



Sponsored by the
European Association of Neurosurgical Societies

Advances and Technical Standards in Neurosurgery

Edited by

L. Symon, London (Editor-in-Chief)

J. Brihaye, Brussels

F. Cohadon, Bordeaux

B. Guidetti, Rome

F. Loew, Homburg/Saar

J. D. Miller, Edinburgh

H. Nornes, Oslo

E. Pásztor, Budapest

B. Pertuiset, Paris

M. G. Yaşargil, Zurich

Volume 15

Springer-Verlag

Wien New York 1987



With 36 Figures

Product Liability: The publisher can give no guarantee for information about drug dosage and application thereof contained in this book. In every individual case the respective user must check its accuracy by consulting other pharmaceutical literature.

This work is subjected to copyright

All rights are reserved, whether the whole or part of the material is concerned, specifically those of translation, reprinting, re-use of illustrations, broadcasting, reproduction by photocopying machine or similar means, and storage in data banks

© 1987 by Springer-Verlag/Wien

Softcover reprint of the Hardcover 1st Edition 1987

Library of Congress Catalog Card Number 74-10499

Printed in Austria

ISSN 0095-4829

ISBN-13: 978-3-7091-7461-6

e-ISBN-13: 978-3-7091-6984-1

DOI: 10.1007/978-3-7091-6984-1

Preface

As an addition to the European postgraduate training system for young neurosurgeons we began to publish in 1974 this series devoted to Advances and Technical Standards in Neurosurgery which was later sponsored by the European Association of Neurosurgical Societies.

The fact that the English language is well on the way to becoming the international medium at European scientific conferences is a great asset in terms of mutual understanding. Therefore we have decided to publish all contributions in English, regardless of the native language of the authors.

All contributions are submitted to the entire editorial board before publication of any volume.

Our series is not intended to compete with the publications of original scientific papers in other neurosurgical journals. Our intention is, rather, to present fields of neurosurgery and related areas in which important recent advances have been made. The contributions are written by specialists in the given fields and constitute the first part of each volume.

In the second part of each volume, we publish detailed descriptions of standard operative procedures, furnished by experienced clinicians; in these articles the authors describe the techniques they employ and explain the advantages, difficulties and risks involved in the various procedures. This part is intended primarily to assist young neurosurgeons in their postgraduate training. However, we are convinced that it will also be useful to experienced, fully trained neurosurgeons.

The descriptions of standard operative procedures are a novel feature of our series. We intend that this section should make available the findings of European neurosurgeons, published perhaps in less familiar languages, to neurosurgeons beyond the boundaries of the authors countries and of Europe. We will however from time to time bring to the notice of our European colleagues, operative procedures from colleagues in the United States and Japan, who have developed techniques which may now be regarded as standard. Our aim throughout is to promote contacts among neurosurgeons in Europe and throughout the world neurosurgical community in general.

We hope therefore that surgeons not only in Europe, but throughout the world will profit by this series of Advances and Technical Standards in Neurosurgery.

The Editors

Contents

Listed in Index Medicus

List of Contributors	XIII
----------------------------	------

A. Advances

Stable Xenon CT/CBF Imaging: Laboratory and Clinical Experience. By H. YONAS, Department of Neurological Surgery, University of Pittsburgh, Pennsylvania (U.S.A.), D. GUR, Department of Radiological Imaging, University of Pittsburgh, Pennsylvania (U.S.A.), R. LATCHAW, Department of Radiology, Presbyterian University Hospital, Pittsburgh, Pennsylvania (U.S.A.), and S. K. WOLFSON, JR., Department of Neurological Surgery, Montefiore Hospital, Pittsburgh, Pennsylvania (U.S.A.)	3
Introduction	4
Methodological Considerations	4
Clinical Methodology	5
Xe/CT Study Procedure	6
Laboratory Validation	9
Clinical Experience	17
Other Clinical Uses	27
Limitations and Problem Areas	28
Conclusion	33
Acknowledgment	33
References	33
Physiological, Inflammatory and Neuropathic Pain. By C. J. WOOLF, Cerebral Functions Research Group, Department of Anatomy, University College London, London (U.K.)	39
Introduction	39
The Primary Afferent Neurone	41
Sensitization of Primary Afferents	44
Pathological Alteration to Primary Afferent Neurones	45
The Spinal Cord	48
The Dorsal Horn and Nociception	48
Acute Inflammation and the Spinal Cord	51
Neuropathic Pain and the Spinal Cord	53
Conclusions	55
References	56

Spinal Cord Stimulation for Spasticity. By J. GYBELS, Kliniek voor Neurologie en Neurochirurgie, Universitair Ziekenhuis "Gasthuisberg", Leuven (Belgium) and D. VAN ROOST, Neurochirurgische Universitätsklinik, Bonn-Venusberg (Federal Republic of Germany)	63
I. Spinal Cord Stimulation	64
1. Historical Review	64
a) Pain as the First Application of Spinal Cord Stimulation	64
b) Other Applications	65
2. Technical Development—Stimulation Parameters	65
3. Surgical Technique of Percutaneous Lead Implantation	67
II. Spasticity, a Synopsis	70
1. Definition—Anatomical Considerations	70
2. Experimental Approach	71
3. Physiological Considerations	72
4. Pathophysiological Approach	74
5. Biochemical Approach	76
6. Spastic Bladder Dysfunction	77
III. The Place of Spinal Cord Stimulation Among Other Treatments of Spasticity	77
IV. Results of Spinal Cord Stimulation in Spasticity	82
1. Experimental Results	82
2. Clinical Results	83
a) Previous Review	83
b) Recent Results	85
3. About the Working Mechanism	88
4. Complications	89
5. Concluding Remarks	89
References	89

B. Technical Standards

Dorsal Root Entry Zone (DREZ) Thermocoagulation. By D. G. T. THOMAS, Department of Neurological Surgery, Institute of Neurology, The National Hospital, London (U.K.)	99
Introduction	99
Physiological and Anatomical Basis for DREZ Lesions	100
Indications and Patient Selection	101
a) Pain in Plexus Avulsion Injury	101
b) Pain in Postherpetic Neuralgia	102
c) Chronic Pain in Traumatic Paraplegia	102
Preoperative Investigation	103
Myelography	103
Surgical Technique	104

Preparation and Positioning	104
Incision, Laminectomy and Dural Opening	105
DREZ Thermocoagulation	107
Closure	110
Peroperative Electrophysiological Methods	111
Postoperative Care	111
Complications	112
Results	112
References	113
Acute Surgery for Ruptured Posterior Circulation Aneurysms. By S. J. PEERLESS, S. NEMOTO, and C. G. DRAKE, Division of Neurosurgery, The University of Western Ontario, London, Ontario (Canada)	115
Introduction	115
Clinical Material	116
Surgical Management and Results	117
Basilar Bifurcation Aneurysms	117
Basilar Superior Cerebellar Artery Aneurysms	118
Vertebral-Basilar Junction Aneurysms	119
Vertebral Aneurysms	119
Posterior Cerebral Artery Aneurysms	120
Relationship of Preoperative Timing and Results	120
Aneurysm Size and Results	122
Incomplete Obliteration of the Aneurysm	123
Vasospasm	123
Discussion	125
References	128
Neuro-Anaesthesia: the Present Position. By DOREEN JEWKES, Department of Neurological Surgery, Institute of Neurology, The National Hospital, London (U.K.)	131
Physiological and Pathophysiological Considerations	132
Practical Aspects/Considerations	134
Induction	135
Etomidate	135
Propofol	135
Midazolam	136
Methaexitone	136
Relaxants Old and New	136
Suxamethonium	136
Tubocurarine Chloride	136
Atracurium Dibesylate	137
Vecuronium	137
Pancuronium	138

Inhalational Agents	138
Trichloroethylene	139
Halothane	140
Halothane Hepatitis	141
Enflurane	141
Isoflurane	142
Controlled Hypotension	144
Beta Blocking Drugs	144
Alpha Blocking Drugs	145
Trimetaphan	145
Direct Acting Vasodilators—Sodium Nitroprusside and Nitroglycerine ..	145
The Sitting Position and Air Embolism	147
Cardiovascular Changes in Posterior fossa Exploration	149
The Effect of Anaesthetic Drugs on Recordings of Evoked Potentials ..	150
Summary	151
References	151
Editorial Note	155
Controversial Views of the Editorial Board Regarding the Management of Non-Traumatic Intracerebral Haematomas	157
1. Was the average time of admission to a neurosurgical service after haemorrhagic stroke?	157
2. Are patients carried to hospital in an ambulance with special medical facilities?	157
3. With the patient in coma is early tracheal intubation advised by the ambulance staff with artificial ventilation if necessary? Is medical treatment carried out on the ambulance?	158
4. What routine investigations are employed in the case of supra-tentorial haematoma?	158
5. Should a lumbar puncture be performed?	158
6. In which case is early surgery, i.e., on 1st or 2nd day advised? Does this advice depend on the clinical condition or investigations or both?	159
7. If early surgery is to be performed is this done through a craniotomy, craniectomy or a burr hole aspiration?	159
8. If early surgery is performed are the clots partially or totally removed?	159
9. Do indications and technique vary with the location of the haematoma?	160
10. If there is blood in the ventricular system does this alter the indication for surgery and is external ventricular drainage performed?	160
11. Does the indication for early surgery vary with associated disease with age or with anticoagulant therapy?	160
12. When is early surgery contraindicated?	161
13. When early surgery is not performed what kind of monitoring and treatment do you advise?	161
14. When the patient has not been operated on in the early stage what would be your indications, if any, for delayed surgery?	161

15. In a patient, who has survived, and is conscious with a severe neurological deficit should liquid haematoma be removed and when?	162
16. Is angiography performed before the patient is discharged?	162
Cerebellar Haematomas	162
17. What is their frequency with respect to the supratentorial haematomas?	162
18. How do you establish the diagnosis?	162
19. Do you perform early surgery or only external ventricular drainage?	162
20. In the case of early surgery which position should be used for operation?	163
21. Should the whole haematoma be removed or only a part of it?	163
22. Are these haematomas more severe than the supratentorial ones?	163
Author Index	165
Subject Index	175

List of Contributors

- Drake, C. G., M.D., F.R.C.S.C., Division of Neurosurgery, University Hospital, 339 Windermere Road, London, Ontario N6A4 5A5, Canada.
- Gur, D., Sc.D., Department of Radiological Imaging, University of Pittsburgh, Pennsylvania, U.S.A.
- Gybels, J., M.D., Kliniek voor Neurologie en Neurochirurgie, Universitair Ziekenhuis "Gasthuisberg", B-3000 Leuven, Belgium.
- Jewkes, Doreen, M.D., Department of Neurological Surgery, Institute of Neurology, The National Hospital, Queen Square, London WC1N 3BG, U.K.
- Latchaw, R., M.D., Department of Radiology, Presbyterian-University Hospital, Pittsburgh, Pennsylvania, U.S.A.
- Nemoto, S., M.D., Division of Neurosurgery, University Hospital, 339 Windermere Road, London, Ontario N6A4 5A5, Canada.
- Peerless, S. J., M.D., Division of Neurosurgery, University Hospital, 339 Windermere Road, London, Ontario N6A4 5A5, Canada.
- Van Roost, Dr. D., Neurochirurgische Universitätsklinik, D-5300 Bonn-Venusberg, Federal Republic of Germany.
- Thomas, Dr. D. G. T., Department of Neurological Surgery, Institute of Neurology, The National Hospital, Queen Square, London WC1N 3BG, U.K.
- Wolfson, Jr., S. K., M.D., Department of Neurological Surgery, Montefiore Hospital, Pittsburgh, Pennsylvania, U.S.A.
- Woolf, C. J., M.D., Cerebral Functions Research Group, Department of Anatomy, University College London, Gower Street, London WC1E 6BT, U.K.
- Yonas, H., M.D., Department of Neurological Surgery, University of Pittsburgh, Pennsylvania, U.S.A.