Rob & Smith's

Operative Surgery

Thoracic Surgery

Fourth Edition

Edited by

John W. Jackson

D. K. C. Cooper

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and

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Tribute to John Jackson

Sadly, John Jackson, the senior editor of this volume, did not live to see it published. He had accomplished the preparation of this edition despite the increasing ill-health and pain which required him to undergo numerous operative and therapeutic procedures; his cheerful fortitude during this time was remarkable. The third-edition volume, covering both cardiac and thoracic surgery and this present volume remain as tributes to his editorial capabilities.

To those who knew him personally, however, he will not be remembered solely for his undoubted expertise as a thoracic surgeon. Rather, he will be remembered for the human qualities he possessed and demonstrated to the full – his concern for both patients and junior colleagues, his kindness, sensitivity and generosity, his delightful sense of humour. John Jackson will be sadly missed by all who were fortunate enough to know him – patients, colleagues, and friends.

D. K. C. Cooper

Preface

Those readers familiar with earlier editions of the series 'Operative Surgery' will note a major change in this current (fourth) edition, namely, the division of cardiac and thoracic surgery into two separate volumes. Hitherto, cardiothoracic operations have been described in a single volume – the third edition being edited by my late colleague John Jackson. There has been a tendency for surgeons to concentrate their practices increasingly in either cardiac of thoracic work, and it was felt that the preparation of separate volumes in these two fields would be timely. Though there will be those who deplore this further small step in the division of cardiothoracic surgery into two subspecialties, there will equally be many others who will applaud. Both the general editors and those involved with the preparation of the two volumes hope that the resulting texts will be easier to consult, and will even more adequately satisfy the needs of the reader.

In this particular volume on thoracic surgery, the requirements of the surgeon in training have been to the fore in the minds of the editors and authors, and it is hoped that the text and figures provide clear guidance for those inexperienced in the performance of certain operations.

The arrangement of the chapters, though now confined largely to mediastinal, pulmonary, and oesophageal operative topics, has largely followed that of the previous edition. The more complicated and less common operations follow minor and investigatory procedures in a more or less logical manner so that it should be possible for the reader to locate any one chapter without continual reference to the index. Where possible, each chapter follows the same pattern – an outline of investigations and indications followed by the operation, and finally aspects of postoperative care. All of the operations are well-tried standard procedures, and each surgeon has been encouraged to describe his own method, to include pitfalls and complications, and to mention or describe alternative procedures where appropriate.

Greater attention has been paid to investigatory procedures, and the chapters on rigid and flexible bronchoscopy, bronchography, aspiration of the chest, pleural biopsy and needle biopsy of the lung, mediastinoscopy, and oesophagoscopy, have been considerably expanded. Blunt and penetrating chest trauma has also been given greater attention, as have certain conditions not seen commonly in the United Kingdom or North America, such as pulmonary hydatid cysts.

The international flavour of the contributions has been increased further, and chapters are included from surgeons in the UK, the USA, Canada, South Africa, Yugoslavia and Germany. The text therefore reflects operative techniques practised and accepted worldwide.

D. K. C. Cooper

Contents

General

Congenital diaphragmatic hernia and eventuation 1
Lewis Spitz

Pectus excavatum 9
I. K. R. McMillian

Pectus carinatum 17
I. K. R. Macmillan

Managament of blunt thoracic injuries 22
J. Kent Trinkle

Penetrating wounds of the chest 39
Melvin R. Platt

Tumours of the chest wall including neurofibromata 48
J. E. Dussek

Thymectomy 54
M. F. Sturridge

Surgery of the thoracic duct and management of chylothorax 59
Sir Keith Ross

Pulmonary

Rigid and flexible bronchoscopy 63
D. K. C. Cooper
S. R. Benatar

Bronchography 74
John W. Jackson

Aspiration of the chest 82
Rex De L. Stanbridge

Biopsy of pleura and lung (including thoracoscopy) 85
Werner Maassen

Scalene node biopsy 101
Rex De L. Stanbridge

Mediastinoscopy 105
Joel D. Cooper

Intercostal drainage 110
Rex De L. Stanbridge

Management of spontaneous pneumothorax 118
R. E. Lea

Tracheostomy 124
Mary P. Shepherd

Surgical access in pulmonary operations 135
Peter Goldstraw

Resection of lung 149
Raymond Hurt

Resection of the trachea for stricture 178
F. G. Pearson

Use of stapler in lung surgery 185
S. C. Lennox

Surgical treatment of pulmonary cysts and bullous disease 189
E. R. Townsend

Pulmonary hydatid cysts 194
E. Ginzberg

Bronchopleural fistula after pneumonectomy and lobectomy 204
M. F. Sturridge

Postpneumonectomy empyema 210
M. F. Sturridge

Rib resection for empyema 212
Vernon C. Thompson

Decortication of the lung and excision of empyema 218
Mary P. Shepherd

Thoracostomy for permanent chest drainage 226
John W. Jackson

Thoracoplasty 229
R. P. Hewitson

Oesophageal

Congenital oesophageal atresia and tracheo-oesophageal fistula 235
Keith D. Roberts

Surgical treatment of achalasia of the cardia – diffuse oesophageal spasm ('corkscrew oesophagus') and periphrenic diverticulum 252
A. W. Jowett

Oesophagoscopy 256
K. M. Pagliero

Perforation of the oesophagus 277
W. F. Kerr

Thoracic repair of hiatus hernia 286
G. Keen

Surgical management of hiatus hernia and complications of gastro-oesophageal reflux 292
Lucius D. Hill
Colin O. H. Russell
Nicolas Velasco
Kjell Thor

Nissen's fundoplication 299
A. H. K. Deiraniya

Reflux oesophagitis treated by gastroplasty 304
F. G. Pearson

Reflux oesophagitis with stricture: alternative methods of management 314
W. Spencer Payne

Operations for carcinoma of the thoracic oesophagus and cardia 326
John W. Jackson

Transhiatal oesophagectomy 343
Mark B. Orringer

Colon replacement of the oesophagus 355
Hugoe R. Matthews

Pulsion intubation of the oesophagus 370
I. Barnett Angorn

Index 375

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Congenital diaphragmatic hernia and eventration

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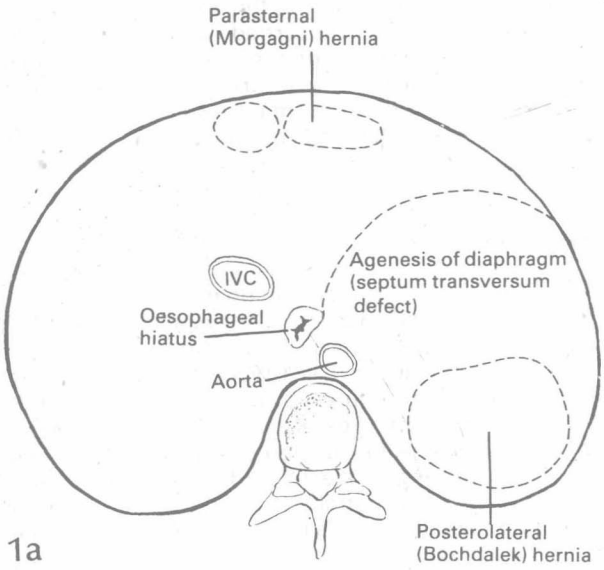
DIAPHRAGMATIC HERNIA

History

Ambroise Paré reported the first diaphragmatic hernia, which was of traumatic origin, in 1597. In 1848, Vincent Alexander Bochdalek published his description of the congenital diaphragmatic hernia that now bears his name. The defect as described by Bochdalek was a triangular slit between the lumbar portion of the diaphragm and the apex of the twelfth rib. He attributed the herniation to rupture of a previously intact membrane in the lumbocostal triangle.

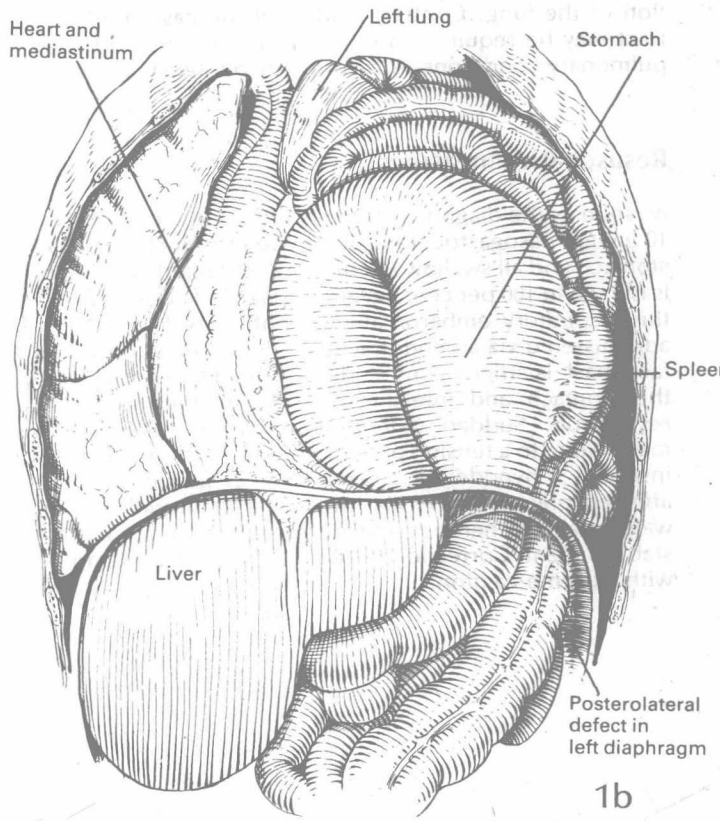


1a

1a & b

Types of hernia

The various areas in the diaphragm (excluding the oesophageal hiatus) through which hernias may occur are shown.



1b

Diagnosis

Diaphragmatic hernia through the patent pleuroperitoneal canal, generally referred to as the foramen of Bochdalek, usually presents as an acute emergency in the neonatal period. The classical diagnostic triad consists of respiratory distress, apparent dextrocardia and a flat 'scaphoid' abdomen. Breath sounds are diminished on the affected side and borborygmi may be auscultated in the chest. The presenting symptoms in cases manifesting at a later stage include recurrent respiratory infections, dyspnoea, especially after meals, and vomiting. The left side is affected in 85–90 per cent of cases. This has been attributed to the later closure of the left pleuroperitoneal canal during the eighth week of intrauterine development. Bilateral hernias are rare.

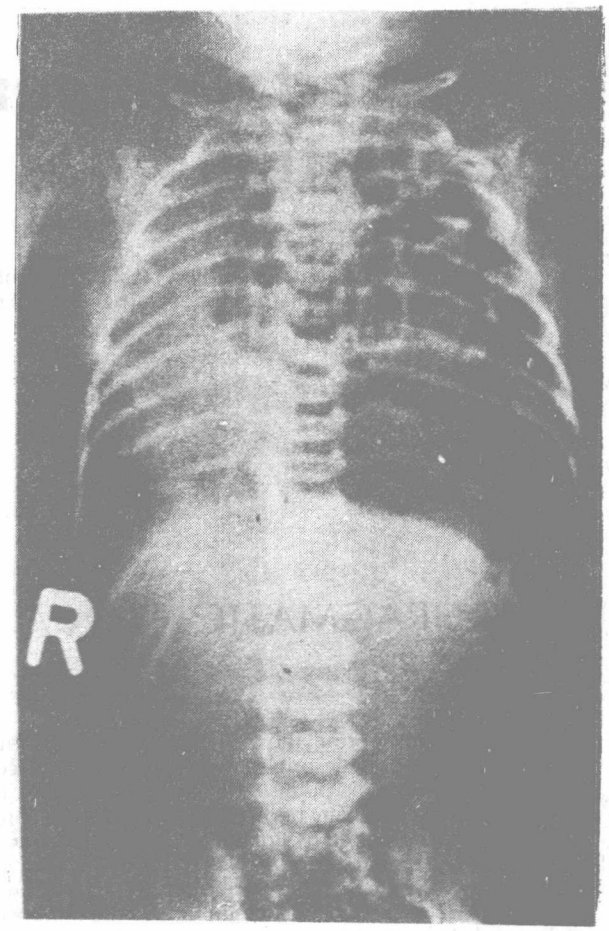
2

A chest radiograph, which should always include the abdomen, is usually diagnostic. The affected hemithorax is filled with gas-containing loops of intestine, the mediastinum is displaced to the opposite side, and there is a decrease in the amount of intraperitoneal intestinal gas shadows.

The presence of a normal intestinal gas configuration with an apparently intact diaphragm is suspicious of congenital lobar emphysema or adenoid cystic malformation of the lung. Contrast studies of the gastrointestinal tract may be required to differentiate these two primary pulmonary conditions from a true diaphragmatic hernia.

Resuscitative measures

As soon as the diagnosis is suspected, a large calibre (No. 10 gauge) nasogastric tube should be introduced into the stomach and all swallowed contents evacuated. The infant is nursed in 100 per cent oxygen and if this fails to improve the respiratory embarrassment, ventilatory assistance is administered via an endotracheal tube. Ventilation with a face mask is strictly contraindicated as this forces air into the stomach and intestines, further embarrassing the respiration. Sudden deterioration during resuscitation may be due to a tension pneumothorax. This is relieved by inserting a hypodermic needle (No. 21 gauge) into the affected pleural space. An intercostal drain with underwater seal can then be formally introduced in a relatively stable patient. Correction of acidosis should be attempted with extreme caution.



2

Transportation

Where possible, transfer of the infant to a paediatric surgical centre should be carried out promptly while all resuscitative measures continue. This implies attendance by experienced medical and nursing personnel ensuring as far as possible that the infant remains normothermic and adequately oxygenated and that the intestines remain decompressed.

Anaesthesia

This consists of standard neonatal anaesthesia with preoxygenation and awake endotracheal intubation (if this was not required during resuscitation) followed by hand ventilation with an Ayre's T-piece. Gentle ventilation, using inspiratory pressures of up to 25 cm H_2O with 5 cm H_2O end-respiratory pressure to maintain the functional residual capacity, is maintained throughout the operative period. Monitoring of electrocardiogram, core temperature (rectal probe), central venous and arterial pressures, blood gases and blood loss is carried out intraoperatively.

The operation

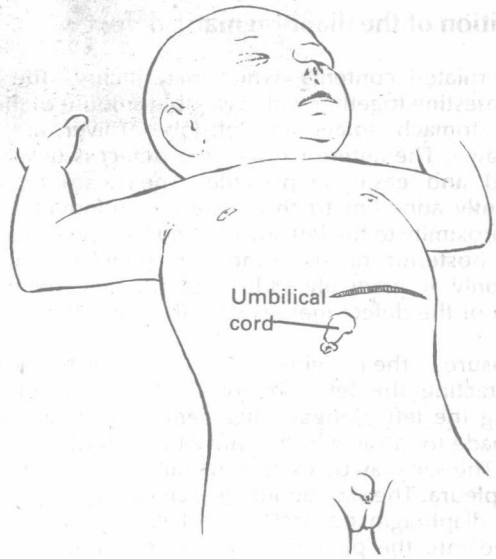
The incision

The abdominal approach is preferred for all left-sided congenital posterolateral diaphragmatic hernias. Correction of the associated intestinal malrotation and enlargement of the peritoneal cavity to accommodate the displaced viscera are more easily achieved through an abdominal incision.

A transthoracic approach may be used for the right-sided hernia where liver may be the only contents, or for recurrent hernias where adhesions prevent simple reduction of the herniated contents.

3

The abdominal approach is via a left upper abdominal transverse muscle-cutting (or alternatively a left oblique subcostal) incision placed 2 cm above the umbilical cord and extending from the midline to the tip of ninth costal cartilage.



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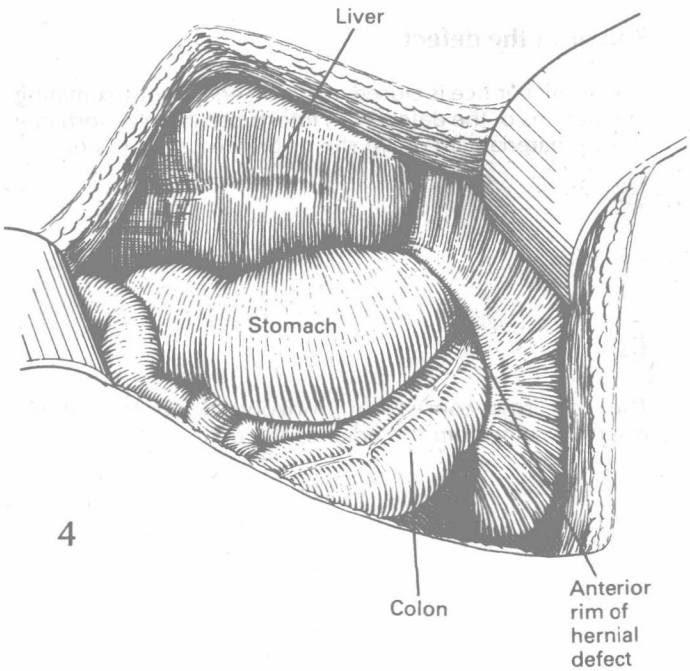

4

4

Exposure of the diaphragmatic defect

The cranial part of the wound is retracted upwards to reveal the anterior well-muscularized diaphragm and the posteriorly located defect through which most of the abdominal viscera have herniated into the pleural cavity. The peritoneal cavity is relatively empty.