Newer observations in seasonal behaviour of Acute coronary syndrome

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Abstract:
Objectives. This observational study sought to determine whether incidence of acute myocardial infarction (AMI) admitted in our institution are varied by season.

Background. The existence of circadian variation in the onset of AMI is well established. Examination of this periodicity has led to new insights into pathophysiologic triggers of atherosclerotic plaque rupture. Although a seasonal pattern for mortality from AMI has been previously noted, it remains unclear whether the occurrence of AMI also displays a seasonal rhythmicity. Documentation of such a pattern may foster investigation of newpathophysiologic determinants of plaque rupture and intracoronary thrombosis.

Methods. We analyzed the number of cases of AMI reported to our institution during the period jan 2005 to dec 2009. Data were normalized so that seasonal occurrence of AMI was reported according to a standard 90-day length. Seasons were divided into winter (jan-mar), summer(apr-jun), monsoon(jul-sep), postmonsoon(oct-dec) as classified by Indian meteorlogy department. Data were also collected on monthly basis.

Results. A total of 7548 cases of AMI were analyzed during the study period of which 5503(73) were males and 2045 (27) were females. No seasonal variation in pattern of myocardial infarction noted in this study. However complication of MI and mortality were more during summer season. Myocardial infarction associated with stroke was also more during summer months. The same seasonal pattern was seen in men and women, in different age groups. In-hospital case fatality rates for AMI followed a seasonal pattern, with a peak in summer.

Conclusions. The present results suggest that there is no important seasonal variation in the occurrence of AMI in our institution. However complication and mortality showed marked peak during summer month with nadir during...
Unlike the large ranges in cold or hot weather found in temperate regions, the warm climate of subtropical region does not affect frequency of AMI. There is no specific difference in the incidence and outcome of STEMI and NSTEMI with reference to seasons.

**Keyword:**
seasonal variation, acute coronary syndrome, STEMI, NSTEMI,

**INTRODUCTION**
The propensity for a circadian pattern in the incidence of myocardial infarction (MI), with a peak in the early morning, has been known for some time, and the increase in mortality from MI in the winter months was first noticed and reported in the 1930s. Since these initial observations a large number of studies, varying in their approach and design, have confirmed that the incidence of MI and mortality from MI shows a seasonal variation. Examination of this periodicity has led to new insights into pathophysiologic triggers of atherosclerotic plaque rupture. Studies have shown that although this variation holds true in temperate climates with seasonal variations in temperature, the pattern is lost in environments without temperature extremes. It seems that this peak winter incidence of MI is particularly applicable to older patients, and indeed it has been suggested that for patients younger than 45, there may be a spring peak in hospital admissions for MI. Although a seasonal pattern for mortality from AMI has been previously noted, it remains unclear whether the occurrence of AMI also displays a seasonal rhythmicity. Documentation of such a pattern may foster investigation of new pathophysiologic determinants of plaque rupture and intracoronary thrombosis. This observational study sought to determine whether incidence of acute myocardial infarction (AMI) admitted in our institution are varied by season in a large tertiary care centre in south India.

**MATERIALS AND METHODS**
All patients with acute myocardial infarction admitted into coronary care unit of our institution during the period 1st Jan 2005 to 31st Dec 2009 were analysed retrospectively. Acute coronary syndrome was diagnosed by clinical criteria when at least two of the following three abnormalities were present.

2. Pathological Q wave, ST elevation or T wave inversion in the electrocardiograms with subsequent evolutionary changes.
3. An unequivocal rise in the Troponin T or I/CK-MB. ACS patients were also analysed whether they have ST elevation (STEMI) or not (NSTEMI).

Data were normalized so that seasonal occurrence of AMI was reported according to a standard 90-day length. Seasons were divided into winter (Jan-Mar), summer (Apr-Jun), monsoon (Jul-Sep), post-monsoon (Oct-Dec) as classified by Indian meteorology department. Data were also collected on a monthly basis.

**RESULTS**
A total of 7548 cases of ACS were analyzed during the study period of which 5503 (73%) were males and 2045 (27%) were females. Among the total number of ACS patients 3321 (44%) were STEMI (ST elevation myocardial infarction) and 4227 (56%) were NSTEMI (Non ST elevation myocardial infarction).
No seasonal variation in pattern of myocardial infarction noted in this study. However, complication of MI and mortality were more during summer season. Myocardial infarction associated with stroke was also more during summer months. The same seasonal pattern was seen in men and women, in different age. This pattern was seen in all subgroups analyzed groups. In-hospital case fatality rates for AMI followed a seasonal pattern, with a peak in summer.

**DISCUSSION**
Although long-period biological phenomena related to seasonal or other changes in weather and climate are fairly well known in human biometeorology, the daily influence of weather changes on the physiology and pathology of man is extremely difficult to demonstrate in a way
The present results suggest that there is no important seasonal variation in the occurrence of AMI in our institution. However, complication and mortality showed a marked peak during summer month with nadir during winter months. Unlike the larger ranges in cold or hot weather found in temperate regions, the warm climate of subtropical region does not affect frequency of AMI. Mechanism underlying the seasonal pattern of AMI observed are unclear & multifactorial. Sympathetic tone may be important because it increases in the cold., "with several consequences. Heart rate and blood pressure tend to rise, increasing the myocardial oxygen demand. Haematological variables are also affected as reflected by increases in thromboglobulin and platelet factor 4 that in turn enhance platelet aggregation. Some studies have reported an increased rate of AMI with decreased temperatures in winter, whereas others have noted a similar increase with rises in temperature in summer. The relation between MI mortality and seasons could be U shaped, with higher mortality associated with extremely hot or cold weather. Unlike the large ranges in cold or hot weather found in temperate regions, the warm climate of subtropical region does not affect frequency of AMI. There is no specific difference in the incidence and outcome of STEMI and NSTEMI with reference to seasons.

References:


