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# Anesthesia of the Upper Limb

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Fernando Alemanno  
Mario Bosco · Aldo Barbati  
Editors

# Anesthesia of the Upper Limb

A State of the Art Guide

 Springer

*Editors*

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ISBN 978-88-470-5417-2      ISBN 978-88-470-5418-9 (eBook)

DOI 10.1007/978-88-470-5418-9

Springer Milan Heidelberg New York Dordrecht London

Library of Congress Control Number: 2013939040

The contents of this book are based on: *L'Anestesia dell'arto superiore*. F. Alemanno, M. Bosco, A.Barbati (eds)

© Verduci Editore 2011 Translated from the Italian by Anthony Steele MA (Oxon), former Senior Lecturer in Medical English, Faculty of Medicine and Surgery, University of Verona.

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Printed on acid-free paper

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*It would be easier for me to list the defects and flaws of this book rather than its merits and positive qualities. Before putting pen to paper I knew that I would inevitably have come to this conclusion, but I wrote the book all the same because I enjoyed writing it, and because I hope someone will enjoy reading it.....*

Indro Montanelli,  
The History of the Greeks  
Rizzoli Editore, Milan 1959

*This book is dedicated to the memory of Andrea Casati who we shall always remember as the worthiest young representative of Italian anesthesiology at the turn of the millennium.*

Fernando Alemanno  
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## Foreword

In the year commemorating the unity of Italy I am pleased to present this book which in some ways epitomizes that unity over the past 150 years. The book is the fruit of the work of three authors who have shared the by no means easy task of writing a monographic study on brachial plexus anesthesia, a topic already expertly addressed in the past by both Italian and non-Italian authors. Perhaps, by some curious geographical coincidence, the authors divided the task between them and addressed the subject matter in three sections: the topographically higher, supraclavicular techniques were addressed by Fernando Alemanno, resident in Alto Adige (northern Italy); the intermediate, infraclavicular, and axillary techniques were addressed by Mario Bosco, resident in Rome (central Italy), while the topographically lower techniques, the truncular anesthesia techniques, were addressed by Aldo Barbati of Naples (southern Italy).

An important aspect of this work is also the collaboration of many other specialists who have devoted years of work and study to the brachial plexus block techniques and more besides, despite each of them continuing to practice general anesthesia, intensive care and pain therapy, regarding the perfection of these techniques not as time taken away from the study of the others, but as the possibility of integrating them overall with a view to optimizing the results.

A great deal of importance has been attributed to the iconography. The advent of ultrasound as applied to regional anesthesia that has occurred over the past decade has made it possible to extend the study of anatomy from the purely dissective realm, as pertaining strictly to the anatomical theater, burdened with all manner of logistic and legislative difficulties, to the virtual '*in corpore viri*' realm of the ultrasound image in which the scholar can compare the real, individual anatomy and all its variants, with his or her memories of classical anatomy learnt in books and atlases and above all in the anatomical theater. We should, in fact, stress that the fluorescent screen of the ultrasound appliance fails to show the minimal details that can be noted in the dissecting room, and therefore ultrasound anatomy cannot do without a sound knowledge of normal human anatomy.

I would like to emphasize once again that the three authors have succeeded in demonstrating that the solving of problems not only in

terms of content, but also in terms of organization, including not least those in the publishing sphere, can only come about as a result of a profitable effort of collaboration and integration on the part of the many centers of excellence present in Italy. We are always hearing the media talking about the ‘brain drain’ and the success Italians are achieving abroad and would never have been able to achieve in Italy. In my opinion, this is only partly true; the real reason for the success lies in the basic scientific preparation of our scholars and their culture. With these two qualities, combined with a good measure of determination and tenacity, characteristic of Italians when they want to achieve their goals, it is not difficult to emerge. An anonymous, yet able surgeon whose pupil I was, on and off, at the start of my professional career, pronounced the following judgement:

“Doctor, when you know your trade and know why you do things one way rather than another, you can go wherever you like.”

It is equally true that many Italians have the defect of overrating everything that is produced abroad and of underrating everything produced in Italy, thus confirming the old adage that ‘no man is a prophet in his own land’.

Regional anesthesia is a vast, continuously developing science, because it is constantly being enriched both as a result of the discovery of new drugs and as a result of the development of new techniques. In parallel with the technological progress made over the last two decades, there has been a substantial upsurge of literature in specialist and non-specialist journals, monographic studies, and treatises regarding regional anesthesia. The present volume helps the reader to familiarize himself with the current state of the art of the subject. Its aim is to provide both a summary of what one needs to know and an open window on a world no longer destined to be a domain reserved only to a few specialists dedicated to orthopedic anesthesia, but rather the common heritage of many others who use their anesthetic skills for vascular surgery or for reconstructive plastic surgery or surgery of the hand.

*Anesthesia of the Upper Limb*, first published in Italian on the occasion of the centenary (1911–2011) of the execution of the first two types of percutaneous brachial plexus block (Hirschel’s axillary block and Kulenkampff’s supraclavicular block), presents itself as a book with an admirable typographical layout, aimed not only at expert anesthetists, but also at postgraduate students lacking specific know-how who have just completed their undergraduate courses and set out on the task of acquiring the basic knowledge indispensable for their specialist training.

A book can express two fundamental, didactic options, one more extensive in scope and with greater in-depth detail, and the other, no less complete, but more agile and essential. The authors of this volume have



succeeded in producing a commendable fusion of these two qualities and, while being fully aware that most of what they were saying had already been written, they have often succeeded in dealing with the various topics in a simple, laid-back manner, in such a way as to make for enjoyable reading.

Rome

Prof. Rodolfo Proietti  
Director of the Postgraduate School of  
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Leonardo Da Vinci "Study of head and shoulder" 1509–1510

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## Preface

The second decade of the last century was a magical time for regional anesthesia of the upper extremity. It was the period that witnessed the advent of the four most important percutaneous brachial plexus block techniques: Hirschel's axillary technique on July 18 and Kulenkampff's supraclavicular technique on October 7, Kappis posterior approach in 1912 followed by Barny's infraclavicular approach in 1914.

The centenary of these first two percutaneous brachial plexus blocks coincided with the publication in Italian of this monographic study, which, in addition to tracing the evolution of the various block techniques that followed the first two in the course of time, focuses on the more modern methods, particularly with a view to their safety.

The aim of this volume is to present the fruit of a 100 years' experience in the field of the regional anesthesia of the upper limb, it being understood that these 100 years not only represent the historical period dating from the execution of the first two blocks to the present day, but also the sum total of the years of study, application, and experience that each of the three authors has spent in this extraordinary branch of anesthesiology.

Regional anesthesia presents indubitable advantages in almost all branches of surgery, because it combines perfect anesthesia with long-lasting postoperative analgesia and above all, if applied to orthopedic traumatology, it affords the best prophylaxis of reflex sympathetic dystrophy.

Anesthesia of the upper extremity came strongly to the fore with the advent, on the one hand, of hand surgery and, on the other, of arthroscopic and prosthetic surgery of the shoulder.

Particular care has been taken in the chapters on the anatomy and topographic anatomy of the region where the brachial plexus originates and develops, providing an adequate complement of iconographical material, ably assisted in this by Eduard Egarter Vigl, an anatomist of the Munich School, and Head of the Institute of Pathological Anatomy of Bolzano Regional Hospital, famous worldwide for his studies and research regarding the Similaun mummy. We believe, in fact, that a sound knowledge of anatomy is fundamental for the anesthetist who has to penetrate tissues, fascias and muscles, avoiding vessels, meninges and serosas, despite being equipped with two important instruments such as

electrical nerve stimulation and ultrasound. The closing decade of the twentieth century witnessed a major revolution in electrostimulation, which definitively supplanted the old method of paresthesias provoked by nerve puncture. Above all, with the paresthesia system it was difficult to establish exactly which nerve was being stimulated, even in a calm, compliant patient. The sensation provoked was generally strong, unpleasant, and approximate.

“Neurostimulation is a unique instrument because it clearly reveals the direct relationship between anatomy and physiology,” said Alain Borgeat, speaking about electrical nerve stimulation as applied to the axillary block: “... neurostimulation is a wonderful teaching tool; within two minutes you can demonstrate the triple innervation of the thumb—abduction, radial nerve, adduction, ulnar nerve, and opposition, median nerve. No resident will ever forget such a picture ...”

In the third millennium the great novelty consists in the use of ultrasound guidance which, with the perfecting of the technology, is increasingly proving to be more precise, particularly as regards its resolution capability. This is a technique capable of visualizing the various nerves, which is unquestionably extremely helpful, without, however, being able to analyze them, and this constitutes one of its limitations. For this reason, the anesthetist is obliged to resort to the simultaneous use of the electrostimulator, also because, in most ultrasound appliances in use in the departments, the visualization is still two-dimensional, which may lead to a substantial parallax error, and the resolution capacity is not always optimal. To conclude, we agree with Admir Hadzic when he says...

“electrostimulation and ultrasound guidance are complementary, and not two mutually exclusive technologies”.

This book is also designed above all for a readership of young colleagues in the hope that it will help them to master the difficult art of regional anesthesia, despite being applied to a limited sector of the human body. In any event, the chapters on conscious sedation, on the use of perineural adjuvants, and on postoperative analgesia in all its forms are also applicable to other sectors of regional anesthesia. We have sought to give this book a fundamentally didactic slant, with the result that certain concepts or procedures may seem boringly repetitive in different chapters, but this is intentional—*repetita iuvant* (‘repetition helps’). We have, however, also attempted to adopt a narrative approach in certain chapters so as to render the account simpler, more attractive, and therefore easier to memorize. We hope that, just as we enjoyed ourselves writing this book, so our readers will enjoy reading it.

Fernando Alemanno  
Mario Bosco  
Aldo Barbati

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## Acknowledgments

The authors wish to thank:

Professor Carlo D. Franco, Doctors Elfriede Prinnegg, Marta Putzu, James Oscar Quinto and Ann Davies for their critical revision of a number of chapters;

Doctors Philipp Agostini, Guido Botter, Claus Pfundmair, and Ludwig Rogg for their important bibliographical contribution; Ms. Francesca Alemanno, Lara Botticini, Carla Di Bella, Roberta Gnali, Gabriella Marinoni, and Mr. Simone Tomasotti for their invaluable iconographic contribution.

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