

UNDERSTANDING MEDICAL TESTING

THE COMPLETE HANDBOOK
OF COMMON DIAGNOSTIC TESTS—
THE PROCEDURES, RISKS, COSTS, AND BENEFITS
FOR THE HEALTH-WISE CONSUMER

X-RAYS

NUCLEAR SCANS

ENDOSCOPIES

BLOOD TESTS

SPECIAL PROCEDURES

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UNDERSTANDING MEDICAL TESTING

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**UNDERSTANDING
MEDICAL
TESTING**

We lovingly dedicate this book to our parents
Margaret and Edward Deska
Mary and the late Charles Pagana
for the confidence, education, love, and
support they have given us

Preface

Gone are the days when patients were passive participants in their medical care. Today patients want and often demand to be actively involved in their care. From working with patients and their families we have identified a specific area of stress to all patients: medical testing. Why did the doctor order the test? What will it show? Will it hurt? How long will it take? Can I eat before the test? How much does it cost?

As a concerned nurse and doctor, we believe the patient has a right to know the answers to these questions about medical or diagnostic testing. Hence the purpose of this book is to decipher the maze of medical testing in an interesting, informative, and enjoyable manner.

A major feature of this book is the consistent format used throughout. Chapters are arranged according to body systems (such as heart, lung, kidney, and reproduction). The advantage of this feature is that tests relating to a certain problem (such as EKG, stress testing, and cardiac catheterization) are all discussed in the same chapter.

Each chapter begins with a brief discussion of anatomy, physiology, and common problems relating to that particular body system. This should facilitate a better understanding of the related medical procedures. The diagnostic studies for each chapter are divided into several categories:

1. X-rays and nuclear scans (studies of a body area after the ingestion or injection of radioactive material)
2. Endoscopy (direct observation of a body organ or cavity through a lighted flexible instrument)
3. Blood tests
4. Stool (feces) tests
5. Special procedures

Normal values, purpose, procedure, and pertinent facts are discussed for each test. The *normal values* include the expected outcome, measurement, or range for the test results of a healthy person. The *purpose* for a particular test includes the reason for performing the study, the information provided by the test, the specific anatomy and physiology involved in the study, the complications associated with the test, and the contraindications for that study. The *procedure* describes

the actual method of performing the study and includes patient care before, during, and after the test; where the study is performed; the patient's position during the test; and the need for anesthesia or sedation.

The *pertinent facts* contain information of special interest to the patients, such as what the patient feels during the test; the duration of the test; special care before, during and after the test; and the customary cost of the study.

It is important to stress that the procedure for each study may vary somewhat in different hospitals and in different areas of the country. For example, the preparation for the intravenous pyelogram (IVP) commonly includes giving bisacodyl laxative tablets to cleanse the bowel. However, enemas may be given to achieve the same goal of an empty bowel.

One area in which one will certainly see variance is the customary cost of each study. The approximate prices are described mainly because of consumer interest and also to give some estimate of the complexity of certain procedures and of the expertise required to perform and interpret these studies.

A unique feature of this book is the inclusion of case reports in each chapter. Case reports include the presentation of a commonly seen patient problem, the results (and normal values) of the medical tests performed, and a discussion explaining interpretation of the studies. Patient treatment based on test results is mentioned. The purpose of the case study reports are to stimulate the reader's interest by providing an actual common patient problem (such as diabetes, heart attack, or lung cancer) and logically assessing and treating the problem based on accurate medical and diagnostic testing.

Over 50 illustrations and photographs are included to enhance the reader's understanding of medical testing. Examples include anatomy, methods of test performance, and test results.

The detailed table of contents can assist the reader in locating information easily within the text. Appendix 1 provides a complete list of commonly used abbreviations and symbols. Appendixes 2 and 3 list the normal values for blood and urine studies. These normal values may vary from laboratory to laboratory because of different units of measurement or different laboratory methods.

Most important, the information included in this book is not limited to one specific type of diagnostic testing. All types such as blood tests, urine tests, x-ray and nuclear studies, ultrasound, endoscopy, noninvasive vascular techniques, computerized tomography, amniocentesis, and many others are included—more than 250 tests.

In summary, this book provides the information needed to ensure complete patient understanding of medical testing so that studies can be performed accurately and safely. Knowledge of this information should make the patient a truly informed and involved participant in his or her medical care. Most of all it is our hope that this book will help allay some of the fears and anxieties related to medical testing. One final word of caution; this book is not meant to be used for self-diagnosis. All studies must be carefully interpreted by a physician in light of a complete review of the patient's history and complaints.

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Kathleen Deska Pagana
Timothy James Pagana

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Diagnostic studies used to evaluate the heart

ANATOMY, PHYSIOLOGY, AND DISEASES AFFECTING THE HEART

The heart is located in the mediastinum, which is the midline cavity between the lungs. The heart is divided by a septum into a right and a left side. The right side contains unoxygenated (venous) blood. The left side contains oxygenated blood. Each side is composed of an atrium (auricle) and a ventricle (Fig. 1-1). The unoxygenated venous (prelung) blood enters the right atrium from the large veins (venae cavae) within the chest. The blood then flows from the atrium into the right ventricle, which pumps the blood forward into the pulmonary artery. This artery leads to the lungs where the blood mixes with the air and becomes “oxygenated.” The oxygenated blood then returns to the left atrium via the pulmonary veins. The left atrium empties its blood into the left ventricle. The left ventricle pumps the blood into the aorta and through the arteries of the body. It is the pumping force of the left ventricle that pushes the blood through the arterial system of the body.

The flow of blood must be constantly forward. Valves exist between the atria and the ventricles of the heart to prevent any backward flow of blood. The tricuspid valve is located between the right atrium and right ventricle. The mitral valve is located between the left atrium and the left ventricle. During contraction of the ventricle (systole), the backward flow of blood from the ventricle into the atrium is prevented by the tricuspid and mitral valves. The pulmonary valve is located between the pulmonary artery and right ventricle. The aortic valve is located between the aorta and left ventricle. These latter valves prevent potentially harmful backflow of blood from the pulmonary artery and aorta, respectively, into the ventricles during relaxation (diastole) of the heart. The valves of the heart are very commonly affected by disease. Rheumatic fever, bacterial infections, infestations, and endocrine disorders (such as thyroid disease) can destroy these valves and thereby interrupt their function. It is also not uncommon to have malformed valves present at and existing since birth (congenital). Occasionally these malformed valves function appropriately; however, usually their function is inadequate and they must be surgically repaired or replaced.