

SURGERY

Edited by ARTHUR W. ALLEN, M.D.

and DAVID WOOLFOLK BARROW, M.D.

Foreword by FREDERICK A. COLLIER, M.D.



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The contributors unite in dedicating this book
to its editor, the late Dr. Arthur W. Allen,
staunch friend, inspiring teacher,
great gentleman, superlative and devoted surgeon

ABDOMINAL SURGERY

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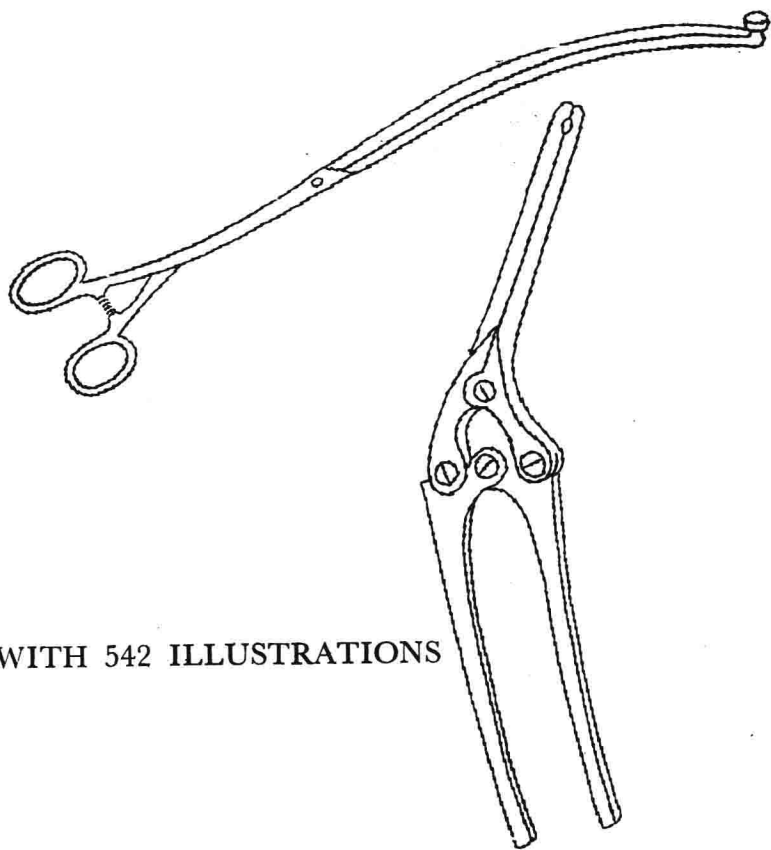
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ABDOMINAL

BY FORTY-ONE AUTHORS



WITH 542 ILLUSTRATIONS

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FOREWORD

This book on abdominal surgery may well be considered a memorial volume to its Senior Editor, Arthur Wilburn Allen, whose untimely death before all of the chapters were completed deprived the contributors of his final helpful comments and lost to its readers the wisdom and charm of his surgical philosophy that were to have appeared in this Foreword. The entire concept of the work, the chapter headings and content, the choice of contributors, and its objective were largely his, and it is hoped by those who contributed to it that those who read it will feel that his ideals, spirit, and experience shine through, although he is no longer with us in person. He was particularly fitted to plan and to direct a presentation of surgery of the abdomen since he lived, taught, and practiced surgery during the vital time of surgery's greatest evolution. While he maintained a wide and vivid interest in all fields of surgical progress, his principal contributions and main interests were in surgical problems of disease of abdominal organs.

At the time he started his professional career, surgery was still in the height of the emphasis of its mechanistic phase that had been made possible by anesthesia, antisepsis, and asepsis. The roentgen ray with the use of contrast media was beginning to make its new and revolutionary contributions to diagnosis of lesions of the gastrointestinal and biliary tracts. New vistas opened that presented many new problems in operative technique that might have further glorified and accentuated the mechanical aspects of surgery except that, fortunately, a fresh and broader concept of surgery began to be evident.

The general condition of the patient,

often critically poor because of anemia, dehydration and malnutrition, had been accepted as a necessary evil of his disease, but it often led to a high mortality and morbidity in those treated by operation.

World War I presented newer and also nearly forgotten problems to surgeons in wound infection, shock, empyema, severe trauma to all anatomical areas that they were not prepared to meet and were unable to solve satisfactorily by methods and knowledge then available. It became clear that there were then too few well-qualified surgeons and those that did exist were unable to cope successfully with all of these new challenges.

Because of the urgency of war, the experimental method was finally called upon to aid and supplement clinical observations and trial-and-error treatment. The satisfaction and complacency of the mechanical era with its emphasis on the operation alone began to disappear. Because of this in the next decade a new surgery began to evolve based now upon the new spirit of inquiry that led inevitably to a wider and more intelligent use of the experimental method.

Careful studies of end results led to dissatisfaction with many of the older techniques. New techniques could be and were evaluated in the laboratory before they reached the ward. Many areas of graduate training in surgery at the university level were established. The lag period between research in the basic sciences and its application to the sick in the clinic, which often had been so long, was shortened by a vivid recognition of its presence in the past. Young surgeons learned research methods and solved many problems of the surgical patient in their

own laboratories. The fundamentals of surgery—shock, wound healing, anesthesia, infection—were re-examined by new methods and with a critical approach.

The physiological, chemical, and biological abnormalities associated with disease and trauma were studied, and science suggested methods for their correction or avoidance. Neurosurgery developed with increasing speed and skill through this closer relationship between clinic and laboratory. Again, the urgent demands on surgery made by the weight of new problems arising from World War II increased the tempo of research in fields of infection and trauma and led to an unbelievably rapid advance in surgery of the lungs, the heart, and the great vessels.

Great and thrilling as these new dramatic advances are, it should not be forgotten that important and solid additions to diagnosis and treatment have continued to be made in surgery of the abdominal organs. Research on the physiological abnormalities of disease in abdominal organs has developed many operative methods for their control and correction. Our original goal of removal of diseased areas can now be supplemented by alteration and correction of disordered function. The liver, spleen, pancreas, and their abnormalities of structure and function can now be treated with a certainty and sureness that was previously unknown.

Most of the pathological effects of disease, such as anemia, dehydration, and malnutrition can now be corrected before operation thus making possible a low mortality and morbidity rate. Drops of ether and chloroform have evolved into anesthesia, a basic and important discipline. The preparation of the patient for operation and his care during and after operation are emphasized in this book by complete and authoritative presentation. The fundamentals of surgery as now known are emphasized. Most of us become followers of tradition in what seem to be the less spectacular phases of an operation. But if tissues are handled gently and hemostasis is secured, there will be fewer infections. If incisions in the abdominal

wall are well-chosen and appropriately closed, there will be few disruptions and rare hernias in scar.

In short, there has developed an intellectual aspect to surgery that is infinitely more important than its mechanical component which was originally so much over-emphasized. Surgeons do themselves and their art a gross injustice in allowing the word "surgery" to become synonymous with "operation." Surgery is an art and a science that treats disease and injury by manual methods. After all, the experimental method is closely related to surgery, both being a happy union of mind and hand.

The contributors were selected with great care and, I think that most will agree, with wisdom. The surgeons associated with the book are well and widely known for their interests and skills. There is a wide geographical distribution thus assuring a national view rather than one that might be parochial.

At one time many-volumed systems of surgery were popular but they were expensive, space-occupying, and, unfortunately, soon became obsolete. The Editors planned this book to be a single-volume system on one area of surgical interest. It was not intended to be an operative manual and the older operations now only of historic value are excluded. The illustrations are carefully chosen and demonstrate the methods preferred by the authors of each particular chapter.

The intellectual and mechanical aspects of surgery are developed and presented together. The book should be of interest and help to anyone caring for patients with pathology or abnormal physiology of abdominal organs. Residents in training and surgeons young and old can learn or, at least, review the opinions and experiences of an outstanding group of American surgeons selected by a surgeon who was a skillful operator, a wise clinician, one who grew up with the union of surgery and science and who, above all, was devoted to his patients, all of whom were to him, people.

FREDERICK A. COLLIER, M.D.

PREFACE

Abdominal Surgery was conceived as a readable, practical, concise yet comprehensive guide to the care of patients with abdominal disease amenable to surgery. The step-by-step details of surgical technique are carefully described and illustrated. In addition, the Editors believe that the operation itself is but a part of the total care of the patient, therefore great care has been taken to explain total-body physiologic deficits encountered in various diseases and the methods for their correction. Indications for surgery are discussed and where alternative procedures are available the relative indications and results to be expected have been presented in a practical way. Discussion of methods not universally accepted, satisfactory as they may be in the hands of their advocates, has been minimized deliberately to save the reader time and, perhaps, confusion.

The Senior Editor, Dr. Allen, died during the preparation of the book, but the decisions of content and selection of contributors had already been made and were largely his. For this he was uniquely qualified through personal acquaintance and through his vast clinical experience. Contributors were chosen whose interest and experience in the field assigned made them eminently qualified to present the "best" current therapy.

The implementation of *Abdominal Surgery* has been for the Junior Editor quite literally a labor of love for Dr. Allen, who considered this book the final contribution of his long and brilliant career. I am sincerely grateful to the contributors for the care, thoroughness, and complete competence with which their assignments have been carried out—a most fitting tribute to Dr. Allen.

D. W. B.

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CHAPTER 1

ABDOMINAL INCISIONS

Leon Goldman and Edwin J. Wylie

Several factors must be taken into consideration in the planning and execution of an incision into or through the abdominal wall, each of which is a determinant in the performance of a successful operation. Attainment of adequate exposure of the structures to be operated upon surpasses all other factors. When the requirements for satisfactory exposure may be met by more than one approach through the abdominal wall, the selection of the approach is guided by the physique of the patient and the anatomic considerations governing the ease of closure, strength of the healed wound, duration and comfort of convalescence, restoration of normal function of the abdominal wall, and the cosmetic appearance of the resultant scar. The following review is supplied to describe anatomic features that are of particular importance to the surgeon.

ANATOMY

SKIN. The connective tissue bundles of the corium in the skin of the abdominal wall, as elsewhere in the body, are oriented in a linear fashion to create lines of tension, called Langer's lines (Fig. 1-1). Incisions parallel to these lines tend to heal as fine lines. The scars of incisions that cross Langer's lines tend to widen transversely and to contract longitudinally. Such contraction often creates a puckered appearance in the scar. Overgrowth of the

scar and formation of keloid are usually more prone to develop in incisions that cross Langer's lines.

SUBCUTANEOUS TISSUE. The subcutaneous tissue contains a layer of fat and superficial fascia. In the upper half of the anterior abdominal wall the superficial fascia consists of a single layer. Below the level of the umbilicus, however, it consists of two layers, the more superficial of which contains the cutaneous nerves and vessels. There are many interneural connections between the sensory nerves that supply the skin; hence, an abdominal incision seldom causes cutaneous anesthesia unless the deeper primary nerve trunks are divided. An analogous rich bed of vascular anastomoses in this layer protects the skin adjacent to an incision from becoming ischemic, and hence removes many of the limitations that are encountered elsewhere in the body to the use of curved, irregular, or connecting incisions. The superficial fascia possesses only slight tensile strength. Its suture contributes no real strength to surgical closure of the abdominal wall.

MUSCLES AND DEEP FASCIA. The muscles, their enclosing fascial envelopes, and aponeurotic extensions, contribute to the basic strength of the abdominal wall (Figs. 1-2, 1-3). The contractile function of the abdominal muscles is furthermore a powerful constrictive mechanism that aids in sneezing, coughing, defecation, and micturition. These muscles function reciprocally

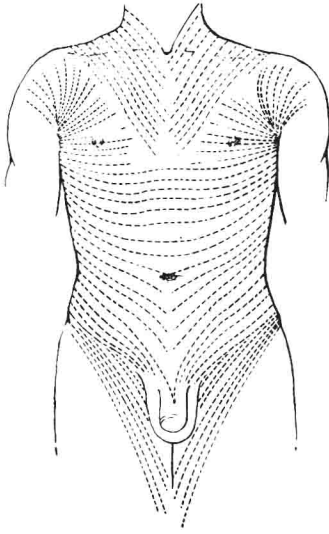


Fig. 1-1. Langer's lines of cleavage in the skin following the distribution of the subcutaneous fibrous tissue.

with the action of the diaphragm during normal respiration. They function antagonistically to the pull of the posterior spinal muscles to stabilize the position of the pelvis in all upright bodily positions. Incisions that permit a rapid return to these functions contribute to a smoother post-operative course.

The central muscle mass is composed of a pair of vertically aligned rectus muscles extending from the thoracic cage to the pelvis. The lateral muscle masses are made up of three large, flat, overlapping muscles arising in the flank. These muscles extend medially and anteriorly by virtue of aponeurotic extensions to encase the rectus muscles, and insert into the fibrous band of the linea alba in the mid-line anteriorly. The vector of force arising from the joint action of the lateral muscles acts to compress the anterior abdominal wall inward.

The outermost lateral flat muscle is the

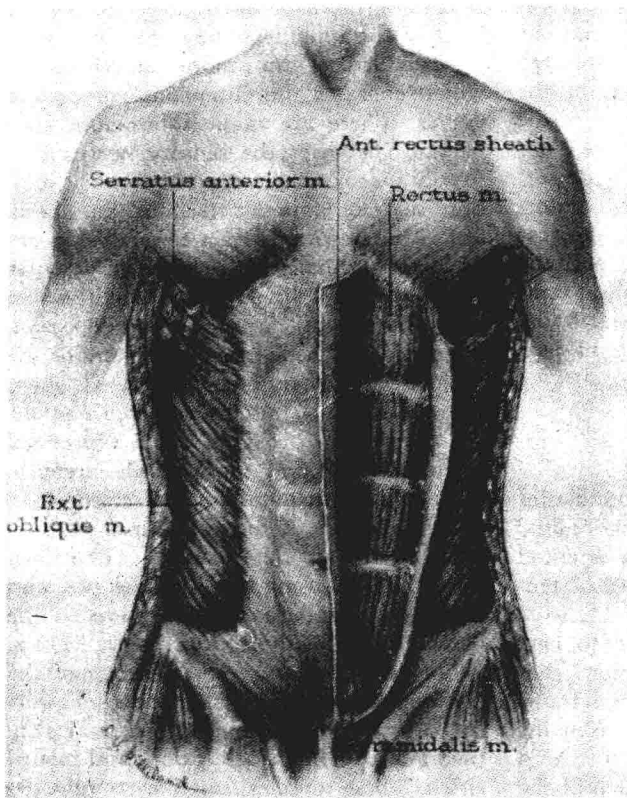


Fig. 1-2. Superficial muscles of the abdominal wall.

external oblique muscle. It arises from the outer surfaces of the eight lower ribs and passes downward, forward, and medially, to insert into the anterior half of the iliac crest, the inguinal ligament, and the pubis. Adjacent to the lateral border of the rectus abdominis, its fibers become aponeurotic and pass anterior to the rectus muscle to become a portion of the anterior rectus sheath.

The internal oblique muscle has its origin on the lateral half of the inguinal ligament, the iliac crest, and the lumbodorsal fascia. Its fibers pass behind and at right angles to those of the external oblique muscle to insert into the four lower ribs. The anterior extension of the internal oblique muscle is aponeurotic. This aponeurosis in the upper abdomen splits into two lamellae, the anterior of which fuses with the aponeurosis of the external ob-

lique to become part of the anterior rectus sheath. The posterior lamella fuses with the underlying transversus abdominis aponeurosis and passes posterior to the rectus muscle. In the lower abdomen, at a level beginning approximately 3 cm. below the umbilicus, the entire thickness of the internal oblique aponeurosis passes anterior to the rectus muscle.

The innermost of the three flat muscles is the transversus abdominis. This is a thinner muscle, which passes horizontally across the abdomen from the iliac crest, lumbodorsal fascia, and the six lower ribs to terminate anteriorly also as an aponeurotic layer. Its aponeurosis passes posteriorly to the rectus muscle in the upper abdomen and anterior to the rectus muscle in the lower abdomen.

The transversalis fascia lies underneath the transversus muscle. In the upper ab-

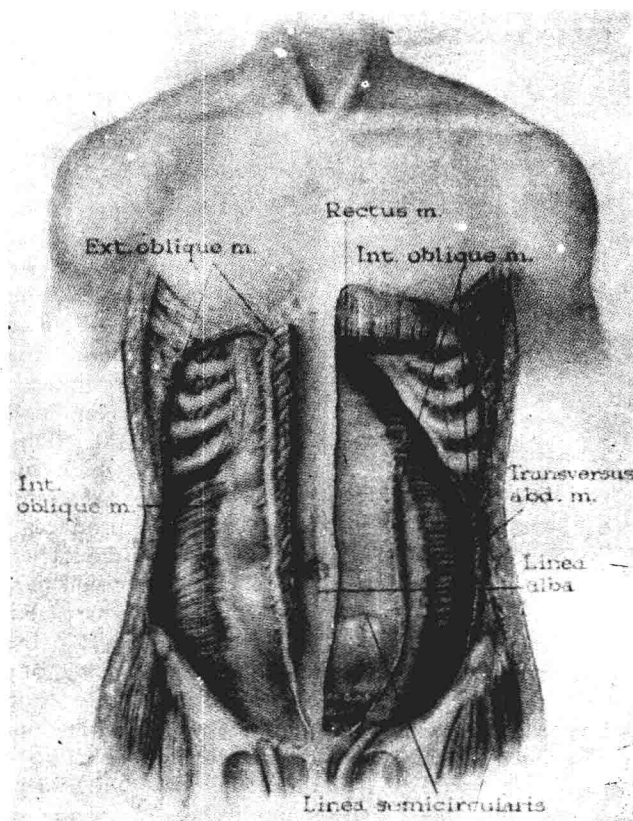


Fig. 1-3. Deep muscles of the abdominal wall.

domen this fascia is a relatively weak layer of fibrous tissue closely adherent to the peritoneum. In the lower abdomen, this layer exists as a stronger, more readily identifiable sheet of fibrous tissue. The transversalis fascia is attached in-

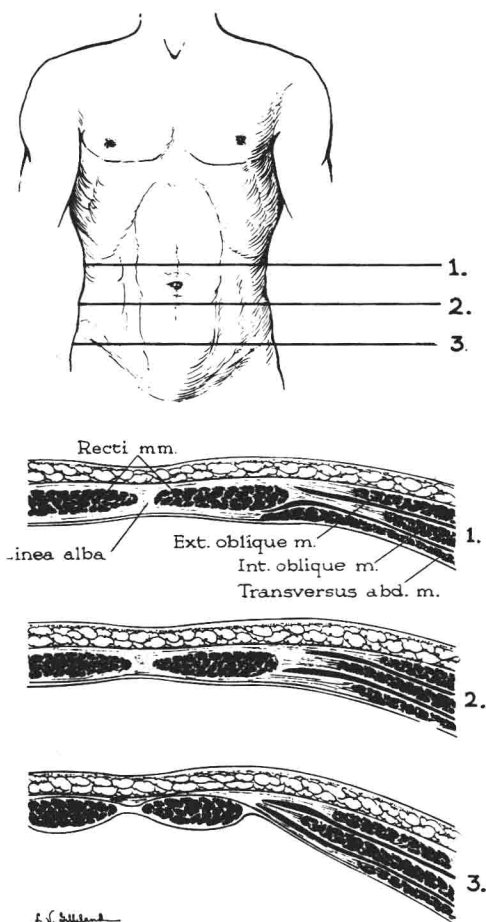


Fig. 1-4. Transverse sections of the abdominal wall at three levels to illustrate the distribution of the aponeuroses of the lateral muscles in the formation of the anterior and posterior rectus sheath.

teriorly to the inner lip of the iliac crest, outer half of the inguinal ligament, lacunar ligament, and the pubic crest.

The two rectus abdominis muscles occupy the central half of the abdominal wall. At least one of these and its apo-

neurotic coverings must be dealt with in most major abdominal operations. The recti arise from the pubic crest underneath the insertion of the external oblique and pass vertically upward to a wide insertion in the ensiform and costal margin as far laterally as the tip of the ninth rib. The rectus muscle is marked by a series of two to five transverse tendinous striations by which the muscle is adherent to its sheath anteriorly. Posteriorly the muscle is only loosely adherent to the posterior sheath and may be readily separated from it. The adherence of the rectus muscle to the anterior sheath prevents significant retraction of the muscle when the sheath and muscle are divided in a transverse direction. Suture of the sheath after a transrectus incision is adequate to reapproximate the divided muscle.

Anterior to the lower part of the rectus muscle and within the rectus sheath is the pyramidalis, a small, pyramidal muscular slip that arises from the pubic crest between the external oblique and rectus muscles. The pyramidalis extends upward and medially to terminate in a slender tendon that inserts into the linea alba midway between the pubis and the umbilicus. Although the muscle acts to give tensile support to the linea alba, no observable functional deficit is produced by its transection or denervation as a result of an adjacent incision.

From the foregoing description it is apparent that the rectus sheath is in reality composed of the confluent aponeurotic fibers of the three lateral flat muscles and the transversalis fascia, all the fibers of which run transversely. It is for this reason that closure of a transverse rectus incision produces a stronger wound than does similar closure of a longitudinal rectus incision paralleling the muscle fibers. In the lower abdomen up to a level 3 to 5 cm. below the umbilicus, all fibers (except those of the transversalis fascia) pass anterior to the recti. Above this level (the semicircular line of Douglas) the fibers split to provide more equal support anteriorly and posteriorly; the external oblique and half of the internal oblique