The final part in this series will focus on the assessment of chest pain. This symptom is one of the most common presenting complaints seen in primary and secondary care and is the leading cause of emergency department visits after abdominal pain. Assessment and differentiation of the various chest pain presentations can be challenging due to variation in clinical presentation, patient history of the symptom and the potential for atypical presentation in women, older people, and those with diabetes or chronic kidney disease. Through structured nursing assessment it is possible to identify those at high risk. The aim of this article is to provide an overview of the assessment of chest pain and differential diagnosis of chest pain.

There are many causes of chest pain as outlined in Table 1 but acute coronary syndrome is one of the potentially more serious causes that require rapid identification and implementation of treatment in an attempt to preserve myocardial function and prevent the development of arrhythmias, heart failure or cardiogenic shock. Acute coronary syndromes are an umbrella term used to describe the clinical presentation of ischaemic heart disease and encompasses unstable angina pectoris, non ST segment elevation myocardial infarction and ST segment elevation myocardial infarction. It is defined by the European Society of Cardiology Guidelines as a life threatening manifestation of atherosclerosis caused by rupture of a vulnerable atherosclerotic plaque with subsequent thrombus formation, which causes a sudden complete or critical reduction in coronary blood flow, which results in the clinical presentation of chest pain.

Assessment of chest pain should focus on the history of the pain, cardiovascular risk factor profile, previous personal history of ischaemic heart disease and prior relevant investigation. All but the history of chest pain has been presented in part one and two of this series. A clear history of chest pain and its associated symptoms are pivotal in guiding investigations and treatment. There are numerous chest pain assessment tools and scores and a sample of these are presented in Tables 2 and 3, which can aid in the assessment of chest pain.

According to Oriolo and Albarran there is no specific recommendation as to which is the most appropriate tool to use, but patient assessment must be systematic and comprehensive without the use of leading questions. In the author’s experience the tool ‘OLD CARTS’ (see Table 2) is most commonly used in clinical practice when assessing chest pain. The following is an overview of OLD CARTS:

**Onset**

Establishing the onset of chest pain is vital in helping to differentiate between acute and chronic pain. Patients with musculoskeletal pain caused by injury or chronic conditions may present to the emergency department days after the injury has occurred as a consequence of inability to carry out routine daily tasks or worsening of the chronic condition. Ischaemic chest pain in comparison may occur with exertion and relieve with rest or with sublingual GTN spray.

**Location**

Despite popular belief left sided chest pain is unlikely to indicate a cardiac origin. Ischaemic chest pain is located central or slightly to the left of central chest, but according to Hamm ischaemic chest pain may be experienced anywhere from the pubis region to the top of the head and in some people they may only experience pain in the areas of radiation such as arm, neck, jaw and not in the chest. Atypical symptoms include absence of...
pain but instead epigastric fullness, fatigue and indigestion. These symptoms may be seen in those who experience autonomic neuropathy secondary to diabetes. In addition atypical presentation maybe experienced in younger (25-40 years) and older (>75 years) patients, women and in those with chronic renal failure or dementia. Absence of chest pain leads to under recognition of the disease and under treatment.7

Duration

Differentiating chest pain according to duration of pain can be helpful marker in aiding diagnosis. According to Oriolo and Albarran¹ if the pain is continuous or prolonged, eg. after exercise, it is unlikely to be anginal in nature. In addition, pain that rapidly comes and goes lasting less than a minute is also unlikely to be cardiac related. In contrast pain caused by ischaemic heart disease can last for as long as 20 minutes or more and it is usually relieved by GTN within one to five minutes of administration. But remember pain caused by oesophageal spasm can also be relieved by GTN spray.

Character

Ischaemic chest pain has several descriptors depending on the patient’s perception of pain. Descriptors include pressure, heavy feeling, feeling of indigestion stabbing and sharp pain. Pain that is reproducible on palpation, sharp or pleuritic pain, pain worse on inspiration or coughing is unlikely to be ischaemic in nature although cannot be excluded.

Typical angina pain is defined as chest discomfort that is aggravated by exertion and relieved by rest or GTN. It is necessary to explore other aggravating/associating factor to aid in differential diagnosis.² Classically ischaemic pain maybe described as exertional pain, pressure or discomfort in the neck shoulder or arm. Atypical descriptors include cramping, grinding, pricking. Rarely is tooth or jaw pain experienced as ischaemia.

Associating factors

Typical ischemic pain is normally relieved by rest and/or GTN. Pain that is relieved by change in body position, adjusting breathing pattern or by antacids is unlikely to be cardiac in nature.³ When assessing the patient about the nature of their chest pain it is also important to obtain information regarding the use of recreational drugs, herbal or over the counter medications as these may interfere with patient’s prescribed medication and/or precipitate chest pain symptoms. Despite knowledge of ACS related to substance abuse it is not routinely asked about or documented in clinical notes.

Other associated symptoms related to chest pain include nausea, vomiting, diaphoresis, shortness of breath, syncope or pre-syncope. If present then the presence of acute coronary syndrome should be high.

Relieving factors/radiation

It is necessary to enquire about how the chest pain is relieved. As mentioned previously pain relieved by change in body position or respiratory pattern or by antacids tend not to be ischaemic in nature. In comparison pain relieved by GTN or rest suggest ischaemia.

Hamm⁷ describes the radiation pattern of ischaemic chest pain as common in the left arm, neck or jaw. Radiation is less common in the right arm or both arms simultaneously, the back, abdomen and the teeth.

Temporal factors

From clinical experience people with a prior history of ischaemic heart disease are able to recognise their ischaemic chest pain from other forms of chest pain. For those who present for the first time with chest pain this is impossible and provides a chal-
Reassessing the pain. Also temporal factors address the treatment used to relieve pain and how often the treatment is administered in order to obtain relief.

**Severity**

Pain is subjective so the use of pain scores, visual analogues and pain scales are helpful in quantifying the severity of chest pain and the effectiveness of the treatment administered. In our clinical practice the pain scale is used and for those that cannot use the pain scale due to communication barriers a visual analogue is available. The pain scale is recorded in the nursing documentation along with the assessment of chest pain.

In addition, recording the vital signs is essential and underpins the subsequent physical examination. Vital signs that directly relate to the cardiovascular system are the pulse and blood pressure, but respiratory rate, temperature and level of consciousness maybe beneficial in establishing differential diagnoses. Regarding the recording of blood pressure Tough advises recording blood pressure in both arms when a patient presents with chest pain. A difference of greater than 20mmHg may indicate aortic dissection and can assist in formulating a diagnosis.

Attaching the patient to a cardiac monitor to observe for ST segment deviation or occurrence of arrhythmias is also recommended.

Recording 12 lead ECG has a central role in the early assessment of patients with suspected ischaemic chest pain. It is recommended that recording and interpreting a 12 lead ECG within 10 minutes of patient presentation is best practice. Ideally an ECG should be recorded when the patient has pain and compared with an ECG recorded when the patient is pain free.

In addition to the ECG routine bloods such as full blood count, coagulation screen, renal function should be observed to rule out non-cardiac causes of chest pain and also to gain insight into how other systems are functioning. Cardiac markers such as troponins should also be noted, these serve to identify and risk stratify patients into high, intermediate and low risk. Troponins are highly sensitive for myocardial necrosis caused by occlusion of the coronary artery.

**Conclusion**

Chest pain is a common presenting complaint with numerous possible causes. A systematic approach as outlined above, supplemented with vital signs, ECG and the relevant bloods will aid in diagnosis, risk stratification and treatment options.

Kate O’Donovan is course co-ordinator for the postgraduate diploma in cardiovascular nursing in the Mater Hospital, Dublin

**References**