Investigating Patients with Recent Onset of Chest Pain Against NICE Guidelines in a District General Hospital Setting in the United Kingdom

Azeem S Sheikh BSc MBBS FCPS MRCP, Kamran Ali MBBS, Azhar A Khokhar FRCP(Lon) FRCP (Glas)

Background: Chest pain is a very common symptom leading to a significant number of patients visiting the primary care trusts, emergency departments and a huge number of emergency hospital admissions.

Objective: The objective of our audit was to investigate whether patients with recent onset of chest pain referred to the Rapid Access Chest Pain Clinic were being investigated in accordance with the recommendations by the National Institute for Health and Clinical Excellence (NICE), in a busy District General Hospital setting.

Design: Retrospective collection of data

Setting: Southend University Hospital NHS Foundation Trust

Patients: We collected data over a period of three months for all the patients who underwent invasive coronary angiogram after being referred via Rapid Access Chest Pain Clinic (RACPC) or General Cardiology Clinic presenting with recent onset of chest pain. A total of 157 patients were enrolled in the study. The patients were then categorised into four groups based upon their description of symptoms, age and risk factors, as defined by NICE.

Results: We found that 86% (135/157) patients had estimated likelihood of CAD >60% and 51% of these had unnecessary non-invasive investigations contrary to what NICE recommends. This shows that adhering to the NICE guidelines would have saved a substantial amount of hospital resources and time of the healthcare team and the patients.

Conclusions: The development of strategies for cost-conscious quality care must begin with the history, risk factors for coronary artery disease and patients’ investigations should be based on their risk stratification.

INTRODUCTION

Chest pain and discomfort are very common symptoms and in the United Kingdom accounts for about 1% of visits to primary care, approximately 700,000 visits (5%) to accident and emergency departments and 25% of emergency hospital admissions. Coronary artery disease (CAD) is one of many causes of chest pain and is the commonest cause of death in the UK.

Increasing age is related to an increase in the incidence of chest pain consultations and is more common in males. Cardiac disease accounts for only 8-18% of all cases of chest pain and 2 and when the cause could be cardiac in origin, appropriate and timely assessment and diagnostic investigations could prevent from significant fatal events.

The National Institute for Health and Clinical Excellence (NICE) guidance on recent onset chest pain urges general practitioners (GPs) to assess the nature and timing of acute pain rapidly and arrange urgent admission for suspected acute coronary syndrome.

The GPs can diagnose stable angina either on clinical assessment alone or combined with diagnostic testing (anatomical testing for obstructive coronary disease and/or functional testing for myocardial ischaemia). The presence or absence of the following three factors should be noted: a constricting discomfort in the front of the chest, or in the neck, shoulders, jaw, or arms; the discomfort is precipitated by physical exertion and relieved by rest or Glyceryl Trinitrate (GTN) within about 5 minutes.
If all three factors are present, the symptoms should be classified as typical angina; two factors are atypical of angina and one or none of these factors - non-anginal chest pain. Once the initial assessment is complete, the guidance recommends estimating the likelihood of coronary disease based on risk factors, age, sex and symptom classification. If clinical assessment suggests typical angina and the estimated likelihood of coronary disease is >90%, NICE advises that further diagnostic investigation is unnecessary. These patients should be managed as having angina. If the estimated likelihood of coronary disease is <10% then other non-Ischaemic causes of chest pain should be considered (Table 1).

The aim of our audit was to investigate whether patients with recent onset of chest pain referred to the Rapid Access Chest Pain or General Cardiology Clinics were being investigated in accordance with the recommendations by NICE, in a busy District General Hospital setting.

**PATIENTS AND METHODS**

This was a retrospective study conducted at Southend University Hospital NHS Foundation Trust, Essex, United Kingdom. We collected data over a period of three months i.e. 1st February to 30th April, 2011, for all the patients who underwent invasive coronary angiograms, we reviewed their age, risk factors, LV function and non-invasive investigations, if they had any prior to having an invasive angiogram. The data was collected from the Datacam software, clinic letters and patients case notes. The patients were then categorised into four groups based upon their description of symptoms, age and risk factors, as defined by NICE.

### RESULTS

Out of a total of 157 patients included in the study, 99 (63%) were male. The mean age was 65 years (range: 38 – 88). One hundred and forty seven (85%) had normal LV systolic function, 8 (5%) had mild dysfunction, 10 (6%) had moderate dysfunction and 7 (4%) had severe LV impairment. The patients were risk stratified into following four groups.

#### Estimated likelihood of CAD 10 – 29%

There were 10 (6.3%) patients in this group, of which 2 (20%) were male and the mean age was 59.8 years (range: 44 – 85). With regards to non-invasive investigations, 5 (50%) patients had an exercise tolerance test (ETT), 2 (20%) had Methoxy-isobutylisonitrile (MIBI), 1 (10%) patient had Dobutamine Stress Echocardiogram (DSE) and 2 (20%) patients had CT Calcium scoring. In this low risk group, only one patient was referred for percutaneous coronary intervention (PCI) due to severe coronary artery disease. The details of the various tests and their outcomes in this group are shown in Figure 1. The coronary artery disease severity as per invasive angiogram is shown in Figure 2.

#### Estimated likelihood of CAD 30 – 60%

There were 30 (19%) patients in this group; 9 (30%) were male and the mean age was 66.5 years (range 43 – 88). Out of these 30 patients, 7 (23%) had ETT, 5 (16.6%) had MIBI, 3 (10%) patients had CT Calcium scoring whilst 11 (36.6%) patients had invasive coronary angiogram as the first line of investigation. In this group, 1 (3.3%) patient was referred for CABG and 3 (10%) were referred for PCI. The details of the various tests and their outcomes are shown in Figure 3. The severity of coronary artery disease as revealed by invasive angiogram is shown in Figure 4.

#### Estimated likelihood of CAD 60 – 90%

This group had 49 (31%) patients; 20 (41%) were male and the mean age was 63 years (range: 38 – 80). Fourteen (28.5%) patients had ETT, 5 (10%) had MIBI, 3 (6%) patients had DSE whilst 2 (4%) patients had CT Calcium scoring followed by CT angiogram and were found to have significant CAD.

#### Estimated likelihood of CAD 61-90%

There were 73 (46.8%) patients in this group; 35 (48%) were male and the mean age was 66.5 years (range: 43 – 88). Twenty six (35.6%) patients had ETT, 15 (20%) had MIBI, 10 (13.7%) patients had DSE whilst 12 (16.4%) patients had CT Calcium scoring. In this high risk group, 19 (25.7%) patients had invasive coronary angiogram and were found to have significant CAD.
Figure 1: Estimated likelihood of Coronary Artery Disease 10 – 29% - Overview

Figure 2: Estimated likelihood of Coronary Artery Disease 10 – 29% - Angiographically coronary artery disease severity

Figure 4: Estimated likelihood of Coronary Artery Disease 30 – 60% - Angiographically coronary artery disease severity

Figure 6: Estimated likelihood of Coronary Artery Disease 60 – 90% - Angiographically coronary artery disease severity

Key to Table & Figures:

(number of patients)

ETT: Exercise Tolerance Test
MIBI: Methoxy-isobutylisonitrile (Myocardial Perfusion Scan)
DSE: Dobutamine Stress Echocardiogram
Angio: Coronary Angiogram
Medical Mx: Medical Management
CT Calcium: CT Calcium score
CTA: CT Coronary Angiogram
PCI: Percutaneous Coronary Intervention
CABG: Coronary Artery Bypass Graft
Figure 3: Estimated likelihood of Coronary Artery Disease 30 – 60% - Overview

Figure 5: Estimated likelihood of Coronary Artery Disease 60 – 90% - Overview
Out of a total of 49 patients in this group, 25 (51%) had invasive angiogram as the first line of investigation. One (4%) patient had severe three vessel CAD and was referred for CABG, 5 (20%) patients were referred for coronary intervention, 6 (24%) were referred for further assessment (e.g. DSE, MIBI, pressure wire study), 6 (24%) of them were found to have mild disease and were managed medically whilst 7 (28%) patients had normal coronaries, as shown in Figure 6. The severity of coronary artery disease as revealed by invasive angiogram is shown in Figure 7.

**Estimated likelihood of CAD >90%**

There were 68 patients in this group, all of them were male. The mean age was 66.9 years (range: 46 – 83). Fifteen (22%) patients underwent ETT, 9 (13%) patients had MIBI, 6 (8%) patients had DSE as the first line of investigation whilst 7 (10.3%) patients had CT calcium scoring.

In this high-risk group, 31 (45.5%) patients underwent invasive angiogram as first line of investigation. Two (6.4%) of them were referred for CABG, 11 (35%) had severe CAD and were referred for PCI, 4 (13%) were referred for further assessment (MIBI, pressure wire study), 9 (29%) were managed medically due to mild to moderate disease whilst 5 (16%) had normal coronaries, as shown in Figure 8. The severity of CAD as revealed by invasive angiogram is shown in Figure 9.
The accurate identification of patients with ischaemic heart disease is important, because 30% of patients presenting with recent-onset angina have a significant cardiac event within 1–2 years and many of these patients may benefit from coronary revascularisation. Patients with recent onset chest pain can be investigated at a RACPC without compromising their eventual outcome. Those with non-cardiac symptoms can be confidently and appropriately reassured without the need for exhaustive cardiac investigation. Early, effective treatment can be initiated in patients judged to have ischaemic heart disease, and further investigations such as angiography can be scheduled for those at highest risk.

Our study confirms that rapid-access chest pain clinic can reliably identify high-risk patients whilst significantly reducing the number of unnecessary hospital admissions as only a small number of patients were referred for assessment when the risk is low as only 6.3% patients had an estimated likelihood of CAD between 10 – 29% and much higher number when risk is high as 74.5% patients had risk of >60% based on their age, typicality of symptoms and risk factors.

These findings are consistent with previous studies, thus clearly demonstrating the role of rapid-access chest pain clinics in the management of this difficult subset of patients. Risk stratification in this study was performed using clinical and currently available evidence-based investigations.

In the moderate-risk group, when the likelihood of CAD was 30 – 60%, 36.6% patients had invasive angiogram as their first line of investigation which was contrary to what NICE recommends. Out of these, only one (9%) patient was found to have severe CAD and needed referral for coronary intervention whilst 72% did not require any coronary intervention. It would have better if these patients were investigated via some form of functional testing rather than exposing them to the risks of an invasive procedure.

In the high-risk group with an estimated risk of CAD was between 60 – 90%, 49% of patients had non-invasive cardiac investigation including ETT, MIBI, DSE and CT Calcium scoring. Fifty-one percent (51%) had invasive angiogram as their first line of investigation. As per NICE recommendations, this group should have had invasive investigation in order to delineate their coronary anatomy. Whilst on one hand the practice led to a waste of time of the patients and the health professionals, on the other this was an extra burden on the hospital resources.

In patients with the estimated risk of CAD >60%, 9 (7.7%) patients underwent CT calcium scoring which was found to be high and of these 6 (5%) had CT angiogram as well and all of them then had an invasive angiogram but only one (11%) patient was found to have disease severe enough to be referred for coronary intervention.

Despite the fact that much of the clinical information collected by the physician is ‘soft’ or subjective data, predictions of outcome based on the information from the initial evaluation are accurate and can be used to identify high- and low-risk patients. In this era of high technology, the physician can select from a wide variety of tests to evaluate patients with suspected coronary artery disease.

**REFERENCES**