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Editors

Nerve Blockade and Interventional Therapy

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 Springer

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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
Tokyo, Japan
Tokyo, Japan

Kiyoshige Ohseto
Hiroyuki Uchino
Hiroki Iida

Contents

Part I Introduction

- 1 Interventional Pain Treatment Using Nerve Block: Usefulness and Perspectives** 3
Kiyoshige Ohseto and Hiroyuki Uchino
- 2 Interventional Treatments and Nerve Blocks** 5
Kiyoshige Ohseto and Hiroyuki Uchino

Part II Overview

- 3 Definition** 9
Hiroki Iida
- 4 Purpose** 11
Hiroki Iida
- 5 Method for Evaluating Pain** 13
Hiroki Iida
- 6 Diagnosis** 15
Takahisa Nishiyama and Kiyoshige Ohseto
- 7 Apparatus** 17
Hiroki Iida and Motoyasu Takenaka
- 8 Drugs Used** 19
Naomi Hirakawa
- 9 Neurodestruction and Stimulation Approach** 23
Sei Fukui

Part III Feature of Each Technique

- 10 Landmark Method (Blind Method)** 29
Takahisa Nishiyama and Kiyoshige Ohseto
- 11 X-ray Fluoroscopy-Guided Method** 33
Hiroki Iida
- 12 Ultrasound-Guided Method** 35
Kiyoshige Ohseto, Naoto Iwase, and Hiroyuki Uchino
- 13 CT-Guided Method** 39
Hiroyuki Uchino, Yukihiro Ogihara, and Kiyoshige Ohseto
- 14 ME-Guided Method** 43
Sei Fukui

Part IV Head

- 15 Trigeminal Nerve Block** 49
Naomi Hirakawa, Yoshiki Imamura, and Kimimichi Otome
- 16 Gasserian Ganglion Block (Percutaneous Radiofrequency Trigeminal Rhizotomy)** 59
Yoshikazu Naganuma
- 17 Glossopharyngeal Nerve Block** 65
Hidekimi Fukui
- 18 Editors' Comment** 69
Kiyoshige Ohseto, Hiroyuki Uchino, Yukihiko Ogihara, and Hiroki Iida

Part V Neck

- 19 Occipital Nerve Block (Landmark, Ultrasound-Guided)** 73
Hiroyuki Nishie
- 20 Phrenic Nerve Block** 77
Yuko Yonekawa
- 21 Superficial Cervical Plexus Block (Landmark, Ultrasound-Guided)** 79
Hiroyuki Nishie
- 22 Stellate Ganglion Block** 83
Naomi Hirakawa, Motohiko Paku, and Natsuko Oji
- 23 Brachial Plexus Block (Landmark, Ultrasound-Guided, and Fluoroscopy-Guided Methods)** 91
Yoshihide Terada and Takahisa Nishiyama
- 24 Editors' Comment** 95
Kiyoshige Ohseto and Hiroyuki Uchino

Part VI Shoulder and Upper Extremity

- 25 Suprascapular Nerve Block** 99
Yuko Yonekawa
- 26 Dorsal Scapular Nerve Block (Landmark Method)** 101
Kumiko Hida
- 27 Axillary Nerve Block (Ultrasound-Guided Method)** 105
Yasuyuki Shibata and Michael J. Barrington
- 28 Peripheral Nerve Block of Upper Limb** 109
Ryohta Nishiyama and Hiroyuki Uchino
- 29 Shoulder** 113
Yosuke Usui
- 30 Shoulder Joint Block and Pumping (X-Ray-Guided)** 117
Hiroaki Yamagami

31	Radiofrequency Thermocoagulation of Shoulder Articular Branches (X-Ray-Guided)	121
	Hiroaki Yamagami and Yukiyo Shiomi	
32	Elbow	125
	Yosuke Usui	
33	Hand	129
	Yosuke Usui	
34	Comment	133
	Hiroaki Yamagami and Yukiyo Shiomi	
 Part VII Thorax and Back		
35	Intercostal Nerve Block	137
	Ryota Hamada, Syuhei Matuoka, Kiyoshi Hatakeyama, and Kiyoshige Ohseto	
36	Thoracic Paravertebral Block (Ultrasound Guidance Technique)	141
	Yasuyuki Shibata	
37	Thoracic Sympathetic Ganglion Block	145
	Hidekimi Fukui	
38	Endoscopic Thoracic Sympathectomy	151
	Yoichiro Abe	
39	Editor's Comment	155
	Kiyoshige Ohseto	
 Part VIII Abdomen and Back		
40	Celiac Plexus Block and Splanchnic Nerve Block (X-Ray Fluoroscopy-Guided, CT-Guided)	159
	Toshio Itabashi, Rikako Yamada, and Hiroyuki Uchino	
41	Superior Hypogastric Plexus Block (X-Ray Fluoroscopy-Guided, CT-Guided)	163
	Yutaka Tanabe	
42	Ilioinguinal Nerve Block	169
	Tatsuo Nakamoto	
43	Comment	173
	Kiyoshige Ohseto	
 Part IX Lumbosacral Region		
44	Ultrasound-Guided Lumbar Plexus Block	177
	Tatsuo Nakamoto	
45	Lumbar Sympathetic Nerve Block	181
	Tetsuya Sakai	

Part X Pelvis

- 46 Sacroiliac Joint Block (Ultrasound-Guided, X-Ray Fluoroscopy-Guided)** 189
Hisashi Date
- 47 Radio-frequency Thermocoagulation of Sacroiliac Articular Branches (X-Ray Guided): High-Frequency Thermocoagulation of the Sacroiliac Joints** 193
Toshio Itabashi, Takayasu Kakinuma, and Hiroyuki Uchino
- 48 Sacrococcygeal Joint Block (Fluoroscopy-Guided, Ultrasound-Guided)** 195
Kenji Shida
- 49 Ganglion Impar Block** 199
Yoichiro Abe
- 50 Intra-articular Injection of the Hip Joint** 201
Kunihiko Murai and Kiyoshige Ohseto
- 51 Radiofrequency Thermocoagulation of Hip Articular Branches (X-ray Fluoroscopy-Guided)** 205
Hisashi Date
- 52 Comment** 209
Yoichiro Abe

Part XI Lower Extremity

- 53 Lateral Femoral Cutaneous Nerve Block** 213
Natsuko Oji
- 54 Femoral Nerve Block** 217
Tatsuo Nakamoto
- 55 Sciatic Nerve Block** 221
Tatsuo Nakamoto
- 56 Saphenous Nerve Block (Landmark, Ultrasound-Guided Method)** 225
Masayuki Fukazawa
- 57 Tibial Nerve Block** 227
Saki Kamata
- 58 IRS** 229
Hitoaki Sato

Part XII Epidural Block

- 59 Thoracic Epidural Block (Landmark, X-Ray-Guided, and Ultrasound-Guided Methods).** 233
Keiko Mamiya
- 60 Lumbar Epidural Block** 241
Kenji Shida
- 61 Sacral Epidural Block** 245
Tadashi Tanoue
- 62 Comment** 249
Keiko Mamiya

Part XIII Epidural Intervention Therapy

63 Spinal Cord Stimulation	253
Takahisa Nishiyama	
64 Epidural Lavage and Nerve Block (X-Ray-Guided)	259
Kumiko Hida and Maya Hayashi	
65 Epiduroscopy	261
Takashi Igarashi and Hisashi Date	
66 Racz Catheter Percutaneous Epidural Neuroplasty (The Racz Procedure) ...	265
Koichi Mizuno and Ryosuke Naiki	
67 Comment	269
Takashi Igarashi and Youichiro Abe	

Part XIV Subarachnoid Block

68 Thoracic Subarachnoid Phenol Block (Landmark Technique, X-ray-Guided)	273
Masako Iseki	
69 Saddle Phenol Block (Landmark Technique)	277
Masako Iseki	
70 Lumbar Subarachnoid Block	279
Rie Hasegawa and Masako Iseki	
71 Pain Alleviation with Subarachnoid Opioid Injection	283
Masako Iseki	
72 Total Spinal Block (TSB)	285
Yutaka Masuda	
73 Comment	289
Masako Iseki	

Part XV Intervertebral Joint, Radiofrequency Thermocoagulation of Posterior Medial Branch

74 Cervical Facet Joint Block	293
Takahisa Nishiyama and Kiyoshige Ohseto	
75 Radiofrequency Thermocoagulation of Posterior Medial Branch of Cervical Spinal Nerve	299
Makoto Fukusaki	
76 Thoracic Facet Block	303
Hideki Toyokawa	
77 Radiofrequency Thermocoagulation of the Posterior Medial Branch of the Thoracic Spine (X-Ray Guided)	307
Keiichi Omote	
78 Lumbar Spine Facet Block (Ultrasound-Guided and X-Ray Fluoroscopy-Guided)	311
Keiichi Omote	

79	Radiofrequency Thermocoagulation of the Posterior Medial Branch of the Lumbar Spine (X-Ray Guided)	317
	Keiichi Omote	
80	Comment	319
	Keiichi Omote	
Part XVI Nerve Root Block (X-Ray-Guided, Ultrasound-Guided)		
81	Cervical Nerve Root Block	323
	Hisashi Date and Tomofumi Chiba	
82	Thoracic Nerve Root Block (X-Ray Guided)	329
	Masataka Ifuku and Masako Iseki	
83	Lumbar Nerve Root Block	335
	Hisashi Date	
84	Sacral Nerve Root Block (X-Ray Fluoroscopy-Guided Method, Ultrasound-Guided Method)	341
	Yoshihide Terada	
85	Comment	345
	Hisashi Date and Masako Iseki	
Part XVII Intradiscal Therapy (X-Ray-Guided, CT-Angiography)		
86	Cervical Disc Contrast Radiography and Block	349
	Hisashi Date and Mitsuhiro Ohata	
87	Thoracic Disc Block	353
	Hisashi Date	
88	Lumbar Disc Block	357
	Hiroaki Yamagami and Yukiyo Shiomi	
89	Disc Interventional Therapy	363
	Sei Fukui	
90	Comment	369
	Sei Fukui	
Part XVIII Intracentrum Therapy (X-Ray-Guided, CT-Angiography)		
91	Vertebral Body Perforation (Percutaneous Transpedicular Vertebral Body Perforation)	373
	Masahiro Ogihara	
92	Percutaneous Vertebroplasty (PVP)	383
	Kenya Kamijima and Ryota Yanaizumi	
93	Comment	387
	Masahiro Ogihara	

Part XIX Lower Limb and Joint

94 Knee	391
Yosuke Usui	
95 High-Frequency Thermocoagulation in the Knee	395
Hideki Toyokawa	
96 Foot	397
Yosuke Usui	
97 Comment	401
Yosuke Usui	

Part XX Motor Nerve (Landmark, Ultrasound)

98 Facial Nerve Block (FNB)	405
Yutaka Masuda	
Index	409

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.

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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.

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