

Acute Chest Pain

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Objectives

- Identify the important features of chest pain that might indicate it's origin
- State the main conditions that can cause chest pain
- Differentiate between causes of chest pain
- State the general management of chest pain
- Manage a patient suffering from a myocardial infarct

Introduction

Chest pain is a very common complaint. Some disorders which give rise to chest pain are very serious and might even be life threatening.

This unit will help you understand the above two statements by the uses of diagnosis.

We will use 6 case studies to illustrate the nature of chest pain, how to diagnose it, and the management required, please note all of these studies reflect the reality of the offshore environment. Be aware that although most people are alarmed by chest pain, some crew will not always come to see you about it, often they do not want to take time off work or let the team down, alternatively they might not want to be sent home and lose money. This will be illustrated in one of the case studies presented

Preparation

To warm up before reading further please take time to review the structure and contents of the chest by referring to an anatomy book.

Question A: Chest pain has many causes, this will become more apparent as you work your way through this unit, try matching the classification of the disease to these disease processes.

Disease Process:

1. Viral tracheitis
2. Pleurisy
3. Angina
4. Fracture
5. Nerve entrapment
6. Carcinoma of the bronchus
7. Chemical laryngo-tracheitis

The first one has been done for you;

Disease Classification	
A. Injury	4
B. Inflammation	
C. Infection	
D. Mechanical	
E. Circulatory	
F. Neoplastic	
G. Occupational	

1. Introduction to Case Studies

For ease of understanding, the chest can be considered in 4 parts:

- The Chest Wall
- The Lungs
- The Oesophagus
- The Heart

Each part of the chest listed above will be considered in the light of the case study, some of the cases will be considered in a descriptive form and others in narrative form whereby you will be expected to respond.

Record your response in the space provided, you will be able to check your answer against the response we have selected as the most appropriate. Specific background information will be provided at certain junctures in the studies; in each case a management plan is given.

2. Chest Wall

“One windy afternoon a rigger is taking some equipment from a paint locker located on the open deck when a sudden gust of wind causes one of the metal doors to swing close. The handle of the door catches the painter with some force in the right side of his chest. He experiences an initial pain from the blow, pulls up his shirt and notices a pink mark on the lower right chest wall. He gives the area a good rub and then prepares to get on with his job. He quickly discovers though that as soon as he twists, bends, lifts, coughs or takes a deep breath, he experiences a sudden sharp pain at the injury site.

This type of injury is common and very painful. The history gives the diagnosis. It is possible that your patient has broken a rib, although under the circumstances described, this is unlikely.”

Let's assume that he has a broken rib and consider the following questions:

- Would you be able to diagnose a fractured rib clinically?
- What is the usual treatment for a fractured rib?

Take a few moments to consider your answers to the above questions before moving on.

A fractured rib is very difficult to diagnose clinically. A periosteal haematoma will produce a lump on the surface of the rib which could be a fracture. The only way to diagnose a fractured rib is by taking an x-ray, there are no special measures required to treat a single fractured rib. The use of strapping and bandages is no longer a recognised form of treatment due to the increased incidence of chest infection reported over the years. Chest

injuries are always painful because bone, wherever it might be located, is extremely sensitive to pain.

Chest wall pain of none-traumatic origin

Before we consider this we perhaps need to consider what we mean by non-traumatic origin. Quite often the pain has arisen as the result of an injury that has been so minor the patient has forgotten all about it.

Points to remember:

- The patient is not unduly distressed by the pain
- They might have a stiff neck
- They have no recollection of the injury
- The discomfort might disturb their sleep as they turn in bed
- It can be exacerbated by deep inspiration or sudden movements
- They are usually able to continue with normal every day activities

Diagnosis of nerve entrapment syndrome

A suggested aetiology of such pain is a nerve entrapment syndrome. A sensory nerve becomes 'trapped' as it emerges between a pair of either cervical or thoracic vertebrae. Sometimes a floating rib can be 'sprung' or impinge on the crest of the ileum.

Having discussed the possibilities of a damaged rib and a trapped nerve, we should now consider another surprisingly common cause of chest pain. What other condition do you know which often affects the chest area?

A cause of chest pain which happens relatively frequently even in a population of working age is herpes zoster. This condition, also called "shingles", should be familiar to you. It is suggested that you check this condition to include or exclude the symptoms which will show within a few days of a painful rash which is visually descriptive. Take a picture with the patients permission and send it to your topside doctor for review.

After several days of low grade but persistent pain, the characteristic rash breaks out, distributed in the area of a sensory dermatome. Whilst not always found in the chest, this is a common area for it to appear.

Management

What are you going to do with this patient? You need to do something for him so think through your treatment and management plan before reading further.

Quite often for younger patients pain may not be so much of an issue however if they require pain relief you could start with Ibuprofen 400mg TDS and / or Paracetamol 1 gram QDS. For further management refer to your standing orders and discuss with your Topside cover.

Note: if the pain is minor they may be able to continue with work however if there is exudate from the rash good personal hygiene is required to prevent spread.

Bornholm's Disease

This condition tends to happen to many people at once and is also known as epidemic myalgia. It is related to infection by Coxsackie B and can affect the intercostal muscles; this condition is always accompanied by fever.

Left Inframammary pain

This is described as transient, sharp but quite severe pain felt over the apex of the heart at rest or mild activity. Lasting for a few minutes at most and can cause a catching of the breath or shallow breathing. The cause is unknown and totally benign however the symptoms can cause distress to the sufferer.

3. Lungs 1

Jonny, is an extremely fit 23 year old rigger welder who is a keen cyclist and rugby player when he is home on leave and a daily user of the gym facilities on board. He is six foot two and slightly built, and no matter what he eats he never puts any weight on, his nickname on board is Snake.

He comes to see you at 9pm in the evening in some distress after experiencing a short-lived episode of severe chest pain.

What are you going to ask him? Take a moment to collect your thoughts before reading on.

Jonny tells you he felt pain in his right chest and puts his hand against the right side of his chest to demonstrate.

- It was severe a few moments ago but it is much easier now
- Jonny has no pain anywhere else

- It initially felt like a sharp stab to the chest
- He has never had this before
- Jonny felt well until the onset of the pain
- Jonny still feels breathless but does feel a lot easier now

At this point you will need to examine Jonny, what abnormal signs might you expect to find? Take some time to reflect on the situation and note your answers before moving on.

Compare your thoughts with the following abnormalities we have listed below:

- Chest normal on visual inspection
- Diminished movement noted on the affected side
- Trachea deviated to the right
- Increased resonance to percussion on the affected side
- Decreased breath sounds on the affected side
- Any Cardiac related symptoms or a Past medical history of Cardiac symptoms

Your examination however reveals no abnormalities. What do you make of Jonny's condition? Consider your views and hold them before reading on.

Johnny's history is typical of a spontaneous Pneumothorax, he has the typical physique and it's common for such patients to relate the incident to a specific strenuous task. Please bear in mind this theory has never been scientifically established. Quite often it is an atypical subpleural bleb which produces a small area of collapse at the apex, clinically this might be undetectable.

Note: a large area of collapse would produce some or all of the abnormalities we listed previously.

Management

Remember:

- Entonox can exacerbate a Pneumothorax
- To sometimes help absorb a small Pneumothorax "Give high flow O2"
- You will not need to insert a chest drain
- An insertion of a chest drain is something that you should never have to contemplate except under the most extreme circumstances, for example when the patient will die if you don't.
- During Medivac by helicopter the condition could worsen and therefore you should request the Pilot flies at no higher than 1,000 feet

What is your management plan?

Do you feel you need to administer drugs?

Do you need to reduce the Pneumothorax?

Do you feel Johnny's condition might deteriorate?

Should he be sent to hospital as soon as possible?

Would travel by helicopter exacerbate his condition?

Think carefully about what you might do before reading on.

Jonny will require a chest X-ray as soon as possible but you should not need to give any medication at this point

“It is the physical property of a fixed mass of gas that its volume is inversely proportional to the pressure applied to the gas. Lower the pressure and the volume will increase; Ascent in an aircraft may result in a fall of surrounding pressure resulting in any pocket of trapped air expanding in the chest. The Pneumothorax will subsequently get worse.”

Note: long haul flights should be avoided until the condition has resolved.

This condition of Johnny's should resolve itself after rest and recuperation at home, he may be away for three to four weeks and unfortunately there is a 25% possibility of recurrence.

4. Lungs 2

Jamie is a 48 year old roustabout who smoked 30-40 cigarettes per day. He is used to his early morning cough but this morning feels pretty rough with it. He complains of intermittent bouts of coughing day and night and has some pains in his chest.

What other questions would you ask Jamie bearing in mind the information you have so far?

- What is the colour of his sputum?
- Past medical history (PMH) of chest infection, and more specifically pneumonia or pulmonary TB?
- Any history of Asbestos exposure?
- Ongoing treatment from GP?
- Weight loss?
- Recent chest X-rays?
- Admissions to hospital?
- Outpatient visits?
- Family history
- Medications
- Allergies
- Currently has he been in contact with anyone who has been diagnosed with Covid-19 symptoms

Jamie is producing grey coloured sputum with difficulty, he had pneumonia in his 20's Nil else to note.

- Jamie does comment that he visited his GP last winter for a bout of “bronchitis”
- He also expresses his wish to quit smoking but tells you that he finds it very difficult and has tried a few times by himself.

It seems that Jamie has a “chest infection” Please bear in mind this is not a very specific diagnosis, what differential diagnosis can you think of?

- Carcinoma of the Bronchus
- TB
- Influenza
- Pneumonia
- Acute Bronchitis
- Acute Covid – 19 symptoms

At this juncture you should be thinking about examining Jamie. You should give him a full general examination which reveals the following:

- Jamie is sweaty and pyrexial
- His tongue is coated
- He has poor dentition
- His pulse is 100 and regular BP 130/80
- There are no enlarged lymph glands
- His chest movements are poor and he is breathing rapidly
- Chest auscultation reveals a lack of air sounds in the right base

You now have enough information to reach a provisional diagnosis, think about this before you read on.

He probably has lobar pneumonia

What is the cause of his chest pain?

Answer, the pain is typical of pleuritic pain. The parietal pleura contains nerve endings sensitive to pain whereas the visceral pleura and lung tissue do not. It is worth noting if you not already reading this in your pre course reading that “the parietal pleura can become inflamed from an infective or inflammatory process affecting the lung tissue.

Management

This crewman has a serious medical condition and will require immediate transfer to shore after discussion with your Topside Doctor. He should be medivaced to the nearest hospital where he can undergo thorough investigations and treatment.

5. Lungs 3

Peter is a 50 year old obese man who is employed by an offshore catering company and is currently employed as facilities manager on board. He has recently returned from a long break in New Zealand. He has presented to your sickbay today complaining of feeling short of breath and he has put this down to the fact that he has gained a little more weight over his extended holiday. Peter has no known history of chest problems and is a none- smoker.

He is now complaining of chest pain when he takes a deep breath in and has coughed up some blood. He tells you he feels faint when he stands up, his right calf has been sore for a few days and looks swollen,

O/E (on examination):

- Respiratory rate is 26-28
- Pulse 120
- SaO₂ in air is 90%

What would you do first considering he is sitting talking to you therefore his airway is patent?

You would give high flow oxygen

- Listen to his chest
- Monitor SaO₂ and respirations
- Monitor BP and Pulse
- Give IV fluids
- Call Topside cover and speak to the on call Doctor

What is your provisional diagnosis?

“Peter might have a pulmonary embolus, otherwise known as a PE, this is fragment of a thrombus that breaks off and travels in the blood stream until it lodges in the pulmonary vasculature. Note that the majority of emboli begin in the pelvic or lower extremity veins, morbidity and mortality associated with these conditions is high.”

Have a look at the broad spectrum of signs and symptoms that we have listed below and reflect on how many Peter has?

Dyspnoea 73%

Haemoptysis 15%

Pleuritic Pain 60%

Palpitations' 12%

Cough 43%

Wheezing 10%

Leg Swelling 33%

Angina –Like pain 5%

Leg Pain 30%

Have a look on the next page at the major risk factors associated with a PE is Peter at high risk?

Major risks: relative risk of 5-20

- Surgery:
 - Major abdominal/pelvic surgery or hip/knee replacement (risk lower if prophylaxis used)
 - Postoperative intensive care
- Obstetrics:
 - Late pregnancy
 - Puerperium
 - Caesarean section
- Lower limb problems:
 - Fracture
 - Varicose veins - previous varicose vein surgery; superficial thrombophlebitis; varicose veins per se are not be a risk factor
 - Clinical evidence of DVT
- Malignancy:
 - Abdominal/pelvic
 - Advanced/metastatic
- Reduced mobility:
 - Hospitalisation
 - Institutional care

- Previous proven VTE:
 - Intravenous drug use (could be major or minor risk factor: no data on relative risk)
 -

Minor risk factors: relative risk factor 2-4

- Cardiovascular:
 - Congenital heart disease
 - Congestive cardiac failure
 - Hypertension
 - Superficial venous thrombosis
 - Indwelling central vein catheter
- Oestrogens:
 - Pregnancy (but see major risk factors for late pregnancy and puerperium)
 - Combined oral contraceptive
 - Hormone replacement therapy
- Haematological:
 - Thrombotic disorders Consider this in in cases of PE aged <40 years, recurrent VTE or positive family history.
 - Myeloproliferative disorders
- Renal:
 - Nephrotic syndrome
 - Chronic dialysis
 - Paroxysmal nocturnal haemoglobinuria
- Miscellaneous:
 - COPD
 - Neurological disability
 - Occult malignancy
 - Long distance sedentary travel
 - Covid-19

After discussion with your topside Dr a provisional diagnosis of pulmonary Embolism has been reached, Peter requires urgent medivac to the nearest hospital. You need to consider whether you send Peter on a routine Helicopter using a suitably trained first aider as escort, this might have implications and you would need to discuss this with the Pilots. The escort would need to have skills such as taking vital signs, O2 administration etc. The alternative would be to call out a SAR's helicopter with a paramedic or Dr escort, this would be ideal however you must look at the whole picture and decide how quickly you want this man to get to hospital and ask yourself:

- Do you wait for a more qualified escort and delay medivac?

- Or do you utilise an in field Helicopter and get the patient to hospital soonest using one of your first aid team?

6. Oesophagus

Reflux oesophagitis is a common condition that usually causes discomfort rather than chest pain.

Sven is a 47 year old 1st officer who recently joined your vessel, he presents to the sickbay one evening complaining of mild indigestion and requests something to relief the symptoms.

You sit Sven down and begin to question him further; at this point he informs you that he has had some discomfort behind the breast- bone. He has had trouble on and off for months now and because of the time scale seems rather vague about the history. Sven tells you that he sometimes feels a pain between his shoulder blades, he explains that it feels like something is stuck. He stresses that he feels perfectly well otherwise but has noted that certain things make the condition worse.

What factors do you think can make oesophagitis worse? Consider this and make a mental note before going any further.

Answer:

- Obesity
- Bending
- Lifting
- Decumbency
- Alcohol
- hot drinks such as tea and coffee
- large meals
- fried food
- curry
- pastries

Please note this list is not exhaustive!

The aetiology of the condition has not been completely resolved. You can however be certain that the lower end of the oesophagus can become damaged due to ongoing exposure to stomach acid. Any staining action, lifting, forced bowel motions, bending over or lying down will encourage movement of stomach acid into the oesophagus.

Many sufferers of this condition also complain of a bitter taste in the mouth.

Question: What symptoms can oesophagitis produce that might confuse the diagnosis? Take a look at the list below and make your choice before reading on.

- Vomiting
- Headache
- Pain in the arms
- Light-headedness

Answer: the last two symptoms on the list might lead you to other conclusions:

Referred pain from the oesophagus can mimic that produced by angina.

Furthermore, it is not uncommon for severe symptoms to cause the patient to feel light headed and faint.

Management

What can be done for Sven? What would you recommend he starts doing?

First of all Sven needs some radical life style changes, you could recommend he lose some weight, eats smaller meals, gives up smoking, cuts down his alcohol consumption for a more immediate treatment you could prescribe an antacid.

You should also encourage Sven to visit his own Doctor when he goes home and inform him that his GP may want to send him for an Endoscopy or Ultrasound prior to further treatment.

Sven might be back offshore with the same complaint before he gets to see his GP which is why it is always good practice to make a note of every visit. Alternatively, he may return to you with medication prescribed by his GP, which is why you should always encourage your crew to tell you what medication they bring on board.

7. Heart 1

Before we discuss the next case study, we need to talk about the heart in general.

“Pain can arise from the Heart muscle, as with ischemic heart disease or from the pericardium as with pericarditis.”

It would be helpful at this point for you to have a look in any general Anatomy and Physiology textbook and familiarise yourself with the Anatomy and Physiology of the Heart.

Ischemic Heart Disease

This is a common disease whereby the incident rate increases with age. The pain is caused when the amount of oxygen required by the heart muscle is greater than the amount supplied, like cramp in a muscle.

After your review of the Anatomy and Physiology of the heart you will be aware that the heart has its own blood supply, known as the coronary arteries. If one or more of these arteries become occluded typically by an atheroma, the blood supply to heart will be compromised. If the interruption of flow is partial then this will cause cramp like pain which should ease with rest, unfortunately if the interruption of flow is sudden and complete the area of the heart muscle supplied will be deprived and die.

The clinical effect of this is called a heart attack, myocardial infarction or coronary thrombosis.

Pericarditis

Pericarditis is an inflammation of the pericardium, or the sack that encloses the heart. This is not a common condition but can produce symptoms similar to those described above (an acute coronary event). We have mentioned this here because it is a cause of severe chest pain in the young adult. Pericarditis in itself is invariably part of another disease process, most commonly attributed to a viral infection.

Case Study

Henry is 44 years old and has worked as the Bosun on your dive support vessel for the past 10 years, he is of average build and has always been active at work and home, he does however tell you that he smokes 20-30 cigarettes per day.

He visits you one evening in the sickbay and tells you that he felt a pain behind his breast bone as if something had been lodged in his gullet. Eventually the sensation went away but he tells you that he has had several of these episodes over the past month or so.

It is worth noting that these symptoms are similar to what Sven complained about in the last case study, he had oesophagitis.

Think carefully now, perhaps an antacid would help Henry, before you go any further you must ask him a few more questions.

Think about what you need to focus you're questioning on?

You need to know more about his pain so you will need to go through the systematic routine appraisal of pain.

What are your thoughts at this juncture stop and consider you're initial diagnosis before reading further.

Remember, typically the condition of angina effects older people. Angina is precipitated by activity and improves at rest, the usual symptoms are discomfort, tightness or pressure behind the sternum with radiation to the left or both arms, sometimes into the jaw or teeth but less commonly through to the back or to the epigastrium.

Henry however is only 44 and his symptoms don't fit with all of the above as typical angina and some of them sound like oesophagitis.

Remember:

Hospital specialists with years of experience and specialist diagnostic equipment at hand can have difficulty with the diagnosis.

So, although Henry's symptoms are a little vague, what features of his history would you steer your diagnosis towards, angina rather than oesophagitis.

Consider your answer before reading on.

- Henry has not complained of pain with bending
- He has to stop what he is doing sometimes
- He has had pain when climbing flights of stairs

Management

Treat for the worst case scenario, and keep a high risk of suspicion. Someone of Henry's age with recent onset worsening angina has a high risk acute myocardial infarction.

Remember you need to discuss this with your topside Doctor ASAP who may decide to treat as if this were angina until tests proved otherwise.

Take a 12 lead ECG reading and send to your topside doctor for him to interpret the reading if possible.

8. Heart 2

We will continue to look at Henry for this case study but this time Henry's character has been suffering from the same symptom described previously however he has foolishly kept the complaint to himself. He has been self medicating with over the counter antacids.

Whilst he was driving the crane on the back deck, he experienced severe pain in his central chest which will not go away. He feels sick and light headed and slowly climbs down from the crane using the back scratcher ladder provided. Henry sits down at the bottom of the ladder and leans against the bulkhead, he breaks out into a sweat and feels a little breathless.

You are called to the back deck and you find Henry sweating and distressed, his pulse and BP are normal, you come to a clear cut decision there and then, what is it?

First Line Treatment

Henry this time around has had a heart attack. You decide to administer first line treatment without moving him, you should follow the procedure below or whatever your standing orders

MONA

- Morphine 10mg IV plus IV anti-emetics
- Oxygen 15 litres a minute
- Nitrate – 2 puffs GTN spray under his tongue
- Aspirin 300mg

Glycerine trinitrate (GTN)

GTN is administered sublingually and is absorbed rapidly into the blood stream. GTN is a potent vasodilator; it dilates the peripheral circulation thereby easing the work of the left ventricle. It dilates the coronary arteries.

The rationale for using GTN in the acute situation is that it diminishes the extent of damage to the myocardium. GTN is available in tablet form and spray. Be aware that once a bottle of tablets is opened they quickly lose their effect due to evaporation of the active ingredient. It is much more acceptable to have GTN in spray form offshore.

Aspirin

Aspirin is usually administered in a soluble tablet form, 300mg, and allowed to dissolve on the tongue. The action of Aspirin discourages extension of coronary thrombus by decreasing platelet stickiness (there are some misconceptions about how Aspirin works and the lay person will often call it a blood thinner).

Assistance

Call the radio operator or bridge and ask for help, press the emergency alarm bell closest to you if you can't summon help any other way.

Equipment

Request an AED, medic's bag, stretcher, blankets, pillow, and oxygen.

Monitor

Check the patient's blood pressure and BP every 5 minutes.

Apply defibrillator pads

Henry's symptoms described earlier do not always occur with myocardial infarction and MI can present a broad range of effects from very minor chest discomfort to DEATH. At this point if you have not already done so you must move your patient to the sickbay.

Once in the Sickbay

- Continue to administer free flow oxygen via a none re-breathier mask.
- You should already have IV access but if you have not done this yet then you must site a venflon at this point
- If you have an ECG machine on board take a reading ASAP and have this faxed or scanned to your appropriate Topside cover, some companies will have a direct line to a cardiology department (check local protocols).
- Arrange medivac with a suitable escort through Topside if the patient is too ill then consider using a coastguard helicopter with medical cover on board. You might also be given the option of a Doctor joining you on the Rig/Platform in extreme circumstances.

Thrombolysis

At this juncture Thrombolysis needs to be discussed. Since Thrombolysis drugs have become easier to use with less side effects they are being increasingly used more often offshore and in remote the setting in the pre hospital situation. This treatment is seen to be increasingly important as research has shown that the sooner a thrombolytic drug is administered the better the chance of a good recovery.

Offshore medics are therefore required to undergo specific training for this which usually covers them for 12 months after which they must complete a half day refresher. Thrombolytics can only be given after discussion with Topside Dr following local standing orders and protocols. You must also have the verbal and written consent of the person you are going to Thrombolysed.

Obviously, the next period is going to be stressful for Henry and his family as he needs to be in a coronary care ward where complications often arise in the early days. He will however be in the best capable hands.

What complications might occur?

- Heart failure
- Arrhythmia
- Cardiac arrest

You must remember that these complications could lead to death.

We will discuss this further during your practical week on your one-day ILS/ALS Skills course.

Note: Statistics show that more than 50% of cases develop complications during the first 24 hr period of hospitalisation

Key Points

- The clinical presentation of the patient should be the ruling consideration in management.
- Contact with the Topside Doctor is necessary in all cases of chest pain.
- Contact with the Topside Doctor is necessary in all cases of chest pain.
- Thorough history taking, followed by a careful examination, is essential for accurate diagnosis.
- Chest pain is a common complaint and has many causes

Questions:

Question 1: Have a look at the four diagnoses below, and then check out the lists of words and phrases used to describe chest pain in the text box below. Try matching the word or phrase to the diagnosis. There are two already completed for you. You can use the same word or phrase more than once.

Myocardial Infarction	
Chest Wall Injury	A
Pleurisy	A
Reflux Oesophagitis	

- | | |
|-------------------------------|----------------------------|
| H. Sharp | A. Breathing restricted |
| I. Dull | B. Retrosternal |
| J. Crushing | C. In the jaw |
| K. Worsening with inspiration | D. In the shoulder |
| L. Tenderness | E. In the arm |
| M. Sickening | F. Worse with decumbency?? |
| N. Momentary | G. Worse with exercise |
| O. Prolonged | |

Question 2: Have a look at the list of painful conditions below. We have not covered all of these so you might need to use what information you already have or do further reading before answering the questions. Match them to the areas of the chest, see the example we have already completed for you.

The chest wall	4
The lungs	
The oesophagus	
The heart	

1. Pericarditis
2. Pleurodynea
3. Pleurisy
4. Shingles
5. Dysphagia
6. Pneumothorax

Question 3: You already know that the symptoms of oesophagitis can mimic those of angina. Indicate below which symptom is most characteristic of angina and which is oesophagitis as usual we have completed one for you.

	Angina	Oesophagitis
Bitter taste in the mouth		X
Discomfort in the jaw		
Retrosternal pain when bending		
Pain in the left arm		
Retrosternal pain with exertion		

Question 4: At the beginning of this module you were asked to find out why pain arising from the diaphragm can cause referral pain in the shoulder tip.

- a. State the reason in once sentence
- b. What is the name of the nerve that supplies the diaphragm?

Question 5: We have written some questions below relating to the treatment of acute myocardial infarction. Please note there is more than one answer to each question.

- a. Why is morphine injected intravenously and not IM?
- b. Why is Pethidine not used for pain relief?
- c. Why is GTN (Glycerine Trinitrate) administered?
- d. Why is Aspirin administered?

Questions for your tutor

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Answers:

Question A:

Disease Classification	
A. Injury	4
B. Inflammation	2
C. Infection	1
D. Mechanical	5
E. Circulatory	3
F. Neoplastic	6
G. Occupational	7

Question 1:

Myocardial Infarction	C,F,H,J,K,L,M
Chest Wall Injury	A,D,E,F,H,I,O
Pleurisy	A,D,E,I,L,O
Reflux Oesophagitis	B,F,J,H,N

Question 2:

The chest wall	4,2
The lungs	3,6
The oesophagus	5
The heart	1

Question 3:

	Angina	Oesophagitis
Bitter taste in the mouth		X
Discomfort in the jaw	X	
Retrosternal pain when bending		X
Pain in the left arm	X	
Retrosternal pain with exertion	X	

Question 4:

- a. It is due to embryological development
- b. The phrenic nerve

Question 5:

- a. Rapid onset, direct route, uncertainty of absorption from IM route
- b. Less potent analgesic less euphoric state
- c. Potent vasodilator reduction in left ventricular workload, improved coronary circulation
- d. Antiplatelet, Decreases in overall mortality to post myocardial infarction, stops blood being sticky!