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Management and Referral of Acute Coronary Syndrome using iSTEMI Network

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ABSTRACT

Acute myocardial infarction (AMI) patients who experience total blockage of the heart arteries accompanied by ST segment elevation on an electrocardiogram (ECG) record, known as ST elevation myocardial infarction (STEMI); one of the leading causes of death in Indonesia. In the STEMI patient care system there are three components that cause delays in handling which lead to an increased risk of death. First, the patient's delay; second, the system delay in the detection of STEMI patients and transfer to capable reperfus facilities; third, delays in health facilities, i.e. the time needed since the patient arrives at the health facility until reperfusion therapy is given, both by fibrinolysis and primary percutaneous coronary intervention. Therefore Palembang needs to prepare an iSTEMI program, so that STEMI patients can be reproduced immediately. ISTEMI management in Palembang requires good organizational management.

1. Introduction

Based on the 2011 World Health Organization (WHO) report, cardiovascular disease, especially acute heart attack or acute myocardial infarction (AMI), is one of Indonesia's leading causes of death. AMI patients who experience complete blockage of the coronary arteries accompanied by ST-segment elevation on electrocardiogram (ECG) recordings are known as ST-elevation myocardial infarction (STEMI). This type of AMI is known to have the highest mortality rate. Deaths from STEMI occur mainly in the early stages, some of which can be prevented by early detection of a heart attack, restoring cardiac blood flow as soon as possible (reperfusion therapy) and treating frequent heart rhythm disturbances. There are two modalities of reperfusion therapy known to date: fibrinolysis therapy by giving certain intravenous drugs and primary percutaneous coronary intervention (IKPP). The earlier reperfusion therapy is carried out, the better the life expectancy. This explains that STEMI treatment targets to reduce mortality and morbidity by doing one of the two methods above as early as possible.

In the STEMI patient care system, three components cause delays in handling, leading to an increased risk of death. First, patient delays, namely the time it takes for the patient to start complaining of chest pain to seek medical help. Second, the system delays in detecting STEMI patients and transferring them to a facility capable of reperfusion.

Third, delay in health facilities, namely the time it takes from when the patient arrives at a health facility capable of reperfusion until reperfusion therapy is given, either by fibrinolysis or primary percutaneous coronary intervention.

Harapan Kita Heart Hospital, as a national referral centre, has made efforts to improve STEMI services. In 2010, implementation was carried out, among others, by establishing a Heart Line as a call centre for STEMI cases to facilitate health workers in Indonesia in consulting, confirming STEMI diagnoses and planning patient transfer for immediate reperfusion. The referral system from an external hospital for reperfusion therapy at Harapan Kita Heart Hospital has been simplified so that the time wasted in the transfer process is minimized.

The results of this implementation have been published and show that in the group of STEMI patients who did not receive reperfusion therapy, the mortality rate was twice that of those who were successful. From these data, it is also seen that the proportion of patients who successfully receive reperfusion therapy is still tiny and far from expectations. The reperfusion rate did not differ significantly before and after program implementation, although the number of referrals increased sharply. This is because most patients arrive at the referral centre late so that it is no longer ideal for reperfusion therapy, which is past the initial 12-hour phase, which is known to be the best time. This delay is concerning because about 50% of patients are referrals from other health facilities, which means that delays may not only be in the form of delays in detection but can also be in the form of obstacles in transfer or referral. However, the data above only shows data on STEMI cases that arrived at Harapan Kita Heart Hospital, and further explanation regarding the cause of this delay is not yet available. An overview of real-world STEMI services in Indonesia in general and Palembang, in particular, is not yet available even though the incidence is relatively high (based on WHO data, there are 200 events per 100,000 population per year). The increasing population and the increasing incidence of heart attacks. Geographical conditions are far from the city of Palembang and hospitals, and congestion causes patient access to the Sick Hospital to take a long time. Not all grade C Hospitals perform fibrinolytic and IKP services are currently only available in Palembang, not yet 24 hours. The iSTEMI program has been successful in metropolises reducing reperfusion time from 300 minutes to 70 minutes. Therefore, Palembang needs to prepare an iSTEMI program so that STEMI patients can be reperfused immediately.[1]

Network model

There are three ways to try to restore the blockage in the heart (reperfusion). Namely (1) fibrinolytic with streptokinase, or with tissue plasminogen activator (TPA) if chest pain < 12 hours (2) primary percutaneous intervention (IKP)/immediate ring placement, which is more effective and reduces mortality, (3) a combination of administration fibrinolytic therapy, followed by an IKP procedure 3-24 hours later (invasive pharmacokinetics strategy). The ISTEMI network system uses a hub and spokesmodel. Hub is a health facility that can perform reperfusion and is willing to become a reperfusion referral following the agreed-upon therapy and referral protocol. Meanwhile, health facilities cannot perform reperfusion but are willing to refer by the initial therapy protocol and a mutually agreed referral flow. This protocol agreement and referral flow become very important as a unified service system in reducing delays in the service of STEMI patients in an area. The hub and spoke system in this region has been implemented in developed countries and has been proven to reduce delays in the service system, from early detection of STEMI patients to patients being transferred to facilities capable of reperfusion and reperfusion

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therapy is given, either by fibrinolysis or percutaneous coronary intervention primary. The health facilities that participate in this network are arranged in iSTEMI Clusters consisting of: (1) HUB who perform IKP in hospitals with 24-hour cardiac catheterization such as M.Hoesin Hospital, Charitas or Siloam Hospital, (2) SPOKE is a class C hospital (as Other SPOKE C) perform fibrinolytic which are then referred to the HUB for 3 to 24 hours, and SPOKE D, namely Hospital C or a health centre that performs an ECG immediately refers to the nearest HUB or SPOKE C < 30 minutes. The existence of surveys and data will assist the regionalization system by identifying facilities capable of reperfusion with a transfer protocol according to the distance travelled and ease of access, which is expected to shorten the transfer time to shorten the time to start reperfusion, starting from the patient suffering from complaints until reperfusion therapy is performed. Given the dense population and the estimated incidence of heart attacks and case estimates, STEMI services need to involve all existing health facilities in the relevant area, both government and private facilities. Based on WHO data, the estimated incidence of heart attack or myocardial infarction in Indonesia is 200 events per 100,000 population per year. So for the Palembang population of 1,260,341, it is estimated that there are around 3522 cases of heart attack events per year. With this large estimated number of events, STEMI services cannot be accommodated at government facilities alone, so it is also essential to involve private facilities.[2,3]

Related parties

In order for this program to run correctly, it requires the involvement of various parties such as (I) the central and local governments, especially in terms of (a) procurement of BPJS for the poor/who do not have insurance, (b) ambulances (c) involving government hospitals, and the private sector (d) procurement of a telemedicine system so that Puskesmas can send data directly to the Hub Hospital via the internet, as well as (e) the legislation outlined in the decision to establish STEMI Clusters, BPJS policy to bypass class C/B hospitals that are unable to perform fibrinolytic, arrangements with the health office regarding STEMI cluster mapping, purchase of fibrinolytic drugs to be available in class C hospitals due to the low BPJS ceiling. In addition, it must also involve (II) the 118 ambulance system, (III) the Association of Indonesian cardiovascular specialists (PERKI) and PAPDI (IV) the Indonesian Doctors Association because fibrinolytic are carried out by general practitioners, (V) the pilot of the iSTEMI Palembang project and (VII) the community to get heart attack education and information on iSTEMI services. The infrastructure needed is (1) available facilities and human resources, including hospitals that can perform fibrinolytic and IKP, availability of intensive rooms in hospitals, telemedicinal facilities, (2) Geography mapping to determine STEMI Clusters which include SPOKE and HUB, as well as the relationship between SPOKE and HUB (3) Data management, it is essential to know the incidence and improvement of service quality (4) Availability of health insurance and the government in the procurement of fibrinolytic drugs in class C and patients who do not include insurance (5) A 24-hour ambulance and (7) Project management team, who coordinates the program which involves doctors and nurses, emergency teams, information workers, information technology, biomedical, and data analysts. The implementation must be carried out systematically, gradually with specific targets with a timeline that all parties support. This program can be started with a small cluster first and then enlarged. After this program runs, all participating hospitals must be willing to collect and report data in real-time and electronically sent it to the central database for quality improvement of the iSTEMI program. [4.5]

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2. Conclusion

iSTEMI management in Palembang requires good organizational governance so that the community will get quick reperfusion. This program will be successful if there are STEMI clusters between community health center-CBA class hospitals, involvement of local government, health insurance, the community, technological innovation in monitoring the program, increasing ambulances and early invasive reperfusion and stratification strategies**.**

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