет Airlangga, Сурабая, Индонезия

²Факультет медицины, Христианский университет им. Дута Вакана, Джокьякарта, Индонезия

³Кафедра кардиологии и сосудистой медицины, Общая больница доктора Соетомо, Сурабая, Индонезия

РЕЗЮМЕ

Сердечный приступ или острый коронарный синдром - это серьезное заболевание сердца, которое возникает из-за обструкции кровотока в сердечной мышце. Сердечно-легочная реанимация является мерой первой помощи для людей, которые испытывают остановку сердца и/или дыхания. Некоторое время назад вышла статья «Как пережить сердечный приступ, если Вы находитесь в одиночестве». В статье говорилось, что пациенты могли бы помочь себе, энергично и многократно кашляя при сердечном приступе. Этую технику часто называют «кашель - сердечно-легочная реанимация». Британский фонд по борьбе с сердечными заболеваниями, Британский совет по реанимации и Американская ассоциация кардиологов выпустили рекомендации против использования кашля как сердечно-легочной реанимации при сердечных приступах. Существует факт, что статья о кашле - сердечно-легочной реанимации может представлять серьезный риск для людей с острым коронарным синдромом, потому что это может вызывать задержки в обращении в экстренные службы, что приведет к ухудшению состояния.

Ключевые слова: кашель - сердечно-легочная реанимация, сердечно-легочная реанимация, острый коронарный синдром, сердечный приступ, неотложная помощь

Heart attack or acute coronary syndrome (ACS) is a severe heart disorder that occurs due to obstruction of blood flow to the heart muscle. The leading cause of this condition is the blockage of coronary arteries that supply blood to the heart due to the atherosclerosis process. Atherosclerosis is a condition of narrowing, hardening, and thickening of the arteries due to the presence of plaque, which is an accumulation of cholesterol, fatty deposits, calcium, and fibrin on the inner walls of the arteries (endothelium). The plaque can cause blockages ranging from partial to total blockage. This condition can interfere with blood circulation to the heart muscle. Without a sufficient volume of blood, the heart becomes deprived of oxygen and essential nutrients needed for the heart to work properly. When this happens, patients will experience chest pain called angina. Patients may not realize that they are experiencing the initial symptoms of a heart attack.

According to the World Health Organization (WHO) the death from non-infectious diseases (NID) are estimated to continue to increase worldwide, the most substantial increase will occur in mid-income and poor/less developed countries. More than two-thirds (70%) of the global population will die from non-infectious diseases such as cancer, heart disease, stroke, and diabetes. In total, it is predicted that by 2030 there will be 52 million deaths per year caused by these non-infectious diseases/illnesses, it will be increased up 9 million from existing 38 million now. ACS is a major cardiovascular problem because it causes high rates of hospital care and mortality [1]. In 2008, cardiovascular disease caused 17.3 million deaths, with 7.3 million deaths caused by the ACS, while other 6.2 million deaths were caused by stroke [2]. Cardiovascular disease is also the most common cause of death in NID, which is 31%, the highest after maternal and child mortality rates, which are the main problems

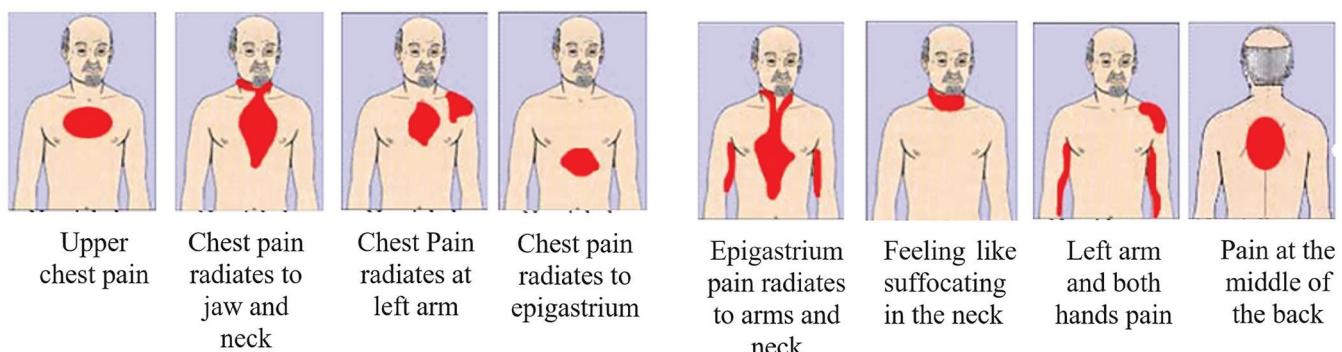
in the health sector. Acute myocardial infarction (AMI) also caused various issues other than cardiac death as a direct impact, including heart contractility disorders, heart rhythm disorders, and remodeling processes, which in later stages result in heart failure [3]. This condition made AMI one of the main focuses of WHO's non-infectious diseases [4]. Therefore, an understanding of the initial management of a heart attack is essential to know.

Cardio Pulmonary Resuscitation (CPR) is a first-aid measure for people who experience cardiac arrest and/or breathing. In a cardiac arrest, blood circulation that carries oxygen to the brain and other vital organs in the body is blocked. Cardiac arrest can trigger brain damage resulting in a person dying within minutes. CPR is performed by chest compression and artificial breathing. It is expected that by administering CPR, oxygenated blood can return to the brain and throughout the body.

Some time ago, there was an article distributed on various social media titled "How to survive a heart attack alone" [4]. In that article, a hypothetical scenario on the condition during the heart attack was described. It was stated that patients might be able to help themselves by coughing vigorously and repeatedly when having a heart attack. This technique is often called "cough CPR". The fact that heart attack is one of the most frequent causes of death worldwide and that coughing CPR is a promising procedure to save us from the possibility of a heart attack without any help from others makes it a quite exciting technique.

Chest pain is also the most common symptom of a heart attack, which can be followed by symptoms of numbness or pain in the arm, back, jaw, or neck, and is accompanied by dizziness or nausea. These symptoms can be recognized early on suspicion of a heart attack as shown in Figure 1.

Figure 1 - Indicators and symptoms of chest pain at the heart attack



It is mentioned that the patient has only ten seconds to do something before the heart attack gets worse. Of course, since most heart attacks occur when someone is alone, it seems like a logical idea to spread information about what to do when no one is around to help them. Dialing 119 can also be very difficult to do if the patient has started to faint and lose his/her consciousness. And of course, CPR training does not include a guideline on how to perform it for yourself, and regular CPR is not something that can be applied to oneself in an unstable situation. However, the Coughing CPR can help in this situation.

Coughing CPR is performed with a vigorous cough and in a rhythmic manner. Each cough must be elongated and very deep. In order to achieve it, an intense breath should also be taken to force the cough out. Each cycle of deep breathing and coughing should be done every two seconds until further help arrives. If the patient feels his heart is starting beating back to

normal, coughing CPR should be stopped [5].

But what is the relationship between cough and heart attack? Basically, breathing deeply is not only something that helps the patient make a cough deeper, but it also allows additional oxygen flow to the lungs. This helps especially if the patient starts having difficulty breathing. The coughing motion also compresses the heart, which immediately triggers blood circulation. It is hoped that the heart can eventually regain its normal rhythm, making it easier for someone affected by a heart attack to ask for help more effectively [6].

Since it was first written in 1999, this cough CPR article has received various responses. The British Heart Foundation, the British Resuscitation Board, and the American Heart Association issued recommendations against the use of Cough CPR for the heart attack conditions [7-9]. Here are some reasons:

- This procedure is considered useless in a pre-hospital

setting. The CPR course always emphasizes that one of the main signs of an emergency is the patient's unresponsiveness, so it is not possible for patients to perform cough CPR.

- Cough CPR is beneficial in arrhythmia cases, but this case is very different from a heart attack. When this is performed for those who have sudden arrhythmias, a nurse or doctor must be present to give precise instructions on how and when to cough.

- A number of other causes can trigger pain conditions. Therefore, in some other medical conditions, cough CPR can be dangerous to perform.

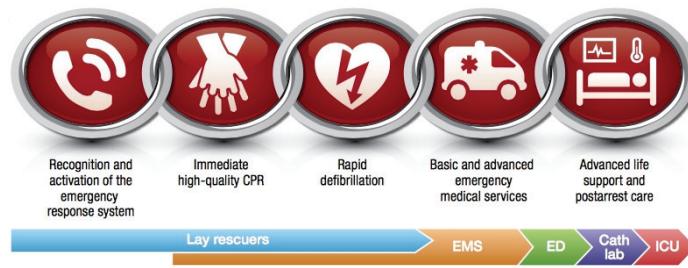
- The thought of carrying out a cough CPR can provide a false sense of security. Thus if an emergency occurs, this can delay the necessary emergency procedures/measures that can make the situation worse.

PubMed's search for cough CPR articles resulted in 60 identified articles. From those 60 articles, there were 13 case reports describing the use of coughing techniques when cardiac arrhythmias are unstable, maintaining blood pressure and awareness, or returning the patient back to sinus rhythm [10]. In all case reports, the cough CPR was carried out in a controlled and monitored hospital environment, such as a heart catheter laboratory. A study performed by LoMauro and Aliverti provided new information about the effects of cough on blood flow. The authors found that healthy people, the deep and vigorous coughs can produce intra-thoracic and intra-abdominal pressure fluctuations which move significant blood volume through the chest cavity and abdominal pumping mechanism. Although this mechanism can provide ideas for maintaining brain perfusion at the beginning of unstable cardiac arrhythmias, the authors were careful to recommend cough CPR [11].

There is the fact that an article about cough CPR may pose a serious risk to people with ACS because it can cause delays in contacting emergency services thus causing worse conditions. Therefore, education about what needs to be performed in the heart attack condition is required. The most appropriate way to do in the heart attack condition is to contact the nearest hospital or ambulance and as much as possible to contact large hospitals that have complete equipment for reperfusion measures. The significant increase in the morbidity and mortality rate of the ACS resulted in changes in the policy and medical treatment of the ACS in the community while maintaining the importance of initial ACS management [12]. Early treatment is important because of an increased risk of depth with late detection and early treatment during myocardial ischemia. The slower handling of ACS (coronary blockage), will result in the risk of damage to heart muscle tissue, which begins the phrase "time is muscle" [13]. The longer the patient is left without help, the more severe heart muscle damage ends in permanent heart failure and death. This then becomes a policy principle in the handling of ACS through an understanding of the chains of survival as shown in Figure 2 [14].

In the handling chain above, the significant community role at the initial ACS management is recognized. It is because most of the death rates were due to a lack of initial symptom management and initial ACS management (first immediate response). The engagement of the community's role in the handling of ACS is through improving their understanding of risk factors and their capacity in overcoming the ACS, also increasing knowledge of the ACS symptoms and the initial handling/first response to the Acute Myocardial Infarction (AMI) patients in the community [12].

Figure 1 - ACS handling chains or survival chains (AHA, 2015)



ACS risk factors can be divided into risk factors that can be changed (modifiable) and cannot be changed (non-modifiable) [12]. Risk factors that can be changed include hypertension (blood pressure > 140/80), type 2 diabetes mellitus, dyslipidemia, and smoking. Risk factors that cannot be changed include age and family history of cardiovascular disease (ACS and stroke).

ACS prevention includes achieving the WHO's target of control and prevention of non-infectious diseases. Prevention is carried out by increasing public awareness, regularity on the medical treatment, and community engagement through promotive, curative, rehabilitative activities and efforts, especially in primary services. This effort needs to be supported by the policy of providing Automatic External Defibrillation (AED) to public facilities as it has been inserted at the community's basic protocol for the ACS management. Basic Life Support (BLS) training programs have to be delivered to the broader community in order to bring the primary emergency response closer to them, especially in this case, the first response to ACS patients in the community. Based on the development of the ACS management guidelines, even the community has its own procedural chain.

The ACS symptom recognition and its first response are certainly not an easy matter because several factors that hinder the achievement of early access occur in the community. These delays include the time needed to understand the symptoms of the ACS, the decision to obtain medical treatment, transportation, and other issues such as the level of public education, culture, and limited access to health [12]. It is important to know the concept that the longer the time to reach access to medical treatment, the worse the prognosis for the occurrence of ACS. Therefore, we can put aside the myths about the Cough CPR in independent ACS handling by understanding the basic concepts of ACS. However, early access to competent medical personnel, one of which is via telephone calls to 119 is the first step which can be performed besides conducting Basic Life Support procedures and the using of the Automatic External Defibrillation (AED) for trained communities like what can be found in public facilities.

Disclosures: There is no conflict of interest for all authors.

References

1. RI KK. Penyakit Tidak Menular. 2012.
2. WHO. Cardiovascular Disease (CVD). 2017.
3. PDSKI. Buku Panduan Kursus Bantuan Hidup Dasar. 2015.
4. Staff S. How to Survive a Heart Attack When Alone. 1999.
5. Commerford PJ, Lawrenson J. Cough - Cardiopulmonary resuscitation - a useful manoeuvre. *Resuscitation*. 1992; 24(1):89-90. [https://doi.org/10.1016/0300-9572\(92\)90176-D](https://doi.org/10.1016/0300-9572(92)90176-D)
6. Criley JM, Blaufuss AH, Kissel GL. Cough-Induced Cardiac CompressionSelf-administered Form of Cardiopulmonary Resuscitation. *JAMA*. 1976; 236(11):1246-50. <https://doi.org/10.1001/jama.1976.03270120022018>
7. Foundation BH. Could something called 'cough CPR' save my life?
8. (UK) RC. Statement on Cough CPR.
9. American Heart Association. Cough CPR. 2017.
10. Saba SE, David SW. Sustained consciousness during ventricular fibrillation: Case report of cough cardiopulmonary resuscitation. *Cathet Cardiovasc Diagn*. 1996; 37(1):47-8. [https://doi.org/10.1002/\(SICI\)1097-0304\(199601\)37:1<47::AID-CCD11>3.0.CO;2-T](https://doi.org/10.1002/(SICI)1097-0304(199601)37:1<47::AID-CCD11>3.0.CO;2-T)
11. LoMauro A, Aliverti A. Blood Shift During Cough: Negligible or Significant? *Front Physiol*. 2018; 9:501. <https://doi.org/10.3389/fphys.2018.00501>
12. Goel PK, Srivastava SK, Ashfaq F, Gupta PR, Saxena PC, Agarwal R, et al. A study of clinical presentation and delays in management of acute myocardial infarction in community. *Indian Heart J* [Internet]. 2012; 64(3):295-301. [https://doi.org/10.1016/S0019-4832\(12\)60090-X](https://doi.org/10.1016/S0019-4832(12)60090-X)
13. 1Kori Kingsbury. Management of Acute Coronary Syndromes, Best Practice Recommendations for Remote Communities. *Cardiac Care Network*. 2013.
14. American Heart Association. Guidelines 2015 CPR & ECC. *Circulation*. 2015; 132(5):293.

How to cite this article: Ivana P. Dewi, Irma Maghfirah, Louisa F.K. Wardhani, Fatimah Alzahra, Ni P.A. Laksmi. Cough CPR as the treatment for cardiac arrest: Myth or fact? *J Clin Med Kaz*. 2020; 4(58):15-18