CHAPTER 8

CARDIAC CONDITIONS

Despite a steady decline the single most frequent cause of death in Australia during 2002 was coronary artery disease which killed 32,029 people\(^1\). Because it is such a killer you must be aware of how to recognise acute cardiac conditions and the best way of doing this is to recognise the significance of chest pain. All casualties who have chest pain should be considered seriously ill until the exact cause of the pain is identified. Chest pain is divided into two groups, pain which originates in the chest wall and chest pain due to heart disease.

**CHEST WALL PAIN**

Chest wall pain can be due to injuries to the muscles and ribs or to disease or injury to the lungs. The words most commonly used to identify this type of pain are sharpness and stabbing. The gestures and body language are quite specific and the casualty can point with a finger or fingers to the exact location of the pain. Unlike cardiac pain chest wall pain can be made worse or better by deep breathing and is tender to touch.

**CARDIAC CHEST PAIN**

Chest pain due to cardiac disease is present in 80 to 90% of all casualties suffering acute myocardial infarction, or severe heart attack. The words casualties use to describe it include tightness, heavy weight, constriction, dull ache or crushing. The gestures and body language used to show the location are vague and the hand is either spread wide or bunched into a tight fist. The casualty cannot put their finger on the exact site of the pain.

There are three causes of cardiac chest pain including Angina Pectoris (Angina), Acute Myocardial Infarction (AMI), and electrical disturbances affecting the heart.

**ANGINA**

Angina is caused by deposits of fat and other substances in the lining of the medium sized arteries of the heart. This leads to a narrowing of the arteries in the heart and a restriction of blood flow to the heart muscle. Normally casualties with narrowing of their coronary arteries suffer no discomfort unless they exert themselves.

**PROVISIONAL DIAGNOSIS OF ANGINA PECTORIS**

**HISTORY**

- patient has been diagnosed as suffering angina and been prescribed angina medication by their doctor
- pain or shortness of breath develops during physical exertion
- pain lasts less than 10 minutes

**SIGNS**

- Sometimes skin is pale, cold and moist

**SYMPTOMS**

- Central chest pain, sometimes radiating to neck and arm

TREATMENT OF ANGINA PECTORIS

1. Approach casualty
2. Loosen tight clothing
3. Rest and reassure casualty
4. Assist casualty to take their own medication (this may be a spray or tablet placed under the tongue)
5. If pain persists for more than 10 minutes or after two doses of medication given 5 minutes apart, call ambulance immediately and treat casualty for AMI.

ACUTE MYOCARDIAL INFARCTION (AMI)

Acute Myocardial Infarction (AMI) is the sudden death of the muscle layer of the heart. This occurs when an artery supplying the heart muscle is blocked, depriving an area of heart muscle of blood. Your aim in treating this condition is to ensure that the casualty reaches a coronary care unit as quickly as possible, preferably within one hour of the time the pain began. To achieve this aim you must be able to identify AMI, rest and reassure the casualty and obtain assistance as soon as possible.

The reason for this approach is that casualties with AMI who are admitted to a specialised coronary care unit in the first hour after the chest pain begins have a greater chance of surviving the event. This makes you, the first aider, the most important link in the medical chain of treatment. Without early identification and treatment the outcomes for AMI are poor.

PROVISIONAL DIAGNOSIS OF ACUTE MYOCARDIAL INFARCTION

HISTORY
a. Patient develops pain
b. Pain develops during rest
c. Pain lasts longer than 10 minutes
d. Patient may have diabetes or angina or other heart problems

SIGNS
a. Sometimes poor perfusion (shock)
b. Rapid breathing > 20 minute

SYMPTOMS
a. Severe central chest pain, radiating to neck, jaw or arm
b. Pain does not alter with movement or deep breathing
c. There is no tenderness to touch
d. Pain described as crushing, tight, heavy, band of constriction or dull ache
e. Watch casualties body language - they often use a clenched fist or gripping motion to describe pain
f. Patient is frightened

If you are in anyway unsure treat any chest pain as an AMI and send the casualty to hospital

TREATMENT OF ACUTE MYOCARDIAL INFARCTION

1. Approach casualty
2. If chest pain is cardiac, immediately call ambulance
3. Take a careful history
4. Rest and reassure casualty
5. Be prepared to perform CPR
ELECTRICAL DISTURBANCES OF THE HEART

A major cause of death in AMI is electrical disturbances of the heart. These electrical disturbances may totally disrupt the electrical and mechanical activity of the heart leading to death. Your ability to identify AMI and quickly obtain an ambulance gives the casualty the best chance of being near the specialised electrical equipment needed to reverse any electrical disturbances which may arise. Your ability to perform CPR will slow death until the arrival of an ambulance with this equipment. Without your efforts all of the sophisticated care systems used in hospitals are going to be useless.

ELECTRICAL ACTIVITY IN THE HEART

The normal electrical activity of the heart is shown below at Fig. 5-1

![Fig. 5-1: Normal sinus rhythm (Normal electrical signal in heart)](image)

There may be abnormal impulses in a normal heart like those shown in Fig. 5-2.

![Fig. 5-2: Normal sinus rhythm with two abnormal impulses](image)

Sometimes abnormal beats occur which cause the heart to develop a dangerous rhythm such as that shown in Fig. 5-3. This rhythm will result in the casualty becoming sick and showing Signs of poor perfusion (shock).

![Fig. 5-3: Ventricular Tachycardia. This rhythm will result in a rapid deterioration of the casualties condition](image)

The ventricular tachycardia shown at Fig. 5-3 above will, if not treated, lead to the electrical conduction within the casualty’s heart becoming chaotic. This condition, shown at Fig. 5-4, is called ventricular fibrillation and the casualty will have no pulse and will be in cardiac arrest. This condition is treated in first aid with CPR.

![Fig. 5-4: Ventricular Fibrillation](image)
If the casualty has suffered a large amount of damage to their heart, or if they have been collapsed for more than about 5 minutes without CPR, the electrical conduction system gradually fails. This condition, cardiac asystole, is shown at Fig. 5-5 below.

Fig. 5-5: Cardiac Asystole (No electrical activity)

In adults, asystole has a very poor outcome and very few casualties survive. However, effective CPR quickly applied gives the casualty some chance.

In children, asystole is treated with CPR and the outcomes are better than with adults.

### TREATMENT OF VENTRICULAR TACHYCARDIA OR VENTRICULAR FIBRILLATION

1. Approach casualty
2. Call ambulance ASAP
3. CPR
4. Obtain Defibrillator
5. Switch on defibrillator
6. Attach pads to front of chest - ensure that gel is well spread
7. Maintain CPR
8. Check pads correctly connected to defibrillator
9. Allow time to read electrical rhythm
10. Order all persons to stand clear
11. Visually check all clear
12. Only press fire button when instructed to do so by defibrillator
13. Fire defibrillator at 150 joules
14. Check for carotid pulse
15. Repeat steps 6 to 14 until ambulance arrives