

The Acute Abdomen

Diagnosis and Management

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Accurate indications, adverse reactions, and dosage schedules for drugs are provided in this book, but it is possible that they may change. The reader is urged to review the package information data of the manufacturers of the medications mentioned.

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Preface

In the evolution of surgical care, diseases within the abdominal cavity have served as a yardstick of progress. When they occur as an emergency—perforation, bleeding, or obstruction—the drama is intensified. Previous authors, most notably Sir Zachary Cope, have captured the suspense and excitement of this drama in several well-written books. The decision to write another book on this same subject evolved over several years and reflected an insistence by students, residents, and colleagues that the topic was incompletely covered in the literature. New knowledge, new technology, and an awareness of the difficulty in assimilating this information served as a stimulus to develop a book that captures the best of the new while retaining the flavor of the old. Hopefully, we have achieved this goal.

A few words about the internal construction of the book might prove helpful at this point. The format is presented from the vantage point of one author. This in no way minimizes the assistance of the contributors, who provided expert advice as well as the written word. Each is identified by his field of expertise; however, the chapter on Emergency Endoscopy was written in its entirety by Dr. Sugawa; the chapter on the pancreas by Dr. Weaver; and Dr. Nelson wrote much of the chapter on intestinal obstruction. The remaining contributors were involved in one or more of the chapters.

Selected readings are offered at the end of each chapter. Occasionally, they represent the authors' personal bias; however, they usually reflect sources that were utilized in the preparation of the manuscript. Regardless of the reason for their inclusion, each should be viewed as an important supplement to the book. Specific footnotes were not included to retain the personal flavor of the manuscript, relying instead on the reader to utilize the selected reading list as needed.

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No doubt, the individual reader may question the emphasis placed on one subject rather than another. Sometimes this was an editorial judgment while in other situations, such as the pancreas, it was felt that significant recent advances made an entire chapter necessary. Finally, a special word of thanks go to Sherry Doggett and Ann Czarnik, whose assistance in preparing the manuscript made a difficult job much easier.

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Foreword

In recent discussions, some have questioned the future role of the general surgeon in this era of steadily increasing specialization. Nowhere can the discipline of general surgery be better exemplified than in discussions of the diagnosis and management of patients with acute abdominal conditions. That the problem may stem from congenital, inflammatory, vascular, neoplastic, traumatic, and many other acquired causes emphasizes the broad knowledge and superb judgment required by the physician if he is to provide a successful outcome for his patient.

The major importance of accurate diagnosis and management of patients with an acute abdomen can also be measured by the number of previous publications on the subject. Dr. Kirkpatrick and his collaborators have provided a valuable addition to the large number of books and voluminous literature concerning acute abdominal conditions currently available to us. Each subject covered here, not only concentrates on the pathophysiology of the problem but also identifies and stresses important diagnostic features. In addition, brief but salient historical notes concerning each condition are provided.

The usefulness and impact of the recent introduction of highly sophisticated diagnostic and therapeutic techniques for patients with acute abdominal conditions are well covered, bringing us up to date with the latest procedures of value to patient care. This concise and useful book reemphasizes the broad range of knowledge necessary for the general surgeon and will find a place in the library of many medical students and physicians.

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Foreword

Acute life-threatening lesions in the abdomen dominated much of medical and surgical thought from the turn of the century to World War II, a period which some now regard as the golden years of clinical medicine. Today, medical journals are replete with observations on genetic, biochemical, immunological, and other fundamental abnormalities occurring in small groups of patients in whom time and tests are readily available for the pursuit of the intellectually fascinating etiology. Descriptions of acute clinical disorders that demand immediate and precise care, having had their heyday in the first half of the century, are understandably seldom encountered in current journals. The postwar years have seen the ascendancy of laboratory medicine, and we now sit poised at the doorway of the computer era.

And yet tens of thousands of patients die each year of neglected but correctable acute intraabdominal lesions. An alert and well-developed clinical sense is vital if unnecessary deaths and morbidity are to be avoided. Failure to recognize and urgently treat acute appendicitis is probably the commonest legitimate source of malpractice proceedings against the general surgeon and others today. Neglect of the leaking abdominal aortic aneurysm in the aging patient—a steadily increasing segment of the population—bears a direct relationship to the outcome. Awareness of this entity and the increasing number of other vascular lesions is a vital cornerstone of what might be termed the modern acute abdomen. Bowel obstructions are likely to remain common entities as long as laparotomies are performed and subtle manifestations of cholelithiasis abound, reflecting the sweet ravages of our rich Western diet.

The new technologies of ultrasonography, CT scanning, NMR, and computer diagnosis will on occasion have a part to play in diagnosis, too often an expensive and delaying role. Common

sense, clinical training, a knowledge of logical possibilities, rapid simple radiographs, and simple blood counts will help to provide an accurate diagnosis in the overwhelming number of patients. This fortunate state of affairs, often forgotten by laboratory-oriented physicians, is greatly helped by the collection in one volume of the many entities that go to produce "the acute abdomen." By definition, "the acute abdomen" demands of the physician that he determine with a minimum of delay whether or not—and when—his patient needs an operation. Too often these considerations are fragmented and buried in widely separated chapters of text, reflecting the modern tendency to neglect superficially disparate data while celebrating symptoms and signs related to the individual's own uniorgan or unisystem specialty.

Doctor Kirkpatrick with his wealth of bedside experience has produced a clinical anamnestic reaction in those who have grown careless. At the same time, he has provided a clear and broad perspective for the less experienced student who needs to have the topography of the acute abdomen delineated and then integrated.

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Making the Diagnosis

Diagnosis by intuition is a rapid method of reaching a wrong conclusion.

J. Chalmers da Costa (1863–1933)
The Trials and Triumphs of the Surgeon
Ch. 1

The last 50 years of medical practice have been characterized by a rapid movement from the classical methods of diagnosis to a system that places a premium on the objective documentation of disease through laboratory and radiographic testing. This shift in emphasis for the most part has improved diagnostic acumen and reduced mortality, often, however, at the direct expense of physician involvement in the evaluation process.

During this same period, explosive changes have occurred in the social order of medical practice. Group practices are common—patients are shared by specialists, emergency departments have often replaced physicians' offices, and the ability of a single physician to manage a single patient from the onset to the completion of a complex major illness is the exception rather than the rule.

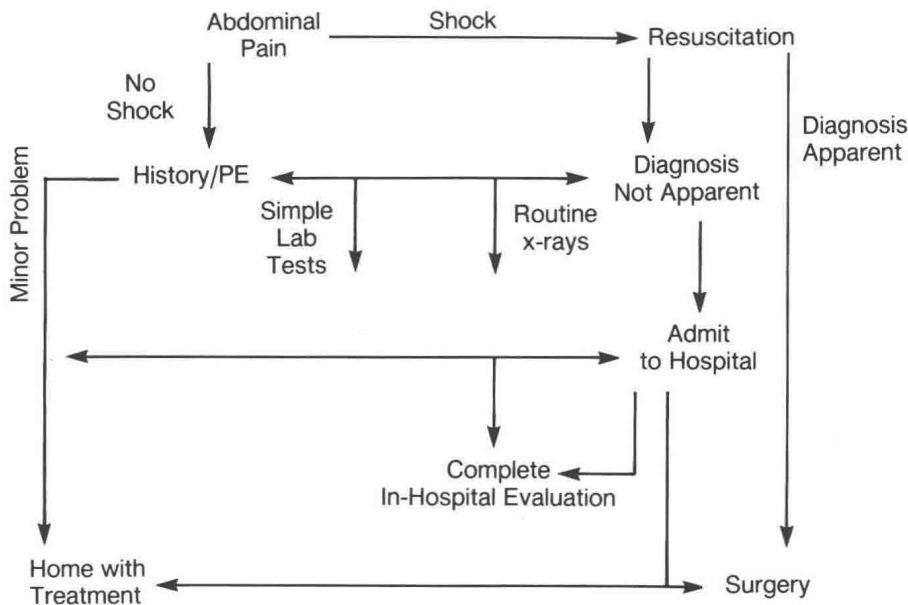
These changes have had a significant impact in the management of the patient with the acute abdomen—a term used in an imprecise way to describe a dissimilar group of urgent, often life-threatening disease processes. However, since these diseases share certain common clinical denominators that often transcend single organ classification, they provide a focal point for utilizing diagnostic skills that, of necessity, incorporate the best of the old school with the new.

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The challenge then is to synthesize all of the available diagnostic options into a single plan that is practical, concise, inexpensive, and accurate without sacrificing the newer, more expensive, and often invasive diagnostic techniques born of the last generation. The type of patient flow scheme suggested in this chapter (Table 1.1), while simplistic for many situations, points out certain important branches in the decision-making tree: (a) Is the patient in shock? (b) Is hospital admission indicated? (c) If yes, medicine or surgery? And (d) is an operation needed? It also points out the pivotal position of the history and physical examination and suggests that the diagnosis of a minor problem can be made without a single laboratory test or radiograph. What tests are needed to confirm the abdominal wall contusion in the young athlete, the boil on the baby, or the abdominal pain seen with acute otitis media?

It also points out that in some situations the diagnosis and need for surgery is so apparent that all efforts should be directed towards resuscitation and preparation for surgery. What initial diagnostic tests are needed to manage the patient in shock from a ruptured aneurysm, from a gunshot wound of the abdomen, or from multiple injuries sustained in an accident? All too often, the impetus to save a life is lost or delayed while awaiting the results of a laboratory test or an x-ray report. Finally, it suggests that, for

Table 1.1
Parietal vs. Visceral Pain



many, a first level of diagnostic tests—complete blood count, urinalysis, serum amylase, electrolyte determination, electrocardiogram, and routine radiographs, including chest and abdominal views—is adequate to confirm the difficult diagnosis while reserving the option of a full in-hospital evaluation for the true diagnostic or therapeutic challenge.

Since the spectrum of diagnostic possibilities is great and time is often of the essence, many authors have suggested the use of military triage or sorting techniques as a solution for the busy emergency department and, to a lesser or greater degree, each physician can incorporate these same principles into his own practice.

TRIAGE BY SYMPTOM COMPLEX

A helpful technique in separating the abdominal catastrophe from the minor abdominal complaint is to identify the pattern of presentation, rather than to concentrate on specific symptoms. For example, nausea and vomiting are such ubiquitous symptoms that alone they have little meaning. However, coupled with abdominal pain and obstipation, they are characteristic of intestinal obstruction; when seen with diarrhea, they can represent nothing more than a simple gastroenteritis. Remember, the compelling differentiation between these disease entities is the overall pattern of presentation, not one specific symptom.

Almost all patients who complain of abdominal pain can be subdivided into four groups roughly corresponding to the severity of the underlying disease: (a) pain alone; (b) pain with shock; (c) pain following abdominal trauma; and (d) pain with signs of sepsis. By categorizing patients in this manner, one is able to make certain broad generalizations. For example, patients with only abdominal pain fall into a low risk category and can be evaluated in a precise manner (6–8 hours) to arrive at the appropriate diagnosis prior to the onset of therapy.

The patient in shock reduces the time interval of evaluation to minutes, and the examining physician must be familiar with the common causes of shock if he is to arrive at an early diagnosis. In a young female, shock and abdominal pain may represent a ruptured ectopic pregnancy while the same symptom complex in an elderly patient has a different etiology—a ruptured aneurysm or a major bowel infarction. Despite the diversity of age and diagnosis, both are urgent life-threatening situations, and an emergency operation is required. The clue to the correct diagnosis, however,

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is again the pattern of presentation, rather than a single specific symptom.

Pain and signs of sepsis are characteristic of a complicated intra-abdominal process and suggests the presence of a hollow organ perforation, gangrene, or abscess formation. These patients represent an intermediate risk population, and surgery should not be delayed to labor the diagnostic fine point of whether a perforated appendix or an ulcer is present—concentrate instead on establishing the need for an operation as quickly as possible!

The patient with abdominal pain following trauma also represents a special situation which requires immediate assessment, since the likelihood of surgical intervention is high. About 95% of patients with a gunshot wound that penetrates the peritoneum will have an intra-abdominal injury and, as a general rule, the gunshot itself becomes an indication for surgery. Those with penetrating stab wounds sustain intra-abdominal injury about 70% of the time, and a more selective plan of action can be utilized in this setting, as long as there is frequent and intensive monitoring for signs of blood loss or peritonitis. Patients with blunt trauma often require surgery—a determination that invariably will require more than a single abdominal exam. The use of peritoneal lavage among this group is useful, and its yield as a specific sorting technique is rewarding in establishing the need for surgery in this setting.

HISTORY AND PHYSICAL EXAMINATION

The History

PAIN

Since pain is the common denominator of the acute abdomen, it is important to understand the clinical significance of the various types of pain as well as the physiologic implications. The visceral nervous system or the visceral portion of the peripheral nervous system comprises the whole complex of fibers, nerves, ganglia, and plexuses by means of which impulses are transmitted from the viscera to the central nervous system (afferent) and back again (efferent). The afferent fibers of this system cannot be considered morphologically or functionally independent, since they have cell bodies situated in the sensory ganglia of the cerebrospinal nerves; however, the type of sensation experienced is vague and poorly localized despite this interdependence with somatic fibers. Most visceral afferent fibers accompany blood vessels for a portion of their course while a few run in the cerebrospinal nerves.

Visceral afferent fibers from the abdominal wall and parietal peritoneum probably accompany arteries for part of their course and then reach the spinal ganglia through the spinal nerves, while the visceral fibers from the stomach, small intestine, cecum, appendix, ascending and transverse colon, liver, gallbladder, bile ducts, and pancreas accompany visceral arteries to the celiac plexus and its major subdivision, the superior mesenteric plexus. They exit these plexuses through the splanchnic nerves; the sympathetic trunk and rami communicans to reach the spinal nerves and ganglia. The fibers from the descending colon, sigmoid, and rectum reach the celiac plexus by first traversing the pelvic and inferior mesenteric plexus and the lumbar splanchnic nerves en route to the sympathetic trunk and spinal nerves.

Visceral pain is usually experienced in the midline corresponding to the anatomic location of these visceral afferent nerve plexuses. If the pain arises from a hollow organ, it usually occurs in response to distention or stretching of the visceral peritoneum, and is often associated with some form of obstruction. Solid organs, on the other hand, usually produce pain from stretching of their capsule. This often occurs in response to parenchymal engorgement from blood, pus, or tumor. In a clinical sense, the cumulative effect of these anatomic characteristics is to provide a strong correlation with both the location and character of the pain experienced. The foregut, including stomach, duodenum, pancreas, gallbladder, and liver, has pain transmitted to the celiac plexus, while fibers from the midgut follow pathways paralleling the superior mesenteric artery and produce vague localization in and around the umbilicus. Hindgut pain is transmitted to the inferior mesenteric plexus located near the bifurcation of the aorta and characteristically produces pain localized below the umbilicus.

Visceral efferent fibers control the organ response to the noxious stimulus and are of two types, *sympathetic* and *parasympathetic*, collectively referred to as the autonomic nervous system. The viscera receives fibers from both systems. They tend to be competitively antagonistic with the effect of this antagonism reflecting the temporary dominance of one over the other. As a general rule, sympathetic fibers are excitatory on smooth muscle and blood vessels and the parasympathetic passive—the opposite effect occurring in glandular elements. The net effect of this interaction on the viscera varies with the magnitude of the insult; however, most noxious intraperitoneal stimuli produce an effect characterized by sphincter spasm (sympathetic), a decrease in gut motility (parasympathetic), and a decrease in organ secretion (parasympathetic).