

Roles of emergency department physicians toward patients presenting chest pain: Review.

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Abstract:

Our significant objective was to identify the strategy applied in ED by physicians to identify reason of chest pain and use scoring system to predict the development of disease. We conducted the literature search in following electronic database MEDLINE/PubMed, EMBASE, for published studies up to December,2017. We have included most evidence based articles which were discussing the presenting chest pain present to emergency department. There is no test that ensures the patient will not have a myocardial infarction in the near or distant future. However, prognosis is not a snapshot however is a continuing variable related to what happens to the patient in the future, eg diabetes, hypertension etc. Prognostication for the person still requires judgment. Both the TIMI and GRACE have the potential to stratify risk in patients providing to the ED with undifferentiated chest pain precisely. The GRACE score is more complex compared to the TIMI score and in the ED setting TIMI may be the preferred scoring approach. Patients with chest pain require differing levels of care dependent upon their ED assessment. The electrocardiogram (ECG) is vital to making the cardiac diagnosis All chest pain patients need to have intravenous access acquired, and be placed on a cardiac monitor with supplemental oxygen

via nasal cannula. Chest radiography may help to identify the etiology of symptoms of chest pain syndrome. The physical examination can be helpful in identifying patients who clearly have noncardiac etiologies to their chest pain. It is very important to differentiate and discover the reason of chest pain, due to the fact that it can bring to fatality.

Introduction:

Within the emergency department (ED) variation exists in the rate of testing and admission for a range of clinical conditions [1]. This is most likely multifactorial and connected to patient, ED, hospital, geographic, and physician-related elements [2]. While the emergency physician (EP) typically decides patient disposition, he or she could be influenced by a range of problems beyond the patient's clinical presentation. Worry of negligence and threat hostility have both been shown to be predictive of ED admission rates and testing for clinical conditions including chest pain and abdominal discomfort [3], [4]. In general, variation in care is a well-established marker of low-value care.

Chest pain accounts for 8-10 million visits annually throughout the United States, and about half of these patients are confessed to either a monitoring system or inpatient solution at a cost of \$10-13 billion annually [5]. Proof remains to gather that a lot of these are "reduced danger" chest discomfort patients who are unlikely to gain from long term observation or extra cardiac risk stratification (e.g., stress testing or coronary computerized tomography [CT] [6]). Recently created sped up diagnostic pathways (ADPs) for breast discomfort, including the HEART score, have

been demonstrated to decrease total admissions for chest discomfort without subjecting patients to major unfavorable cardiac events (MACE) [8]. Expanding data suggests that when low-risk standards are fulfilled, additional screening offers no advantage and might enhance the death rate for this certain part of breast discomfort patients [7]. Additionally, modern-generation troponins (usually with 99th percentile of the top referral limitation in a healthy and balanced population of $< 0.01 \mu\text{g/ L}$, also without taking into consideration high-sensitivity troponins not yet in use in the U.S.) can dependably omit acute coronary syndrome (ACS) when performed in serial testing without added threat stratification [9]. On the other hand, one recent research study of Medicare patients found an association in between more conventional practice (greater admission rates) and lower incidence of acute myocardial infarction (MI) and death for this patient population [10].

We live in an era where available pathways exist to risk stratify patients with chest pain and rapidly rule out acute coronary syndrome (ACS) with enhancing accuracy however where clinical guidelines suggest 72-hour provocative testing and considerable medico-legal risk still pervades practice. Our significant objective was to identify the strategy applied in ED by physicians to identify reason of chest pain and use scoring system to predict the development of disease.

Methodology:

We conducted the literature search in following electronic database MEDLINE/PubMed, EMBASE, for published studies up to December, 2017. We have included most evidence based articles which were discussing the presenting chest pain present to emergency

department. We then manually searched the references of the original studies and reviews to identify any potential studies omitted by our search concerned topic. And we applied restriction to only English language with human subjected studies to be included in our study.

Discussion:

- **Communication challenges in the emergency department**

Communication between physician and patient represents a fundamental aspect of health care quality, and is attracting an enhancing amount of attention in health care researches [11]. Physician- patient communication regarding prognosis and choices for care is critical in aiding patients effectively prepare for and strategy future care, and physicians' communication design could affect patients' satisfaction, trust, desire to work together, and health condition [12]. Investigating the communication between physicians and patients could therefore help to optimize healthcare arrangement by determining specific training requires for physicians in this context. Physicians operating in the ED face numerous difficulties, such as working in a chaotic environment and treating mentally or chronically ill patients, difficulties that impact ED communication, which is additionally constricted by anxiety and the time-sensitive nature of lots of instances [13]. Patients arrive in the ED with numerous quantities of info, experience with the healthcare system, language fluency, and health proficiency [14], and the technique of emergency situation medicine is identified by episodic contact with patients and problems in developing continuous care. For many patients, being discharged from the ED stands for a moment of high

vulnerability [14]. Inadequate interaction at discharge might lead to negative repercussions, ranging from inappropriate use of medications to disregard of follow-ups for pending tests. Efficient discharge interaction is an important tool for developing continuity of care and a connect to the primary care provider. Additionally, it is likely to be economical by decreasing readmission of patients with ischemic heart disease [15].

- **Chest pain: What every physician needs to know.**

The evaluation and management of the patient with chest pain syndrome is an analysis difficulty to all who exercise emergency medicine. "Chest pain syndrome" is inclusive of symptoms that could be caused by acute myocardial ischemia and includes such varied problems as chest pain, chest pressure, neck pain, jaw discomfort, shoulder pain, epigastric pain, back pain, palpitations, dyspnea, coughing, nausea, weakness and malaise, or dizziness.

The proportion of patients with other complaints that ultimately prove to have an acute coronary disorder (ACS) is definitely much reduced, yet understanding of this may only include in the issues of the clinician determined not to neglect a situation amongst the large variety of candidates [16].

Actually, over 5% of all ED visits are because of chest pain-related complaints. In spite of substantial investigation into risk stratification scores and a multiplicity of proposed diagnostic algorithms and screening techniques, upwards of 2% of breast discomfort syndrome patients will be discharged house and be subsequently detected with an acute myocardial infarction within 1 week. Therefore, patients who present to the ED with the problem of "chest pain" or associated

problems need to receive triage priority with minimal time delay to evaluation and 12-lead electrocardiography.

The differential medical diagnosis of chest pain syndrome is wide and disparate, consisting of condition procedures that vary from nonurgent to life threatening. Moreover, within the consideration of lethal causes, patients might be experiencing coronary causes, along with pulmonary embolism, aortic dissection, aortic rupture, pneumothorax, or perhaps esophageal rupture. There are lots of other medical diagnoses that are much less time crucial, yet as varied as widely as bone and joint discomfort, zoster, pleurisy, pneumonia, or gastroesophageal reflux. Treating all these patients as time important is essential till emerging sources of upper body pain are left out.

The usual pathophysiology related to signs and symptoms occurring from acute coronary disorder is reduced myocardial perfusion additional to occlusive disease of the coronary artery(ies), resulting in lowered oxygen supply to the myocardium. Acute coronary syndrome encompasses ST segment elevation myocardial infarction (STEMI), non-ST section altitude MI (NSTEMI), and unpredictable angina (UA) [17].

Unsteady angina could consist of anginal signs that occur at rest, are of new onset, or signs that are a lot more frequent or longer in duration, but need not consist of suggestive changes on the electrocardiogram (ECG). Similarly, NSTEMI could offer with very little or no ECG modifications, yet necessarily entails elevated degrees of enzymes a sign of myocardial necrosis. STEMI is, as the name indicates, an electrocardiographic diagnosis, and the look for it mandates the very early ECG (within 10 minutes of ED discussion) now considered as a universal indication of quality care.

- **Diagnostic Confirmation for making sure that patient has chest pain**

Symptoms of chest pain syndrome can be quite vague. The practitioner needs to ask pertinent questions of the patient in order to identify the pain. How would you explain the pain? Is it dull or aching, sharp or tearing? Where is the pain located? Is it substernal or more certain to one side of the upper body? Exist any exacerbating or alleviating factors? Does pain enhance when you lean onward, or does it worsen when you take a deep breath?

Chest pain could likewise be confused with abdominal pain, particularly if it is epigastric or greater in the upper abdominal quadrants. The clinician needs to always keep in mind that discussions may be "traditional," "irregular," or intermediate between those arbitrary classifications. Patients with chest pain syndrome need to be assessed quickly to identify the etiology of their discomfort [18]. Key interventions that need to occur in a time-critical fashion are ECG and a focused background and physical examination. Unless the patient is hurried to the cardiac catheterization laboratory on the basis of these three elements, a chest radiograph should likewise be acquired quickly.

- **History**

ACS is divided into STEMI or non-ST segment elevation-ACS, the latter of which includes NSTEMI and UA [19].

Table1. Signs and symptoms of acute coronary syndrome:

1. Chest pain (when present)

- Usually described as burning, pressure, or tightness
- Usually located substernal or in the left chest

<ul style="list-style-type: none"> • Can be reproducible
2. Pain radiating elsewhere <ul style="list-style-type: none"> • Referred pain to the arm(s), back, neck, or jaw
3. Nausea, vomiting, or unexplained indigestion
4. Vomiting
5. Dyspnea
6. Other symptoms may occur in the absence of chest pain, including these, palpitations, dizziness, and malaise. These “atypical” presentations are more common in females, the elderly, and diabetics.

Table2. The most important risk factors for ischemic cardiovascular disease are:

1. Diabetes
2. Hypertension
3. Tobacco use
4. Hypercholesterolemia
5. Family history of cardiovascular disease, especially at a young age (<40 years)

Patients that are at high risk for establishing difficulties of NSTEMI-ACS (non-ST elevated-ACS) can be identified by means of numerous danger stratification examinations.

The Thrombolysis in Myocardial Infarction (TIMI) danger rating is a device that can be used to identify a patients danger for mortality, anemia, or need for immediate treatment within 14 days.

The score has been evaluated and verified as a great predictor of negative result. The score is made up of seven components:

1. Age \geq 65 years
2. More than three risk factors for ischemic cardiovascular disease
3. Known ischemic cardiovascular disease
4. Aspirin use in the last 7 days
5. Two episodes of severe angina in the last 24 hours
6. ST segment changes \geq 0.5 mm
7. Positive troponin

Score interpretation: risk of 14-day all-cause mortality, new or recurrent MI, severe recurrent ischemia requiring revascularization:

0-1 = 4.7% risk
2 = 8.3% risk
3 = 13.2% risk
4 = 19.9% risk
5 = 26.2% risk
6-7 = 40.9% risk

The **GRACE** score (note these components carry different statistical weights, unlike the components in the TIMI Risk Score [20]).

1. Age
2. Heart rate
3. Killip class
4. Creatinine
5. Cardiac arrest at admission
6. ST segment deviation
7. Elevated cardiac enzyme

- **ED Use of CT Coronary Angiography and Myocardial Perfusion Imaging to Evaluate Chest Pain Patients and Predict Future Myocardial Infarction.**

Currently, there is a great deal of interest in carrying out computed tomographic coronary angiography in the ED to assess patients with chest pain who have an "intermediate" risk of a cardiac occasion. The concern here is to define intermediate danger. If this is based upon the Framingham Risk Score, it should not apply to these patients considering that the score connects to occasions that might occur in the following ten years, not the next 10 days. Probably a simpler technique is to recognize those stable patients whose symptoms and ECG/troponin are absolute (high possibility) for myocardial ischemia and those whose symptoms and ECG/troponin recommend (high chance) non-cardiac upper body pain [21]. All other patients can be thought about as chest pain of uncertain etiology, ie "intermediate risk."

CT coronary angiography is a wonderful imaging method that offers great anatomic information, but it could not be appropriate in the ED to triage "intermediate risk" chest pain patients. As an

example, if the CT angio is regular or reveals just very little abnormalities, statistically, the prognosis of populaces of these patients over the long-term readies.

In the specific patient, no person can anticipate who will have an infarction in the near future and who will not, even if there are no high-gradestenoses present, minimal irregularities with thin caps over lipid pools can be present which might rupture and lead to a coronary occlusion and succeeding myocardial infarction in the future.

When routed to the private patient, the same is true for myocardial perfusion imaging. Myocardial perfusion imaging tells us whether or not there is a transient perfusion defect in the myocardium during anxiety. These defects usually connect to high-grade coronary artery stenoses. If no perfusion problem is present, the existence of minimal coronary irregularities is not gotten rid of. In the future, these irregularities can be responsible for plaque rupture which could occlude a coronary artery and cause a coronary infarction or abrupt cardiac death.

- **Simpler Triage Tests in the ED to Assess Chest Pain Patients.**

The vital tests performed in the ED to help with decision production are the ECG and the troponin T. The ECG and troponins are essential analysis examinations yet have to be analyzed in the context of the medical presentation and various other things such as threat elements, age, gender, and so on. If either ECG or Troponin T is positive, the patient ought to be confessed for monitoring and succeeding in patient assessment with, in my opinion, a catheter-based coronary angiogram [22].

If the electrocardiogram is positive for ischemia, no matter whether the troponin T is positive or negative, most of these patients should be admitted to hospital and referred for a catheter-based coronary angiography. If the ECG is negative for ischemia, the troponin T is negative, and the

patient is stable (hemodynamically and electrically), this is the type of patient that can be discharged from the medical facility and subsequently by a doctor. On followup a nuclear or echo stress test can be performed, and if it is negative, a high-grade coronary artery constrictions is not likely but does not eliminate a non-obstructive plaque that may be prone to rupture. If the stress test is positive, typically this patient has a high-grade coronary artery stenosis and should be admitted to healthcare facility and referred for a catheter-based coronary angiography. If the choice is made by the doctor on follow-up to do CT-based coronary angiography, a regular coronary angiogram makes a high grade stenosis unlikely however does not dismiss little plaques that are prone to rupture in future. On the other hand, if the CT-based coronary angiography declares, the patient needs to probably go through a nuclear or echo stress test; and if a nuclear stress test is positive, catheter-based coronary angiography is necessitated. In the last circumstances, the patient will certainly be revealed to 3 resources of radiation and 2 sources of radio-opaque contrast product.

Conclusion:

There is no test that ensures the patient will not have a myocardial infarction in the near or distant future. However, prognosis is not a snapshot however is a continuing variable related to what happens to the patient in the future, eg diabetes, hypertension etc. Prognostication for the person still requires judgment. Choices related to triage (home or hospital) need to be based upon the ECG and troponinT as well as multiple elements such as clinical presentation, (stable or unsteady,) age, sex, family history, and a variety of risk aspects such as hypertension, diabetes, known dyslipidemia, smoking, obesity, chronic kidney disease and sedentary lifestyle. Both the

TIMI and GRACE have the potential to stratify risk in patients providing to the ED with undifferentiated chest pain precisely. The GRACE score is more complex compared to the TIMI score and in the ED setting TIMI may be the preferred scoring approach. Patients with chest pain require differing levels of care dependent upon their ED assessment. The electrocardiogram (ECG) is vital to making the cardiac diagnosis All chest pain patients need to have intravenous access acquired, and be placed on a cardiac monitor with supplemental oxygen via nasal cannula. Chest radiography may help to identify the etiology of symptoms of chest pain syndrome. The physical examination can be helpful in identifying patients who clearly have noncardiac etiologies to their chest pain. It is very important to differentiate and discover the reason of chest pain, due to the fact that it can bring to fatality.

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