

SEVENTH EDITION

# PRINCIPLES OF SURGERY

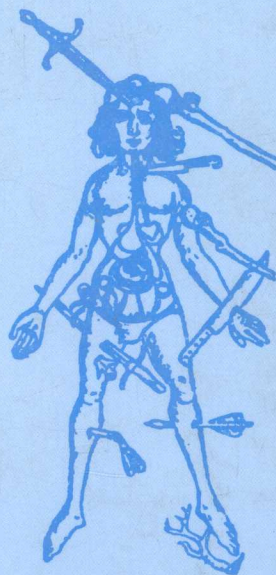
外科学原理 (上)

SCHWARTZ

SHIRES  
SPENCER

DALY  
FISCHER  
GALLOWAY

VOLUME 1



世界图书出版公司

# PRINCIPLES OF SURGERY

SEVENTH EDITION

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**Volume 1**

McGRAW-HILL  
HEALTH PROFESSIONS DIVISION  
New York St. Louis San Francisco Auckland Bogotá Caracas  
Lisbon London Madrid Mexico City Milan Montreal  
New Delhi San Juan Singapore Sydney Tokyo Toronto



(陕)新登字 014 号

陕版出图字 著作权合同登记 25-1998-103 号

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ISBN 007-1168745

This edition is permitted by arrangement with McGraw-Hill Book Co. Singapore



## Principles of Surgery

### 外科学原理

by Schwartz et.al.

任卫军 重印责任编辑

世界图书出版公司 重印发行

(西安市 南大街 17 号 邮编 710001)

西安七二六印刷厂印刷

787 × 1092 毫米 开本 1/16 印张 151

1999 年 6 月第 1 次重印

ISBN 7-5062-4018-1/R·352

(全二卷)定价:895.00 元

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Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required. The editors and the publisher of this work have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication. However, in view of the possibility of human error or changes in medical sciences, neither the editors nor the publisher nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they assume no responsibility for any errors or omissions or for the results obtained from the use of such information. Readers are encouraged to confirm the information contained herein with other sources. For example, and in particular, readers are advised to check the product information sheet included in the package of each drug they plan to administer to be certain that the information contained in this book is accurate and that changes have not been made in the recommended dose or in the contraindications for administration. This information is of particular importance in connection with the use of drugs.



1999年10月28日

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1000140288

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To students of Surgery, at all levels, in their  
quest for knowledge

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# Preface

The Seventh Edition of *Principles of Surgery* completes our participation in the surgical education of an entire generation of medical students and surgical residents throughout the world. We also were pleased to have played a role in the continuing education of practicing surgeons.

Many have regarded teachers as the noblest of people; others attach that designation to healers. As one who has been privileged to serve in both roles, namely, to have provided a vehicle for educating those who will perpetuate the healing profession in the realm of Surgery, and, at the same time, to have had the opportunity to participate in relieving patients of their disease, I consider myself twice blessed.

As a surgeon I have been satisfied by successes in patient care. As a teacher, I have been literally rewarded by expressions of appreciation by our readers who have indicated that we have enhanced their education.

Thirty-two years have passed since we accepted the publisher's and our own self-generated challenge to develop a "new and modern" textbook of Surgery. The favorable reception and the text's longevity suggest that we have succeeded. As the landmark of the Seventh Edition is completed, the frustrations and toils are erased and what remains is an immeasurable sense of gratification.

Seymour I. Schwartz, M.D.  
June, 1998

## ACKNOWLEDGMENT

We are particularly appreciative of the efforts of Andrea Weinstein, who had an integral role in each of the processes throughout the development of this edition. John Guardiano also contributed significantly to the technical editing of the manuscript.

# Preface to the First Edition

The *raison d'être* for a new textbook in a discipline which has been served by standard works for many years was the Editorial Board's initial conviction that a distinct need for a modern approach in the dissemination of surgical knowledge existed. As incoming chapters were reviewed, both the need and satisfaction became increasingly apparent and, at the completion, we felt a sense of excitement at having the opportunity to contribute to the education of modern and future students concerned with the care of surgical patients.

The recent explosion of factual knowledge has emphasized the need for a presentation which would provide the student an opportunity to assimilate pertinent facts in a logical fashion. This would then permit correlation, synthesis of concepts, and eventual extrapolation to specific situations. The physiologic bases for diseases are therefore emphasized and the manifestations and diagnostic studies are considered as a reflection of pathophysiology. Therapy then becomes logical in this schema and the necessity to regurgitate facts is minimized. In appreciation of the impact which Harrison's *PRINCIPLES OF INTERNAL MEDICINE* has had, the clinical manifestations of the disease processes are considered in detail for each area. Since the operative procedure represents the one element in the therapeutic armamentarium unique to the surgeon, the indications, important technical considerations, and complications receive appropriate emphasis. While we appreciate that a textbook cannot hope to incorporate an atlas of surgical procedures, we have provided the student a single book which will satisfy the sequential demands in the care and considerations of surgical patients.

The ultimate goal of the Editorial Board has been to collate a book which is deserving of the adjective "modern." We have therefore selected as authors dynamic and active contributors to their particular fields. The *au courant* concept is hopefully apparent throughout the entire work and is exemplified by appropriate emphasis on diseases of modern surgical interest, such as trauma, transplantation, and the recently appreciated importance of rehabilitation. Cardiovascular surgery is presented in keeping with the exponential strides recently achieved.

There are two major subdivisions to the text. In the first twelve chapters, subjects that transcend several organ systems are presented. The second portion of the book represents a consideration of specific organ systems and surgical specialties.

Throughout the text, the authors have addressed themselves to a sophisticated audience, regarding the medical student as a graduate student, incorporating material generally sought after by the surgeon in training and presenting information appropriate for the continuing education of the practicing surgeon. The need for a text such as we have envisioned is great and the goal admittedly high. It is our hope that this effort fulfills the expressed demands.

Seymour I. Schwartz, M.D.

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**BASIC**  
**CONSIDERATIONS**





## CHAPTER 1

## The Systemic Response to Injury

Edward Lin, Stephen F. Lowry, and Steve E. Calvano

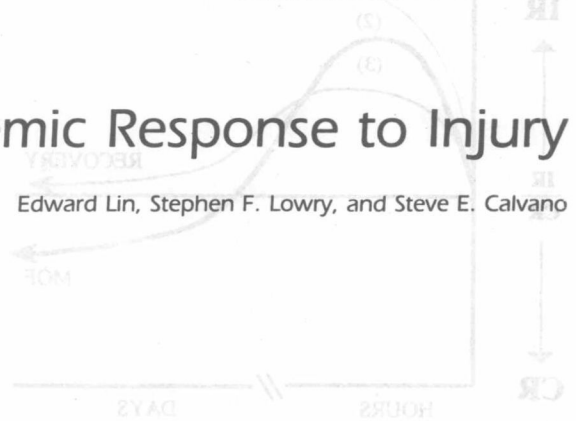


FIG. 1-1. Systemic response to injury. The graph illustrates the magnitude of the systemic response to injury over time. The Y-axis represents the magnitude of the response, and the X-axis represents time, divided into HOURS and DAYS. Three curves are shown: (1) a solid line peaking early and returning to baseline quickly; (2) a dashed line peaking later and returning to baseline more slowly; and (3) a dotted line peaking very late and returning to baseline very slowly. The curves represent different components of the systemic response.

**Introduction****Endocrine Response to Injury**

Overview of Hormone-Mediated Response

Hormones Under Anterior Pituitary Regulation

Hormones Under Posterior Pituitary Regulation

Hormones of the Autonomic System

**Immune Response to Injury**

Cytokine-Mediated Response

Regulation of Inflammatory Cell Death

Immunocyte Receptor Activity in Inflammation

Hormones and Cytokine Interactions

**Other Mediators of Injury Response**

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**Metabolic Response to Injury**

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Metabolism After Injury

**Nutrition in the Surgical Patient**

Surgery, Trauma, Sepsis

Assessment and Requirements

Indications and Methods for Nutritional Support

Enteral Feeding

Defined-Formula Diets

Parenteral Alimentation

Home Parenteral Nutrition

**INTRODUCTION**

The host response to injury—surgical, traumatic, or infectious—is characterized by various endocrine, metabolic, and immunologic alterations. If the inciting injury is minor and of limited

duration, wound healing and restoration of metabolic and immune homeostasis readily occurs. More significant insults lead to further deterioration of the host regulatory processes, which, without appropriate intervention, often precludes full restoration of cellular and organ function or results in death. The spectrum of cellular metabolic and immunologic dysfunction resulting from injury suggests a complex mechanism for identifying and initially quantifying the injurious event. This initial response is inherently inflammatory, inciting the activation of cellular processes designed to restore or maintain function in tissues while also promoting the eradication or repair of dysfunctional cells. These dynamic processes imply the existence of antiinflammatory or counterregulatory processes that promote the restoration of homeostasis (Fig. 1-1).

A discussion of the response to injury must account for the collective dynamics of neuroendocrine, immunologic, and metabolic alterations characteristic of the injured patient. This chapter discusses concepts related to macroendocrine and microendocrine contributions to the basic metabolic and immunological consequences of injury and also the current concepts of metabolism and nutritional support for the surgical patient as a practical and readily applicable adjunct for the provision of essential substrates. The dynamics of hormonal and immunologic influences on the metabolic and substrate requirements of the injured patient are emphasized.

**ENDOCRINE RESPONSE TO INJURY****Overview of Hormone-Mediated Response**

The classic response to injury comprises multiple axes. These hormone response pathways are activated by (1) mediators released by the injured tissue, (2) neural and nociceptive input originating from the site of injury, or (3) baroreceptor stimulation from intravascular volume depletion. The hormones released in response to these activating stimuli may be divided into those