# Acute Coronary Events as a Trigger of Sudden Death in Heart Failure

**Reviewed by Gregg C. Fonarow, MD**
*UCLA Division of Cardiology, Los Angeles, CA*
[*Rev Cardiovasc Med.* 2001;2(2):105]



Sudden unexpected death constitutes 25% to 83% of deaths in patients with heart failure.[1] Primary arrhythmias have been believed to be the predominant mechanism of sudden death in these patients.[1] In contrast, sudden death in patients without heart failure but with coronary artery disease (CAD) is often accompanied by acute coronary findings. In autopsy studies, plaque rupture, a fresh thrombus, or recent acute myocardial infarction (MI) was found in 57% to 73% of CAD patients without heart failure who died suddenly.[2] Since CAD is present in 50% to 75% of patients with heart failure, it is possible that acute coronary events contribute significantly to sudden death. The importance of these events in triggering sudden death in patients with heart failure has not been clear or well studied previously.

## Acute Coronary Findings at Autopsy in Heart Failure Patients with Sudden Death: Results from the Assessment of Treatment with Lisinopril and Survival (ATLAS) Trial

Uretsky BF, Thygesen K, Armstrong PW, et al.
*Circulation.* 2000;102:611-616.

A recent study by Uretsky and associates evaluated autopsy results in patients in the Assessment of Treatment with Lisinopril and Survival (ATLAS) trial, a randomized clinical trial that compared low doses of angiotensin-converting enzyme (ACE) inhibitors with high doses in patients with class II-IV heart failure.[3] The prevalence of acute coronary findings (coronary thrombus, ruptured plaque, or acute MI) and their relation to sudden death was analyzed. Acute coronary findings were present in 33% of the 171 patients in whom autopsies were obtained. Of patients with significant CAD, 54% who died suddenly had acute coronary findings. The percentage of patients classified as dying of MI was 28% in the autopsy group versus only 4% in the nonautopsy group ($P < .0001$). Of the autopsy patients with acute MI who died suddenly, acute MI was not suspected or diagnosed clinically before autopsy in 97% (31 of 32 patients).

Acute coronary findings were also present in a significant number of patients who died of progressive heart failure. Of patients with CAD, there were acute coronary findings in 32% who were classified as having died of myocardial failure. Of these, 40% (6 of 15 patients) with myocardial failure did not receive a diagnosis of MI during life.

This analysis indicates that acute coronary findings are frequent in patients with heart failure who die and are often not diagnosed clinically. This is especially true in patients with CAD who sustain sudden cardiac death. Therapies that have been demonstrated to reduce the risk of acute coronary syndromes in patients with established CAD include antiplatelet therapy with aspirin or clopidogrel, ß-blockers, ACE inhibitors, and 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors.[3] These therapies would be expected to have significant clinical benefit for patients with heart failure. The reduction in sudden death seen with ACE inhibitors and ß-blockers in heart failure clinical trials may have resulted as much from a reduction in atherosclerotic events as other previously ascribed mechanisms (antiarrhythmic, hemodynamic, and antiremodeling effects).[4,5]

This study by Uretsky and colleagues represents an important advance in understanding the mechanisms of sudden death in patients with heart failure. It indicates that acute coronary events appear to be a major trigger for sudden death in these patients. As such, improved utilization of strategies to prevent the progression of CAD and atherosclerotic plaque rupture in patients with heart failure may substantially reduce the incidence of sudden cardiac death and overall mortality.

### References

1. Stevenson WG, Stevenson LW, Middlekauff HR, Saxon LA. Sudden death prevention in patients with advanced ventricular dysfunction. *Circulation*. 1993;88:2953-2961.
2. Davies MJ. Anatomic features in victims of sudden coronary death: coronary artery pathology. *Circulation*. 1992;85:I19-I24.
3. Smith SC Jr, Blair SN, Criqui MH, et al. AHA consensus panel statement: preventing heart attack and death in patients with coronary disease. *J Am Coll Cardiol*. 1995;26:292-294.
4. Sackner-Bernstein JD, Mancini DM. Rationale for treatment of patients with chronic heart failure with adrenergic blockade. *JAMA*. 1995;274:1462-1467.
5. Cleland JG, Erhardt L, Murray G, et al. Effect of ramipril on morbidity and mode of death among survivors of acute myocardial infarction with clinical evidence of heart failure: a report from the AIRE Study Investigators. *Eur Heart J*. 1997;18:41-51.