Kiyoshige Ohseto
Hiroyuki Uchino
Hiroki Iida
Editors

Nerve Blockade and Interventional Therapy

Springer

Kiyoshige Ohseto • Hiroyuki Uchino • Hiroki Iida
Editors

Nerve Blockade and Interventional Therapy

Springer

Editors
Kiyoshige Ohseto
Department of Anesthesiology
Tokyo Medical University
Tokyo
Japan

Hiroyuki Uchino
Department of Anesthesiology
Tokyo Medical University
Tokyo
Japan

Hiroki Iida
Anesthesiology and Pain Medicine
Gifu University
Tokyo
Japan

ISBN 978-4-431-54659-7 ISBN 978-4-431-54660-3 (eBook)
https://doi.org/10.1007/978-4-431-54660-3

Library of Congress Control Number: 2018968616

This Springer imprint is published by the registered company Springer Japan KK part of Springer Nature.
The registered company address is: Shiroyama Trust Tower, 4-3-1 Toranomon, Minato-ku, Tokyo 105-6005, Japan

Preface

An interventional therapy used in the pain clinic is the nerve block. The primary method used to acquire the skill in nerve block procedures has been to practice technique using landmarks.

However, radiography, computed tomography, and ultrasonography have recently been used to ensure accurate and safe performance of nerve blocks. These techniques allow visualization of needles and instruments using real-time images. Because the positional relationship between the needle tip and the anatomical target can be reproduced by imaging, novices can quickly and safely acquire procedural skills without relying on expertise, as required when using the landmark method.

Although Japanese pain clinic specialists are presumably highly skilled, dialogue with pain management specialists in other countries has been hampered by the lack of English language textbooks.

This English version of a Japanese textbook on interventional therapy for pain management was completed by courtesy of Springer Publishing.

We hope that this book will facilitate increased communication and exchange of knowledge with foreign students and physicians studying in Japan.

We also hope that this book will help Japanese pain clinic specialists to exchange knowledge on nerve block procedures with colleagues in other countries.

Tokyo, Japan — Kiyoshige Ohseto
Tokyo, Japan — Hiroyuki Uchino
Tokyo, Japan — Hiroki Iida

Contents

Part IV Head

Part V Neck

Part VI Shoulder and Upper Extremity

Part X Pelvis

Part XI Lower Extremity

Part XII Epidural Block

Part I

Introduction

Interventional Pain Treatment Using Nerve Block: Usefulness and Perspectives

1

Kiyoshige Ohseto and Hiroyuki Uchino

1.1 Introduction

Here, we introduce diagnostic nerve block, which is expected to become an important technique in the future, and we also describe its usefulness and perspectives. The goal of interventional treatment using nerve block is to make an accurate diagnosis of the pain and also to perform interventional therapy, such as injection of the appropriate drug in the vicinity of the nerves causing the pain, to achieve prompt pain relief. For this purpose, accurate identification of the damaged site and nerves is required. The nerve provocative test is always performed first to identify the damaged site. Second, the extent of sensory disturbance is estimated, i.e., paresthesia, from the neurological data. Moreover, if sensation in the region of pain is normal, the affected nerve is speculated based on the dermatome. On the other hand, if identification by the dermatome is difficult and the patient feels only motion pain, identification of the points of tenderness is important. The nerve causing the pain is sometimes located under the site of tenderness. First, to speculate the site of and the specific nerves causing the pain, a radiologist will sometimes be consulted for assistance in the interpretation of various diagnostic images, such as X-ray, magnetic resonance, computerized tomography, and ultrasound images. Second, a nerve block is performed to the nerve or joint site that was identified as being responsible for the pain, under fluoroscopy-guided method or ultrasound-guided method. The main aim of nerve block is to induce the same pain through the same nerves by drug injection through the block needle and then to check the disappearance of the pain by the injection of local anesthetics. This technique enables the clinician to make a functional diagnosis. The procedures of the neuroimaging and nerve block under X-ray fluoroscopy or ultrasound guidance described in this book enable neurofunctional identification of the nerves causing the pain, which has been difficult until now. Furthermore, if effective interventional treatment is performed for the targeted nerves or sites, long-term effects can be achieved. We would like all pain clinicians to become experts in the nerve block technique, by learning the procedures of each step, including diagnosis of the pain and estimation of the temporary effect of the nerve block, and then proceed to perform the interventional pain treatment to achieve favorable effects.

It is sometimes difficult to accurately characterize the pain using only pathological and morphological approaches. In such cases, functional diagnosis based on a nerve block is considered to play an important role in identifying the nerve causing the pain and its site, which could lead to a definitive diagnosis. If a diagnostic nerve block is applied for the treatment of pain that has been difficult to treat, this should lead to prompt pain amelioration.

The purpose of this book is also to assist in performing preventive analgesia and therapeutic nerve block effectively and safely. Furthermore, the most important point of this book is to open and establish new avenues for the concept of nerve block, through the introduction of accurate and safe procedures of the diverse types of diagnostic nerve block.

We sincerely hope that this book will contribute toward providing strategies of pain treatment to medical staff and patients who are interested in pain management.

1.2 Postscripts

The Japanese references are listed at the end of the Japanese (in Japanese) and relevant articles. We would like you to refer to the figures and pictures in the Japanese references.

K. Ohseto (✉) · H. Uchino
Department of Anesthesiology, Tokyo Medical University, Tokyo, Japan
e-mail: ohseto@tokyo-med.ac.jp

K. Ohseto et al. (eds.), *Nerve Blockade and Interventional Therapy*, https://doi.org/10.1007/978-4-431-54660-3_1

Interventional Treatments and Nerve Blocks

2

Kiyoshige Ohseto and Hiroyuki Uchino

2.1 Introduction

Our objective in writing this book is to describe procedural advances enabled by developments in medical technology and assistive devices. Benjamin Franklin called man a "tool-making animal," and indeed it is within our nature to continuously improve the tools we use as labor-saving or (for our purposes) medical devices.

Nerve block techniques have traditionally relied primarily on the landmark method in which surface anatomical features are used to determine the point of insertion. The practitioner's judgment and experience is then used to determine direction to target, the feeling of the inserted needle through the fingers, the feeling of needle against bone, and estimation of depth. All of these factors are taken into account along with desired efficacy and potential risks. In other words, it is an extremely demanding procedure requiring long practice and experience to master.

Advances in medical technology help evolve medical devices, including those which make nerve blocks more effective and safe than ever. For example, early-generation ultrasound devices used for guiding the needle in nerve blocks showed only fuzzy images of the needle. Recent improvements in both ultrasound and needles now show both the needle tip and surrounding anatomy clearly.

Advances in X-ray fluoroscopy-guided method have reduced radiation exposure levels while also allowing images to be analyzed in detail in bright rooms. CT-guided nerve blocks mean that the anatomy and position of the needle can be visualized in real time during the procedure. The cost of nerve blocks is in general very low; the procedure itself is the major component of the price as the drugs used are inexpensive. Total cost for a nerve block is considered lower than long-term drug treatment.

However, there are still many approaches to nerve blocks, and there is no book discussing best approaches for beginning practitioners to train with in order to attain mastery both rapidly and safely.

The Japan Society of Pain Clinicians has published interventional pain treatment guidelines, which are useful for making evidence-based choices among available interventional treatment methods, including nerve blocks.

It is our hope that this book will only prove more valuable going forward, as multicenter clinical studies and joint research projects will require a reference for selection of safe and effective standardized procedures.

Discussions of each nerve block procedure in this book are written by expert practitioners. Comments for each are then added by the supervisory editor for each section, with additional information such as technical tips and the best devices to use at each stage.

This book was also planned to serve as a reference for doctors in other countries, as well as a tool for aiding mutual understanding among practitioners and a study book for exchange students. It may also be useful for doctors traveling overseas as a tool for demonstrating and performing procedures. To fulfill all of these objectives, we are now planning a series of accompanying videos on the Internet.

Above all, we hope that this book will increase the safety and efficacy of nerve block procedures among current and future practitioners. We welcome any feedback about suggestions regarding the content of the book.

K. Ohseto (✉) · H. Uchino
Department of Anesthesiology, Tokyo Medical University, Tokyo, Japan
e-mail: ohseto@tokyo-med.ac.jp

K. Ohseto et al. (eds.), *Nerve Blockade and Interventional Therapy*, https://doi.org/10.1007/978-4-431-54660-3_2