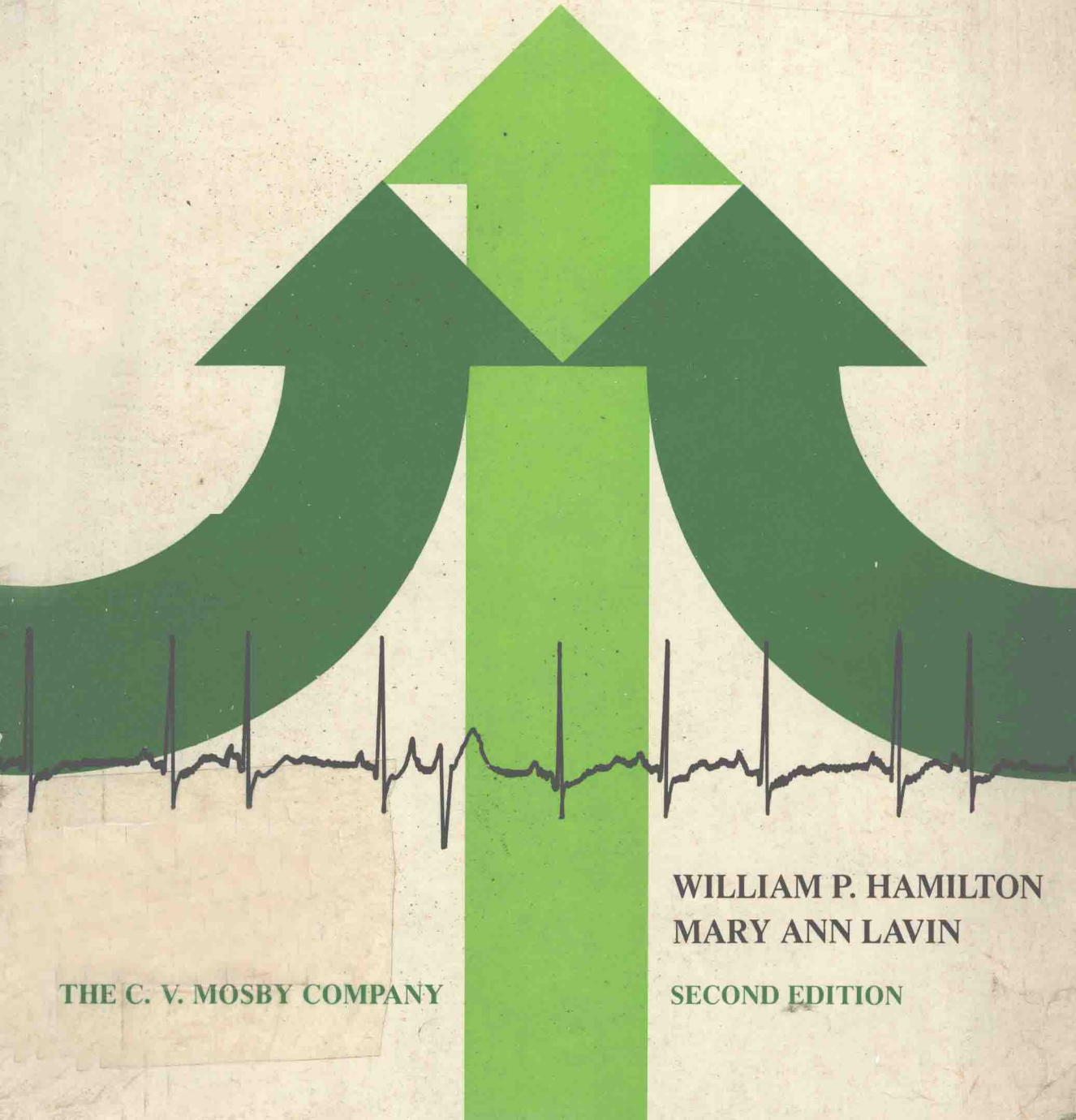


# DECISION MAKING IN THE CORONARY CARE UNIT



WILLIAM P. HAMILTON  
MARY ANN LAVIN

THE C. V. MOSBY COMPANY

SECOND EDITION

# DECISION MAKING IN THE CORONARY CARE UNIT

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*with 126 illustrations*

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**DECISION MAKING  
IN THE CORONARY CARE UNIT**

*This book is dedicated to*  
**Judy and Fran**

## PREFACE

This book represents a teaching method that we have used successfully in conferences with coronary care unit personnel. It consists of a brief didactic outline of a specific point followed by cases that represent variations on the theme. These are actual coronary care unit cases in which important decisions had to be made.

We feel that the decision-making process must include an outline of a goal, a specific method of action, and an evaluation of this action. An important factor in decision making is previous experience in real situations. Coronary care unit decisions are frequently lifesaving. We hope that this book will provide you with clinical experience in simulated lifesaving situations before a life actually is at stake.

This book is intended to be highly practical. The answers given for the clinical problems represent our personal point of view. In the interest of space we have kept our responses as short as possible. More extensive treatment of the various problems presented in this book can be found in a variety of nursing and coronary care unit textbooks.

This edition includes a chapter on patient education. The purpose of the chapter emphasizes true educational concepts. We hope that the information given patients will serve to motivate them to change their life styles. In some instances these changes may promote longevity, and in all they should provide a better quality of life.

We wish to extend our sincere appreciation to the nursing and professional staff of the Coronary Care Unit at St. John's Mercy Medical Center, St. Louis, Missouri, and to the graduate students enrolled in the Cardiovascular Nursing Program at St. Louis University. In their constant quest for knowledge these individuals have been a continual source of inspiration to us. We also wish to express our indebtedness to the Sisters of Mercy at St. John's Mercy Medical Center and to the faculty and administration of the St. Louis University School of Nursing and Allied Health Services for their generous support during the preparation of this manuscript.

We are most grateful to Mrs. Margaret Westphale, who has typed and reread each chapter of this book, and to Miss Polly Cullinane for her invaluable assistance in preparing the many illustrations.

William P. Hamilton  
Mary Ann Lavin

## INSTRUCTIONS

The staff members of a coronary care unit are constantly making important and frequently lifesaving decisions. Each of the clinical situations in this manual necessitates that you make such a decision. The information that you have available and upon which your decision will be based is of two types.

The first type is entitled "background." This information provides various degrees of insight into the patient's history, the reason for the present admission, and his clinical symptoms. Often the background tells you about other diseases or such factors as age, sex, and occupation relevant to the present situation.

The second type of information is entitled "present situation," and it introduces you to the immediate problem. This section will reflect a rapidly changing clinical state, an unexpected response to therapy, or merely an artifact that demands proper identification. This section concludes with an ECG rhythm strip that must be interpreted and correlated with the other findings.

Finally, we ask the question, "What would you do?" Following this, write your response in the space provided.

Before writing this response we suggest that you analyze each situation with regard to goals, actions, and evaluations. By goals we mean the end toward which your actions are directed. The goals listed for these problems reflect our thinking and experience. They represent what we feel is the most important problem facing the particular patient at this particular time. By actions we mean the specific method that you would use to care for this patient. Evaluation means an objective review of your goals and actions as well as of the effectiveness of the response.

After you have completed your response, compare your solution with ours. You may not necessarily agree with us. Our differences should serve as starting points for discussion and study that will allow you to increase your knowledge of cardiovascular problems.

Medical therapy and special techniques alluded to in this book are not covered by many local ordinances and local practice acts. Before readers attempt to use these therapies in their own clinical practice, they are advised to obtain permission from their hospital administration and state attorney general. The publication of this book in no way implies that the authors approve any action that is experimental, illegal, or in opposition to any local practice standard.

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## CHAPTER 1

# care of the patient with CARDIAC PAIN

Pain is probably the most frequently encountered symptom seen by the staff of a coronary care unit. Such pain may be divided into two types—cardiac and noncardiac. It is important to differentiate between them, although therapy in the coronary care unit may be the same for both.

Cardiac pain frequently is manifest in locations other than the chest and may on occasion mimic the pain of noncardiac diseases. Even more confusing, noncardiac pain at times cannot be distinguished from cardiac pain. Diseases such as pericarditis, dissecting aortic aneurysms, pulmonary emboli with or without infarction, pulmonary hypertension, nondisseminating arteriosclerotic aneurysms, spontaneous pneumothorax, pleurisy, bronchitis, acute cholecystitis, pancreatitis, gastroenteritis, duodenal ulcer, neuromusculoskeletal disorders, and anxiety frequently cause a type of chest pain that is difficult to distinguish from coronary pain. For further information on the differential diagnostic features of various types of chest pains, refer to Appendix B in Andreoli and others.\*

The patient with characteristic cardiac pain presents a rather typical picture. He, unlike the patient with acute gastrointestinal inflammation or renal colic, associates his pain with a sense of impending doom. Consequently, he generally calls for help and thereafter lies quietly in bed waiting for the pain to change. The typical clinical appearance of a patient with cardiac pain is that of a middle-aged man lying in bed, somewhat pale, without any specific cardiac arrhythmia, explaining to the nurse in an apprehensive tone that he has extremely severe pain and would like relief. When a patient experiences pain induced by myocardial ischemia, both his emotional and circulatory status may be altered. The myocardial ischemia induces the pain that then produces anxiety. The anxiety in turn causes an increase in cardiac work, which causes additional myocardial ischemia and consequently more pain. In order to help an individual caught in these circumstances, this vicious cycle must be interrupted. Thus a calm, efficient coronary care practitioner who initiates intramuscular or intravenous analgesic therapy, quietly begins oxygen therapy, speaks in a reassuring manner, and remains with the patient can usually break the ischemia-pain-anxiety cycle by means of these interventions.

The following clinical situations present examples of patients with chest pain. Each has an individual type of pain and a bona fide or suspected myocardial

\*Andreoli, K. G., Hunn, V. K., Zipes, D. P., and Wallace, A. G.: *Comprehensive cardiac care*, ed. 3, Saint Louis, 1975, The C. V. Mosby Co.

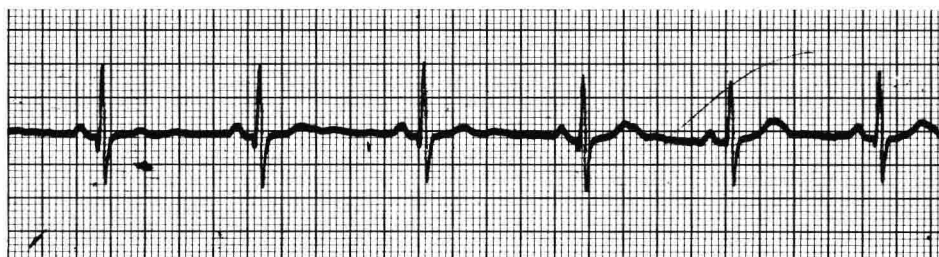
## 2 Decision making in the coronary care unit

infarction. Put yourself in the place of the coronary care practitioner seeing each of these patients and decide what you would do. You should also remember that arrhythmias may be induced by or be the result of the ischemia-pain-anxiety cycle and that, while relief of the ischemia-pain-anxiety cycle is our primary concern in this chapter, other appropriate goals should be utilized in planning your interventions.

### CLINICAL SITUATION NO. 1

**Background.** J. M. is a 52-year-old fireman who, while sitting at the fire station, suddenly felt nauseated, short of breath, and restless and complained of a "real tight" pressure across his chest and upper arms. He was immediately given oxygen and brought to the hospital, where he was admitted to the coronary care unit with a diagnosis of acute inferior myocardial infarction. His pain was promptly relieved by 10 mg. of morphine sulfate.

**Present situation.** It is now the next day and Mr. M.'s vital signs are stable. His color is good, and his rhythm has been normal since admission. He suddenly has a recurrence of pain similar to the type that brought him to the hospital. His ECG rhythm strip is depicted below.



**What would you do?**

**Goal.** Relieve the ischemia-pain-anxiety cycle.

**Intervention.** This is a typical situation in the coronary care unit. A patient with a definite myocardial infarction is having coronary ischemic pain some time after being admitted to the unit. During the initial few moments of pain we do not know whether the patient is having a recurrent myocardial infarction, angina pectoris, or noncoronary pain. At this point the distinction is academic and not very important insofar as Mr. M. and his clinical condition are concerned. Our primary goal at this time is to quickly relieve his pain.

There are a number of ways in which pain can be relieved under these circumstances. Some physicians allow nitroglycerin to be given sublingually for pain that recurs following a myocardial infarction. The principle behind such a maneuver is to relieve the ischemic component of the ischemia-pain-anxiety

cycle. Other physicians, however, feel that the mild hypotension associated with nitroglycerin administration is dangerous during the early phase of an acute myocardial infarction. Therefore it is best to check with a patient's physician at the time of admission in order that both of you understand what will be done for recurrent ischemic pain following the initial myocardial infarction.

Although nitroglycerin promptly attacks the ischemic portion of the ischemia-pain-anxiety cycle, it does little to alter the apprehension that is frequently associated with pain. Under these circumstances, the administration of morphine sulfate is probably indicated. Morphine not only relieves pain (perhaps somewhat more slowly than nitroglycerin) but also induces a mild euphoria, therefore directly relieving anxiety. The route of administration would depend on the protocol that prevails in your coronary care unit. Many physicians feel that intravenous administration of a narcotic is indicated for prompt relief of acute pain.

Besides the administration of medication, other therapeutic measures should also be initiated. Allow or assist Mr. M. to attain a comfortable position. Administer oxygen. Encourage slow, deep breathing so that he can obtain maximum benefit from the oxygen administration. Finally, the very presence of an assured, competent coronary care practitioner may be the greatest therapeutic maneuver in the relief of anxiety.

While you are caring for Mr. M., be sure that you competently assess his skin color and temperature, mental status, respiratory rate, and blood pressure.

**Evaluation.** Base the evaluation of your care on the promptness with which Mr. M.'s pain was relieved.

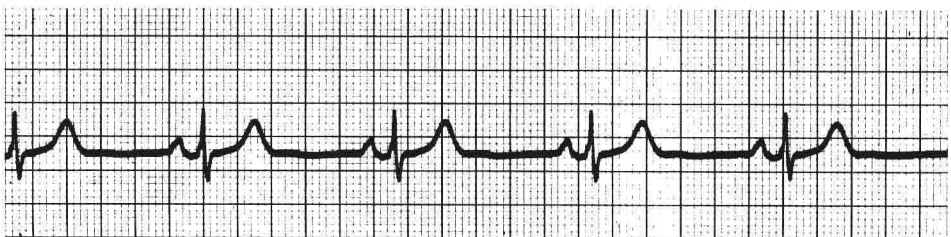
**ECG interpretation.** Heart rate: 62 beats per minute. Rhythm: Regular. P waves: One before each QRS. P-R interval: 0.14 second. QRS interval: 0.08 second. Q-T interval: Normal. Arrhythmia: None (sinus rhythm).

**Comment.** Variations in T waves are frequently seen as respiratory artifacts in precordial ECG tracings.

## CLINICAL SITUATION NO. 2

**Background.** D. O. is a 44-year-old man who had three episodes of "strong sandpaper-type sensations" in his throat while mowing his lawn 4 days ago. The first two episodes were relieved by rest. However, the third episode persisted, and he was admitted to the coronary care unit with a diagnosis of acute inferior myocardial infarction.

**Present situation.** Mr. O. has now been in the coronary care unit for 4 days. Tests have indicated diagnostic enzyme changes. He denies experiencing discomfort except after breakfast, at which time the "sandpaper sensation" returns. His ECG rhythm strip is reproduced below.



**What would you do?**

**Goal.** Relieve the ischemia-pain-anxiety cycle.

**Intervention.** This situation illustrates the importance of having the patient describe his own pain. It would be easy to think of "sandpaper sensations" in the throat as unimportant if you were uninformed about the patient's history and if you were not aware of atypical cardiac pain. Other examples of atypical cardiac pain are jaw pain, back pain, and right shoulder pain. Cardiac pain may result from either angina pectoris or myocardial infarction. The former is of short duration and is relieved by rest, nitroglycerin tablets, or both. The latter is persistent and is not relieved by these means. In this situation Mr. O. is describing atypical cardiac pain associated with angina pectoris following a myocardial infarction.

Sit down in Mr. O.'s room and allow him to talk about this sensation. Frequently patients attribute their cardiac pain to the performance of some sort of activity. In this particular situation, Mr. O. might disclose that the cold milk he drank at breakfast produced the pain. Eliminate the stimulus, in this case the cold milk, and other cold drinks from his diet. Since coronary pain is very frightening and associated with a sense of impending doom, plan on being in Mr. O.'s room the next morning when he is eating breakfast. In the event that it is not the cold milk that is precipitating the pain, it may be that Mr. O. will do much better if he has smaller, more frequent meals. When his physician arrives, notify him of his patient's complaint. He may decide to administer a vasodilator such as nitroglycerin prior to the breakfast meal.

**Evaluation.** Evaluate your plan of care according to whether pain is associated with breakfast the next morning.

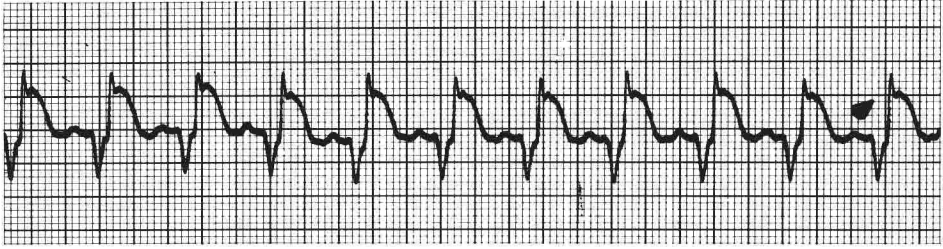
**ECG interpretation.** Heart rate: 55 beats per minute. Rhythm: Regular. P waves: Before each QRS. P-R interval: 0.18 second. QRS interval: 0.08 second. Q-T interval: Normal. Arrhythmia: None.

**Comment.** No specific arrhythmia is present under these circumstances. There is normal intraventricular conduction and normal atrioventricular conduction. The rhythm seen on this tracing would not be the cause of the patient's pain.

**CLINICAL SITUATION NO. 3**

**Background.** H. R., a 59-year-old grocer, was admitted to the coronary care unit at 3:30 A.M. with a diagnosis of acute myocardial infarction. This is his fourth myocardial infarction in 7 years.

**Present situation.** One and a half hours after admission, Mr. R. continues to complain of numbness and pain in his left arm, even after the administration of morphine. His skin is cold and clammy; he is short of breath and looks very worried. His blood pressure is 110/76. His ECG rhythm strip follows.



What would you do?

**Goal.** Relieve the ischemia-pain-anxiety cycle; correct the arrhythmia, in this case the sinus tachycardia evident in the rhythm strip; and prevent the cardiogenic failure-shock syndrome.

**Intervention.** Obviously the ischemia-pain-anxiety cycle has not been broken. Since analgesic therapy has been initiated, concentrate on relieving ischemia and anxiety. The anxiety may also be inducing the tachycardia, peripheral vasoconstriction, and shortness of breath. To relieve ischemia, administer oxygen at the appropriate flow rate and encourage Mr. R. to take slow, deep breaths. Reposition him if necessary in a comfortable, semirecumbent position. To relieve Mr. R.'s anxiety, answer any questions he may have and be sure that the monitoring equipment and oxygen administration have been sufficiently explained. Tell him that he can assist in relieving his pain by relaxing his arms and legs. Provide a quiet environment and remain with Mr. R. until the pain is relieved. If the pain, tachycardia, and vasoconstriction are not relieved within a short time, notify his physician; he may desire to take additional measures, such as vasodilator therapy.

**Evaluation.** Evaluate your actions on the basis of reduction and elimination of pain, reduction in heart and respiratory rate, and decreased peripheral vasoconstriction.

**ECG intervention.** Heart rate: 118 beats per minute. Rhythm: Regular. P waves: Before each QRS. P-R interval: 0.16 second. QRS interval: 0.14 second. Q-T interval: 0.28 second. S-T segment: Elevated. Arrhythmia: Sinus tachycardia.

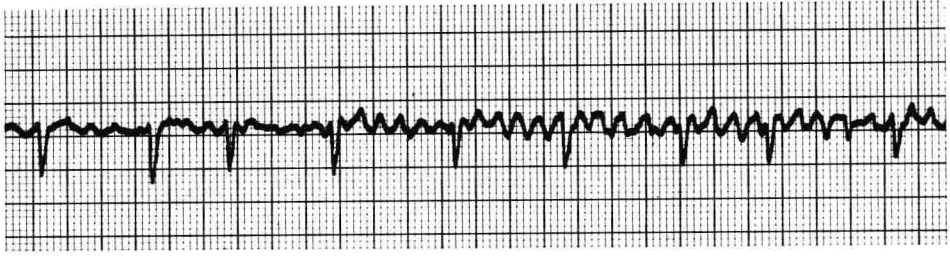
**Comment.** It is important to realize that in this tracing there is a wide QRS (bundle branch block) and a sinus tachycardia. It is worthwhile to mention again that relieving Mr. R.'s pain and anxiety will most probably reduce his heart rate.

#### CLINICAL SITUATION NO. 4

**Background.** F. N. is a 57-year-old carpenter who has just been admitted to the coronary care unit with a diagnosis of myocardial infarction.

**Present situation.** Mr. N. is complaining of crushing chest pain. His skin is

warm and dry. He is neither short of breath nor cyanotic. His blood pressure is 126/88. His ECG rhythm strip is depicted below.



**What would you do?**

**Goal.** Relieve the ischemia-pain-anxiety cycle; correct the arrhythmia (in this case atrial fibrillation with a ventricular response of approximately 110 beats per minute) if it is contributing to the cardiac pain.

**Intervention.** In order to relieve the ischemia-pain-anxiety cycle, administer the prescribed analgesic to Mr. N. Administer oxygen and help him to attain a comfortable, semirecumbent position. Provide a quiet environment and remain with him. Since he is a newly admitted patient, explain the purpose of the unit and the monitoring devices.

Since atrial fibrillation is commonly associated with chronic obstructive pulmonary disease and valvular disease as well as with myocardial infarction, check Mr. N.'s previous medications and past medical history. Discuss your observations and actions with his physician. Digitalis administration may be indicated to decrease the ventricular rate.

Finally, the patient in atrial fibrillation is more likely to develop emboli from the uncoordinated contractions of the atria. This lack of coordination predisposes to inadequate emptying of the atrial appendage, with consequent formation of thrombi. Plan, therefore, to observe Mr. N. carefully for signs of peripheral, pulmonary, and cerebral emboli. Anticoagulant therapy may be indicated.

**Evaluation.** Base the evaluation of your care primarily on the relief of Mr. N.'s pain. Then evaluate the thoroughness of your actions.

**ECG interpretation.** Heart rate: Approximately 110 beats per minute. Rhythm: Irregular. P waves: Not seen. P-R interval: Not measurable. QRS interval: 0.07 second. Q-T interval: Not measurable. Arrhythmia: Atrial fibrillation with varying degrees of coarseness.

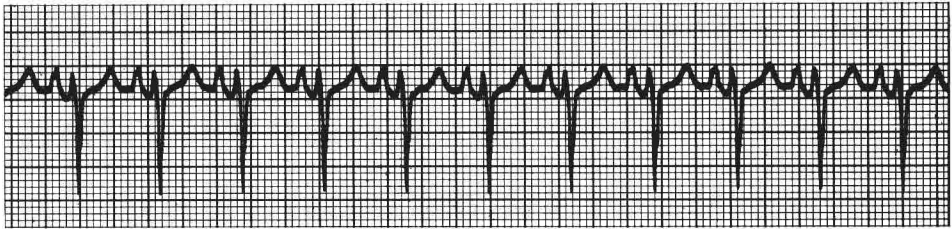
**Comment.** In the left-hand portion of the tracing there are low-frequency atrial fibrillatory waves, and in the right-hand portion of the tracing there are coarse fibrillatory waves. This change in the ECG rhythm strip is often a function of respiration. When the patient breathes in and the electrode moves away from the electrical activity of the heart, the fibrillatory waves diminish in ampli-

tude. When the patient breathes out and the electrodes move closer to the heart, the fibrillatory waves may become coarser.

### CLINICAL SITUATION NO. 5

**Background.** S. R. is a 48-year-old railroad engineer who has been awakening at night for the past 6 weeks with "burning red-hot sensations" across his upper chest. When the same type of pain recurred today at work, he sought medical attention. He was admitted to the coronary care unit with a diagnosis of an impending myocardial infarction.

**Present situation.** Now, 3 hours after admission, Mr. R. is restless, moaning, grasping his chest, clenching his fists, kicking his sheets, and pulling off his oxygen mask because he feels smothered. His ECG strip demonstrates the following rhythm.



**What would you do?**

**Goal.** Relieve the ischemia-pain-anxiety cycle.

**Intervention.** Let us look first at the entire situation. Although Mr. R. is experiencing an arrhythmia, in this case a sinus tachycardia, it is neither life threatening nor likely in itself to result in decreased cardiac output. Pain is Mr. R.'s most pressing problem. This pain may be severe cardiac pain indicative of a myocardial infarction. On the other hand, because of the severity of the pain and Mr. R.'s reaction to it, you should also think of other causes, including the possibility of a dissecting aortic aneurysm or another disease resulting in excruciating pain.

Regardless of the origin, the pain must be relieved. Administer, preferably intravenously, the prescribed drug therapy for analgesia. Administer oxygen to Mr. R. and allow him to assume the position he finds most comfortable. Reduce his random activity by darkening the room and decrease extraneous noise. Talk to him in a calm manner. Remain in his room so that you can evaluate the results of your actions.

At the same time, further assess Mr. R.'s condition for signs of a dissecting aortic aneurysm. In cases of dissecting aneurysms there are frequently signs of altered circulation to various parts of the body. Therefore check Mr. R.'s blood



## 8 Decision making in the coronary care unit

pressure in both arms and note any discrepancies. Now check his peripheral pulses in both arms and legs. Finally, check his bowel sounds, since a gut deprived of circulation may exhibit either hypoactive or hyperactive bowel sounds. Observe Mr. R. for signs of shock and schedule hourly measurements of fluid intake and output. Since Mr. R. was admitted with a diagnosis of impending infarction, his physician must be advised of the change that is now occurring. Furthermore, if the pain is not relieved, or if there are indications that a dissecting aneurysm is present, prompt diagnosis is required so that appropriate therapy can be initiated.

**Evaluation.** Base an evaluation of your plan of care on the relief of Mr. R.'s pain and the promptness with which further diagnostic tests are made to determine the cause of his pain.

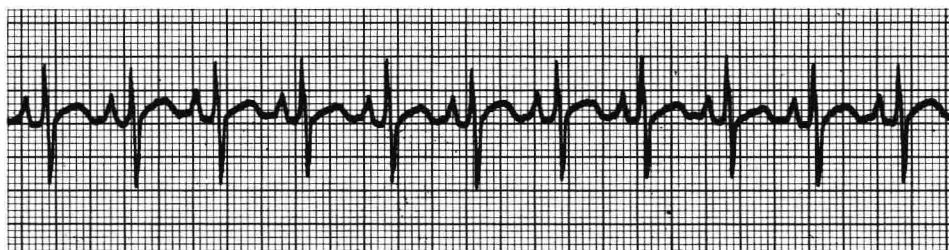
**ECG interpretation.** Heart rate: 130 beats per minute. Rhythm: Regular. P waves: Before each QRS. P-R interval: 0.14 second. QRS interval: 0.07 second. Q-T interval: Normal. Arrhythmia: Sinus tachycardia.

**Comment.** The arrhythmia is probably related to the clinical situation rather than the cause of it. Frequently patients with severe pain of any nature experience a rapid heart rate.

### CLINICAL SITUATION NO. 6

**Background.** S. T. is a 56-year-old widow. While watching television 3 days ago, she suddenly developed acute anterior chest pain associated with diaphoresis and a rapid heart action. Because she is a nurse, she was able to take her pulse and discover that the rate was 148 per minute. She was admitted to the coronary care unit with a diagnosis of possible myocardial infarction associated with a rapid tachycardia.

**Present situation.** Three days after admission, it is apparent that there have been no ECG or enzyme changes indicative of acute myocardial infarction. Mrs. T.'s attending physician has stated that no active myocardial disease is present, and he has requested that she be transferred from the unit in the morning. Mrs. T. has just finished eating her supper when her chest pain recurs. She calls to you, and as you enter her room, you note that her bedside monitor depicts the following arrhythmia.



What would you do?



**Goal.** Relieve pain and anxiety and maintain the patient's dignity and individuality.

**Intervention.** Mrs. T. obviously needs relief. While the pain that she is having at present may not be caused by myocardial ischemia, she is not aware of this fact. The only thing she knows is that at present she is having pain. It would be a mistake to play down her pain or indicate that you feel it is unimportant because it is noncardiac. Too frequently patients on the coronary care unit who are experiencing noncoronary pain are made to feel guilty because they have not had a myocardial infarction. It is almost as if everyone in the coronary care unit considers the beds too important to be used by someone with something less than a life-threatening situation. Regardless of the etiology of the pain, it is absolutely imperative that you administer an analgesic agent and reassure Mrs. T. while efforts are being made to determine the origin of her pain.

In order to determine the origin of pain, certain information and facts must be elicited.

1. Obtain an accurate description of the pain. Ask the patient to describe its type, intensity, location, and duration. Determine whether the pain is accompanied by nausea, belching, or sweating. Ask the patient about her previous experiences with pain to see if they are similar to the pain now being described.
2. Examine the circumstances associated with the onset of pain and its relief. Determine the onset of pain in relation to meals, types of food, position, and activity.
3. Evaluate the physical findings associated with the pain. These include temperature, blood pressure, respiratory rate and heart rate, and skin color. Also check the skin to see whether it is cool or warm, clammy and moist or dry. If the pain is abdominal, the abdomen should be gently palpated to determine the presence of tenderness or distention. If the pain is thoracic, note the tenderness to touch, location, and symmetry of respirations, and look for lag or guard, the presence of friction rub, rales, or decreased breath sounds.
4. Evaluate the patient's response to therapy. Once medication has been administered, the patient's responses must be observed. These observations are frequently important in determining the origin of pain. For instance, if you administer morphine to a patient with pancreatitis, you might make the pain considerably worse. In another instance, relief of pain after the administration of an antacid might very well indicate that the pain is resulting from acid peptic disease. Appropriate positioning is frequently of therapeutic value in the relief of pain. Therefore the patient's response to positioning is important in determining the origin of pain. The pain of pericarditis, for example, is frequently ameliorated when the patient sits up and leans forward. It is also said that the pain of pancreatitis is frequently lessened when the patient lies on one side or another in the fetal position. The pain of hiatus hernia is often decreased when the patient sits in an upright position.