

# OPERATIVE SURGERY

Fundamental International Techniques

## Cardiothoracic Surgery

THIRD EDITION

Edited by

John W. Jackson

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## Cardiothoracic Surgery

Edited by

**John W. Jackson**

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Butterworths (Publishers) Inc  
Boston: 19 Cummings Park, Woburn, Mass. 01801

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First Edition Published in Eight Volumes, 1956-1958  
Second Edition Published in Fourteen Volumes, 1968-1971  
Third Edition Published in Eighteen Volumes, 1976-1978

©  
Butterworth & Co (Publishers) Ltd  
1978

ISBN 0 407 00604 4

#### British Library Cataloguing in Publication Data

Operative surgery. — 3rd ed.

Cardiothoracic surgery

I. Surgery, Operative

I. Jackson, John W II. Rob, Charles

III. Smith, Sir Rodney, b.1914 IV. Dudley,

Hugh Arnold Freeman

617'.91

RD32

77-30634

ISBN 0 407 00604 4

Typeset by Butterworths Litho Preparation Department  
Printed in England by The Whitefriars Press Ltd., London and Tonbridge  
Bound by The Newdigate Press Ltd., Dorking, Surrey

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# OPERATIVE SURGERY

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## Introduction

The third Edition of this volume in the general series Operative Surgery takes its foundations from its predecessors and I am grateful to the previous volume editor, Mr. W. P. Cleland, for his advice and help in re-arranging the text so as to reflect the change in title from Thorax to Cardiothoracic Surgery.

In this re-arrangement, 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 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 details of post-operative care. All the operations are well-tried, standard procedures calling for a degree of technical competence and considerable surgical experience. Each surgeon has been encouraged to describe his own method, to include pitfalls and complications and to mention or describe alternative procedures where appropriate.

In surgery for congenital heart disease the trend has been more and more away from palliation and multiple-stage operations and towards complete and total correction of the abnormal anatomy and, when this is not possible, a physiological re-arrangement of the haemodynamics. Likewise in adult cardiac surgery the primary aim has been complete repair or correction, with excision and replacement as the alternative when it is considered to provide the better long-term result. Since the last edition vein bypass grafting has replaced the palliative procedures that were then the only available treatment for coronary artery disease and its complications.

In spite of the continued development of new antibiotics, empyema and tuberculosis are still with us, and their careful surgical management remains essential for success and long-term survival. New chapters have been included on post-resection empyema, infected pneumonectomy space and bronchopleural fistula.

In oesophageal surgery the trend has been towards safe reconstruction and replacement, with particular emphasis on the problem of the prevention of oesophageal reflux, and alternative methods in the management of its complications.

I am pleased to have been able to introduce a new group of contributors from Great Britain, France, the Netherlands, the United States and Canada to give the work a new and increased international flavour.

Finally I would like to thank all those who have contributed to earlier editions, because it was on the basis of the quality of their work and reputation that a new edition has been possible.

JOHN W. JACKSON

# OPERATIVE SURGERY

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# Treatment of Cardiac Arrest

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## Aetiology

Cardiac arrest has been defined as sudden and usually unexpected failure of the heart to maintain circulation. If this broad definition is accepted, attempts at resuscitating patients dying of chronic disease or of the complications of old age will be avoided. Drowning, electrocution and asphyxia are the commonly encountered causes of cardiac arrest outside hospital, and treatment in these cases may be initiated by laymen. The medical practitioner is more likely to be confronted with cardiac arrest due to anoxia or drug sensitivity, whether in the operating theatre, x-ray department or ward. Myocardial infarction and pulmonary embolism are among the common causes of cardiac arrest occurring in hospital.

## Recognition

Absence of major pulses in a collapsed patient is sufficient indication for treatment and no time should be wasted in auscultation or electrocardiographic confirmation. Respiratory arrest and fixed dilated pupils may confirm the diagnosis but should not be awaited, for drugs such as atropine and morphine may influence the pupillary response to anoxia.

## Urgency

Circulatory arrest of more than 3 or 4 min duration is likely to be followed by irreversible cerebral damage, and care must be taken to avoid resuscitating the patient to a vegetative existence. However, survival without brain damage has been reported following longer periods of arrest, particularly in children, which deprives an arbitrary period of time of absolute value. Massage of the beating heart is most unlikely to initiate an arrhythmia and the operator should therefore discount the possibility of such an accident

arising on account of premature or unnecessary treatment.

## External resuscitation

Whereas internal cardiac massage is readily achieved in the operating theatre, this method has considerable disadvantages elsewhere. The introduction of an efficient method of closed massage was therefore timely and this is now well established as the procedure of choice in the first instance in almost all cases of cardiac arrest. Despite theoretical doubts concerning the efficiency of external massage, experimental and clinical observations confirm that under these conditions cardiac output may reach 60 per cent of normal. Clinical experience confirms that an adequate circulation can be maintained for at least an hour, followed by subsequent survival without ill effect. Raising the patient's legs to encourage rapid venous return is a useful preliminary manoeuvre and a hard blow over the sternum with the clenched fist has been known to stimulate the arrested heart into a resumption of normal activity, but too much time should not be wasted, for these manoeuvres are not usually successful alone.

## Duration of resuscitative efforts

These must be continued so long as the patient responds. In the presence of a good peripheral circulation and small pupils, persistence cannot be denied. Failure of the peripheral circulation is recognized by stagnant peripheral anoxia with dilated pupils and the condition is usually self-evident. In essentially reversible situations such as asphyxia, electrocution and drug reactions, no effort should be spared and many cases are on record describing unimpaired survival following more than an hour of cardiac massage.

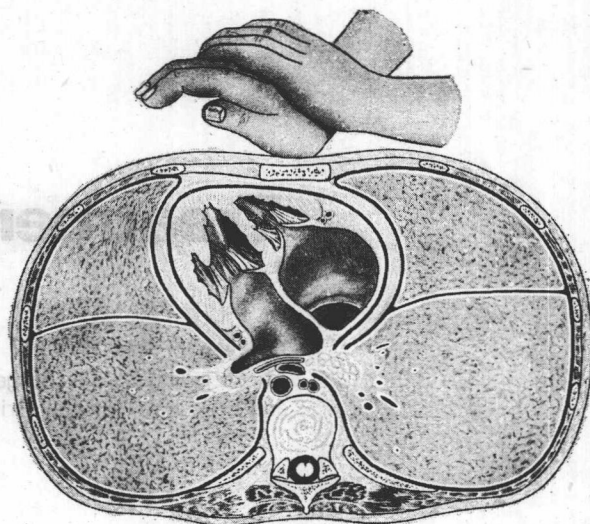


## TECHNIQUE

## 1

*Anatomical basis*

The heart is limited anteriorly by the sternum, posteriorly by the vertebral bodies and lateral movement is restricted by the pericardium. Anteroposterior pressure forces blood from the heart into the great vessels so long as there is adequate venous return and the valves are competent.



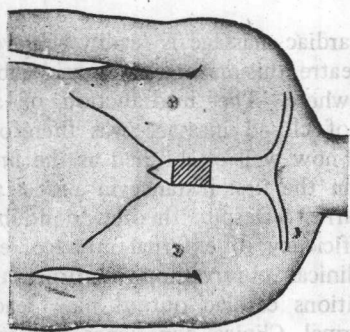
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## 2

*Position of patient*

The patient is placed supine on a firm surface, such as a fracture board or on the floor, to ensure that massage is not rendered inefficient by the oscillations of a sprung bed. The operator stands or kneels beside the patient and massage is applied over the lower third of the sternum. The heel of one hand is placed over this site and the other hand covers it to re-inforce the thrust. In children, external cardiac massage is effective if one hand only is used.

Firm pumping movements at the rate of 70 per minute, each thrust depressing the lower sternum 1–2 inches (less in children) will produce a palpable pulse in the presence of an adequate blood volume. From time to time massage may be discontinued, allowing rapid assessment of the peripheral pulses. In ideal circumstances the patient will have been connected to the electrocardiogram recorder and the rhythm noted. An electrical impulse does not necessarily imply an expulsive heart beat, and the peripheral pulses and blood pressure rather than the monitor must guide the operator as to the adequacy of spontaneous heart action. Effective massage is readily recognizable. The patient's colour will improve and dilated pupils may contract. At the same time respiratory efforts and even consciousness may return. Peripheral pulsation in larger vessels is difficult to assess, for pulsation without flow or mere transmission of body wall movement may convey a false impression. The patient's appearance is probably as good a guide as any.



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