

# Improving Laboratory Utilization in Acute Coronary Syndrome



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the escalating healthcare costs must be the next focus in utilization of resources.

## CK-MB and CPK tests

Physicians are invited to alter their laboratory tests ordering practices in order to achieve optimal patient care. Despite the existence of evidence based guidelines, physicians continue to order excessive tests for their patients out of habit, lack of actual cost awareness and financial incentives such as a reward to physicians to provide less costly care.<sup>2</sup> **Studying the utilization patterns of requested laboratory tests can help in identifying overutilization of resources and therefore implement new strategies to optimize health care and reduce health care costs<sup>6</sup>.**

The most commonly ordered laboratory tests in a tertiary care center (hospital A) were the CK-MB, CPK and Troponin for chest pain patients.

CK-MB and CPK were previously used in combination with Troponin to diagnose or exclude acute myocardial infarction, assess infarct size and monitor reinfarction. As per the latest (American College of Cardiology/American Heart Association (ACC/AHA) guidelines, CK-MB testing is currently given a class III recommendation as “no benefit” in an era of Troponin (TrT) measurement. The only time CK-MB should be ordered is when Troponin testing is simply not available.<sup>1,6</sup> Third party payers in the United States such as Medicare does not reimburse Troponin and CK-MB testing performed simultaneously.<sup>8</sup>

## CK-MB adds nothing other than cost.

A retrospective study conducted in January 2015 on 58 randomly selected medical records in hospital A showed results compatible with the literature; Troponin measurements have superior value compared to CK-MB measurements in patients with ACS. The results showed that Troponin is more sensitive since 48% had elevated

Health care costs have tremendously increased during the last decades. The advancement in technology and the continuous increase in the Laboratory menu offered physicians a variety of choices that enabled them to improve patient outcome by diagnosing patient more precisely and providing effective treatment and preventive strategies<sup>6</sup>.

As a result of these improved outcomes, which are frequently linked with an increase in requesting laboratory tests (4% of health care costs)<sup>6</sup>, a perception was developed that excessive ordering of tests is healthier. This notion suggests that physicians practice may be suboptimal; this is supported by several studies that find that considerable amounts of tests are unnecessary and that there are variations in the care in ordering tests for patients with similar diagnosis.<sup>3</sup>

Encouraging efficient utilization of resources and improving laboratory value (Quality/Cost) to control

## Biomarkers: Diagnosis

Recommendations	COR	LOE
Cardiac-specific troponin (troponin I or T when a contemporary assay is used) levels should be measured at presentation and 3 to 6 hours after symptom onset in all patients who present with symptoms consistent with ACS to identify a rising and/or falling pattern.	I	A
Additional troponin levels should be obtained beyond 6 hours after symptom onset in patients with normal troponins on serial examination when electrocardiographic changes and/or clinical presentation confer an intermediate or high index of suspicion for ACS.	I	A
If the time of symptom onset is ambiguous, the time of presentation should be considered the time of onset for assessing troponin values.	I	A
With contemporary troponin assays, creatine kinase myocardial isoenzyme (CK-MB) and myoglobin are not useful for diagnosis of ACS.	III No Benefit	A



Troponin but normal CK-MB results. In addition, 4% had false positive CK-MB elevations, as defined by normal Troponin values. Also, and as part of the practice, CK-MB and Troponin tests were ordered simultaneously for the majority of patients regardless of the results of one versus the other.

Troponin elevated with normal CK-MB values	Normal troponin with false positive CK-MB elevations	Negative for both	Positive troponin and positive CK-MB
48%	4%	21%	22%

## Adopted Strategy

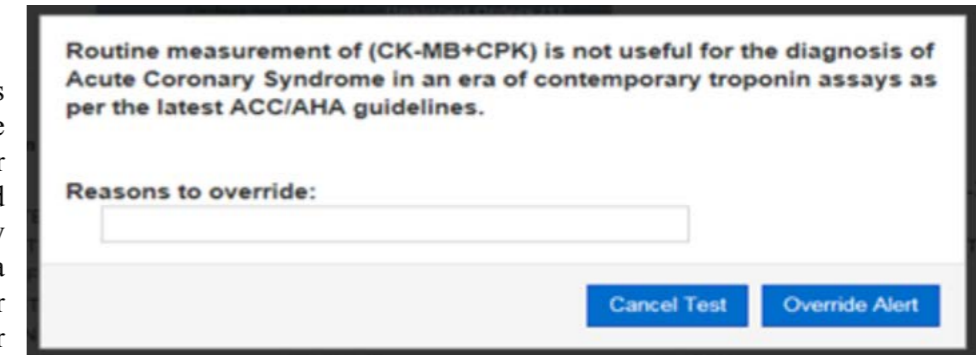
Based on the above fact and as part of implementing cost effective standards of care measures for ACS patients, one of the executed initiatives to reduce unnecessary tests ordering was to introduce a computer based intervention or Computerized Physician Order Entry (CPOE) alert.

Alerts are strategies that provide just in time knowledge or advice to improve clinical decision making and provide a long term educational benefit.

## Implementation

Several measures were implemented to reduce the utilization of ioenzymes in Acute Coronary syndrome:

- A Computerized Physician Order Entry (CPOE) alert was created and implemented in Mid-August 2015. This alert is believed to act through a combination of “just in time advice” and “long term education”.
- CK ioenzymes (CK-MB and CPK) test was removed from the CPOE Top priority list in the Emergency



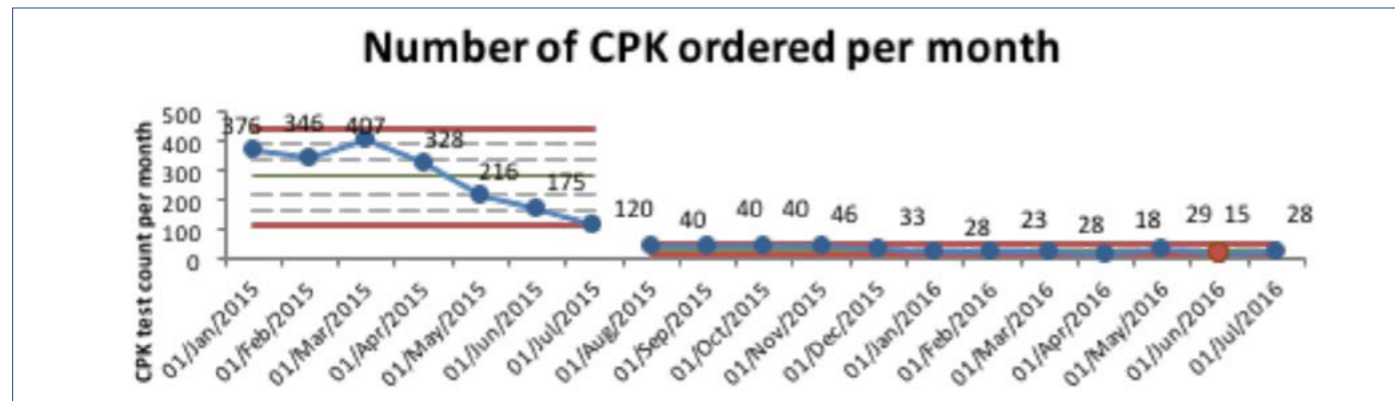
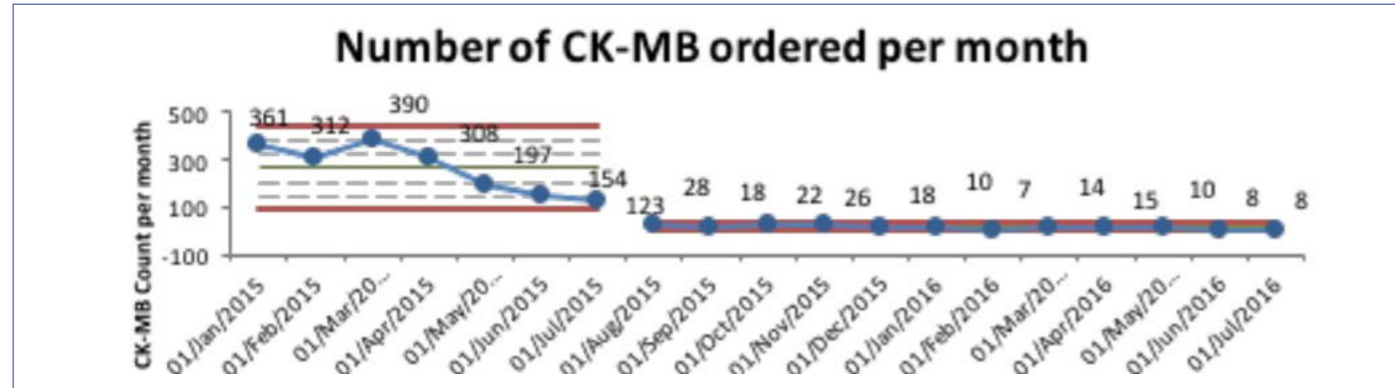
## Department

- CK-MB and CPK tests were removed from the ST elevation myocardial infarction (STEMI) panel. CK-MB and CPK are part of a series of cardiac markers tests i.e. when cardiac markers are ordered, CK-MB and CPK tests are ordered automatically.
- Educational and training sessions were given to Emergency Department attending physicians and cardiologists to notify them about the changes in the new guidelines and to update them about the computer based intervention.
- Laboratory administrators were informed about the decision of refraining from ordering ioenzymes for ACS in order to adequately review their stock supplies

Results

Following the implementation of the alert, a significant test utilization reduction was noted in both CK-MB and CPK. The percentage of the response to the intervention (cancelled/

interventions) was 90%. The remaining medical records (10%) were checked for appropriateness of test ordering by chart and peer reviews. The CPK test was ordered more efficiently and frequently for indicated reasons such as myopathy, muscle injury/pain, myositis and rhabdomyolysis.



Conclusion

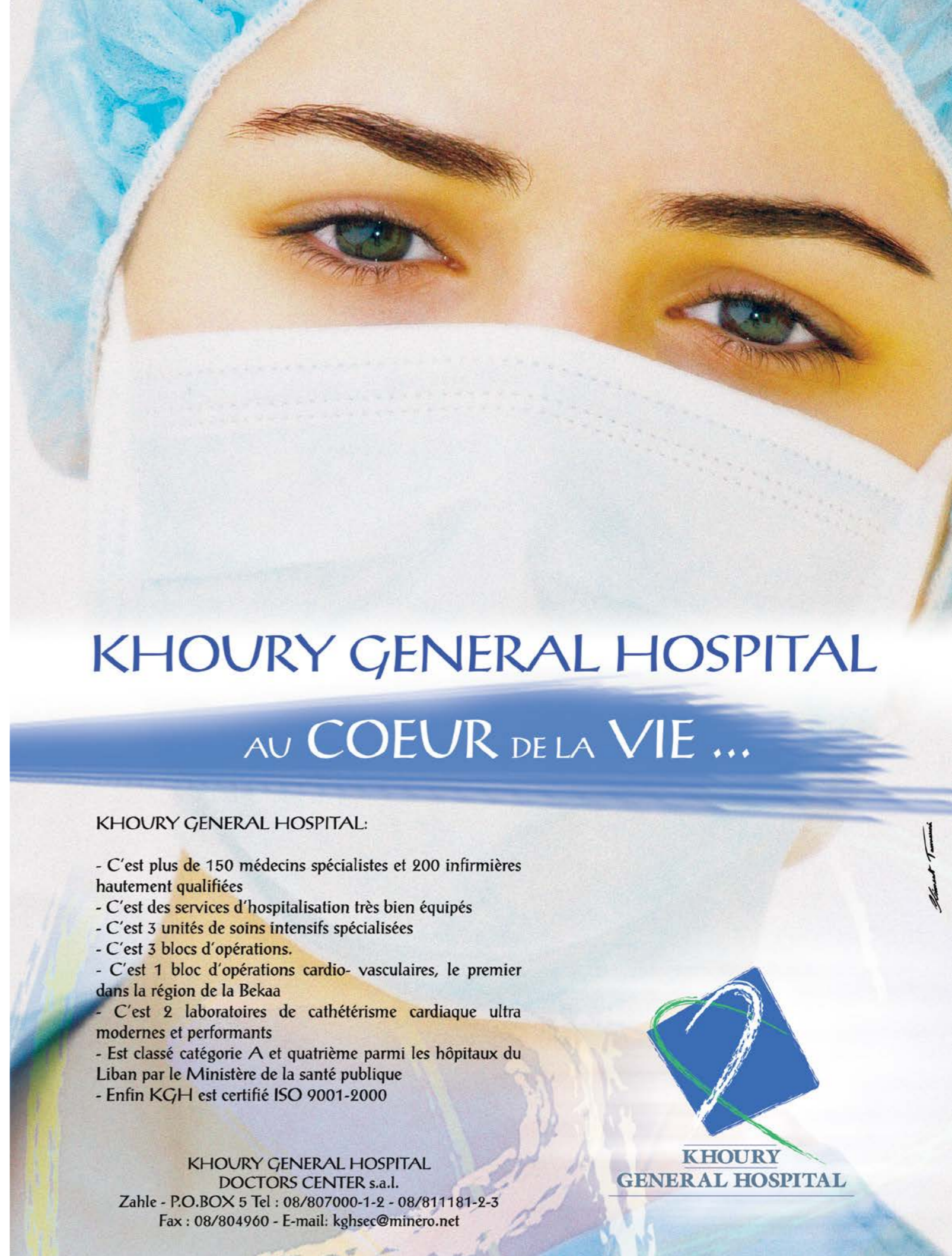
Computer based intervention or alert is a new strategy that provides immediate access to guidelines. It has a great potential in improving clinical decision making. CK-MB and CPK utilization have significantly decreased in this hospital following the implementation of the Alert using the information system. CK-MB and CPK tests have no role in the management of patients with ACS; they should not be ordered in an era of contemporary Troponin assays as per the latest ACC/AHA guidelines.

Preserving the Quality of care is paramount when implementing alerts. The intervention is intended to narrow the gap between the current practice and evidence and not only just focus on cost and volume reduction. Patient safety is an ultimate priority.

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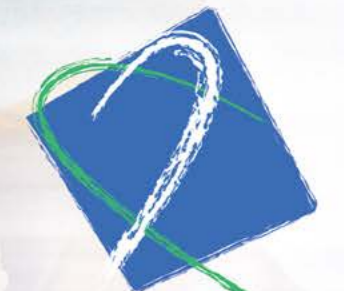


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