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In-hospital cardiac death: preventive strategies

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Opinion

The cardiac death is defined as death due to a cardiac disease, unknown origin, or when underlying disorder is unable to cause death by itself.[1] The in-hospital cardiac death, a specific type of cardiac death, has medical, epidemiological, administrative and ethical implications. In fact, it is consequence of health care and conceptually always preventable.[2] Almost all hospitalized patients are at risk to develop cardiac complications. Several acute pathophysiological disturbances such as hypoxemia, hypotension, renal dysfunction, electrolytic imbalances, neurological disorders and anaemia direct or indirectly act on cardiovascular system. Some cardiac/non-cardiac diagnostic or therapeutic intervention such as drugs, coronary catheterization, cardiac and non-cardiac surgery can also damage the heart. There are three groups of patients according to type of therapy: 1) surgical; 2) medical; and 3) critically ill patients. Surgical patients have a higher risk for acute myocardial infarction (AMI) and acute pulmonary embolism (APE); medical patients frequently develop APE, acute heart failure (AHF) and cardiac arrest. Conversely, critically ill patients are at risk for any cardiac complication.

Acute pulmonary embolism is a cardiovascular emergency commonly observed in hospitalized patients with an associated mortality rate of 5-30%.[3] The most effective and safe strategies preventing deep vein thrombosis and APE are: 1) evaluation and control of risk factors; 2) early mobilization; 3) mechanical methods; and 4) and thromboprophylaxis for those patients without contraindications.[4,5] In-hospital AMI has a incidence of 5%.[6] and a mortality rate higher than 15%.[7] Several therapies have been suggested for patients at risk such as those undergoing non-cardiac surgery.[8] however, no preventive strategy has demonstrated to be effective. Consequently, these patients should be managed as follow: 1) evaluation and control of risk factors; 2) perform the surgery according to current guidelines, including preoperative cardiovascular assessment and management.[8] 3) for those patients requiring emergency surgery, preoperative, transoperative and postoperative correction of hypotension, hypoxemia, electrolytic imbalance and metabolic disorders as soon as possible, as well as early antibiotic therapy; and 4) early correction of acute pathophysiological disturbances during and after surgical intervention such as hypotension, hypoxemia, pain and infections.

The one-year mortality rate of AHF is 20-30%.[9] Additionally, AHF is diagnosed in 40% of patients after an AMI; the risk of death is higher compared with those patients without AHF.[10] So that, for prevention of in-hospital AHF we suggest: 1) evaluation and control of cardiovascular risk factors; 2) perform the surgery according to current guidelines.[8] 4) continue with chronic cardiovascular therapy along time of hospitalization; 5) early correction of acute pathophysiological disturbances such as hypotension, hypoxemia, pain, electrolytic imbalance, anxiety/ agitation, and infections; 6) avoid excessive intravenous fluid therapy; 7) early mobilization and rehabilitation; and 8) prevent/ treat renal dysfunction and hypertension. Annually, more than 200 000 cases of in-hospital cardiac arrest (IHCA) are recognized in United State.[11] and more than 50% of them occur into the intensive care unit.[12] Furthermore, the mortality rate at hospital discharge is 60-70%.[13] Usually, IHCA is secondary to hypoxemia or shock.[14] consequently, clinical deterioration can be anticipated. Cardiac origin can only be identified in 36% of patients with IHCA.[15] The current evidence suggest that many IHCA can be avoided with a closed surveillance, as well as an early, timely and correct therapy of acute pathophysiological disturbances associated with cardiac arrest. The rule of 5H and 5T can help for this purpose.[16]

In conclusions, there is not sufficient evidence to recommend any drug other than thromboprophylaxis for patients at high risk of APE. Treatment of the underlying disorder, closed surveillance, control and correction of acute pathophysiological disturbances, as well as an early diagnose and adequate therapy of cardiac complications are the mainstay of treatment for in-hospital cardiac death prevention. A randomized controlled trial to determinate the efficacy of preventive strategies is required.

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Conflicts of interest

There are no conflicts of interest.

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