

SECTION I

PRINCIPLES

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CHAPTER 1

INTRODUCTION

Patients in the ICU are the most critically ill patients in the hospital. They are usually supported by many different types of mechanical devices and generally have many monitoring lines, tubes, and catheters. Critical management of these patients can change from minute to minute. Physicians depend on the physical examination of their patients, which is often quite difficult, and the portable chest radiograph to help understand the patient's problems. While CT and ultrasound can be of enormous help with these sick patients, the portable chest radiograph is the most helpful and most commonly used x-ray examination. The malposition of lines, tubes, and catheters and cardiopulmonary complications, such as atelectasis, pneumonia, failure, and effusions, are often initially detected on the portable film.

One of the more frightening experiences for a 1st-year resident is to be summoned to the ICU in the middle of the night as the result of a marked deterioration of a patient. A portable chest x-ray is generally obtained, which reveals a plethora of tubes, lines, and

mechanical-assist devices as well as a multitude of cardiopulmonary problems manifested in many different guises. Compounding the problem is the fact that a portable film often does not have the technical quality of films obtained in the radiology department, and there is no radiologist available to help the resident make important life-deciding decisions.

Very little attention has been paid to teaching medical students, residents, and ICU nurses how to approach and read an ICU film. The purpose of this book is to address the more common problems a student will encounter. Attention to the issues and clinical problems that are displayed herein should provide the student with the framework for intelligent and, I hope, accurate interpretation of the changes seen on chest film found in these patients. This book should help the student identify and correct any abnormal positions in the various devices inserted into the vascular and respiratory systems and identify abnormalities of the cardiopulmonary system.

The book consists of a series of chapters discussing various issues, including how to obtain a proper film and the more common clinical problems encountered each day in an ICU. The accompanying CD has one to nine cases relating to the topics covered in each chapter. Cases are presented that simulate common problems in the ICU. Each case has a short clinical history followed by a portable radiograph. Each case is the result of a sudden change in a patient's condition, which resulted in an x-ray being obtained. The reader is encouraged to look at the radiograph, identify the various problems, determine the clinical condition that caused the deterioration in the patient, and plan what to do about the problems discussed. I have been teaching this course as part of the 4th-year radiology elective at the University of Connecticut Health Center for 5 years. As I explain the situation to the students, it is 2:00 A.M. and the nurse in the ICU has just awakened you to tell you that one of your patients has crashed. The reader tells the nurse to get a chest radiograph and arrives 5 minutes later in the ICU. What do you see and what are you planning to do about it? That is the name of the game.

After studying at the radiograph, the student should turn to the discussion of the findings, which includes an interpretation of the problems found and an outline of the course of action to be followed. It is hoped that this will help the reader solidify the concepts presented in Section I of the book.