

DR.NATH'S METHOD OF
BRACHIAL PLEXUS SURGERY
IN CHILDREN

儿童臂丛神经损伤

NATH 治疗学

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浙江科学技术出版社

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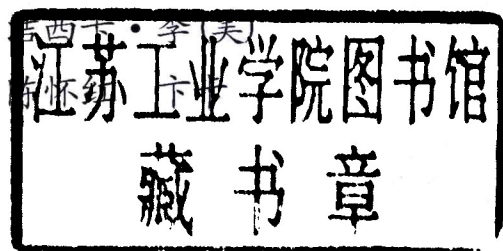
图

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图书在版编目(CIP)数据

儿童臂丛神经损伤 NATH 治疗学(英文) / Rahul K. Nath
(美) 著. —杭州: 浙江科学技术出版社, 2008. 10

ISBN 978-7-5341-3443-2

I. 儿… II. Nath… III. 儿童疾病—臂丛神经—损伤—治疗学—英文 IV. R722.14

中国版本图书馆 CIP 数据核字 (2008) 第 154676 号

书 名 儿童臂丛神经损伤 NATH 治疗学
著 者 Rahul K. Nath (美)

出版发行 浙江科学技术出版社
杭州市体育场路 347 号
邮政编码: 310006
电话: 0571-85170300-61703
E-mail: hsh2002poc@163.com

排 版 杭州大漠照排印刷有限公司制作
印 刷 浙江新华印刷技术有限公司
经 销 全国各地新华书店

开 本 787 × 1092 1/16
字 数 220 000
印 张 9.5
印 数 1 ~ 3 000
版 次 2008 年 10 月第 1 版
印 次 2008 年 10 月第 1 次印刷
书 号 ISBN 978-7-5341-3443-2
定 价 90.00 元

责任编辑 胡 水
责任校对 顾 均

封面设计 孙 菁
责任印务 李 静



Dr. Rahul K. Nath has treated nerve-injured patients from all 50 states and 26 countries. He founded the Texas Nerve and Paralysis Institute in 2004 with the goal of making it the best such organization in the world.

"To date, we have established a clinical, academic and research center that consistently aims for high quality in the area of peripheral nerve injury," he says. "This level of excellence comes about through the hard work and dedication of our institute members, as well as our associates. Our mission is to improve the quality of life for our patients through direct clinical care and basic science research. We feel that global communication and education are our responsibility and have set up national and international outreach clinics to help with this goal."

The Texas Nerve and Paralysis Institute employs several researchers who perform basic science and clinical outcome research. A patented synthetic DNA molecule to block scar production is in development and should allow improvements in the outcome of nerve and other injuries within the next few years. In addition to 2 USA patents for the DNA molecule, Dr. Nath has also received a patent for a nerve repair device. During his 12 years of practice, he has pioneered and improved surgical techniques. Dr. Nath is widely published and recently wrote the first textbook on management of brachial plexus injuries in children. He was recently profiled by People magazine and CNN for surgery he performed on an Iraqi child.

Focus: Complex Nerve and Brachial Plexus Injuries

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This book is dedicated...

*to my parents, Surrendra and Sushila (I hope you feel better soon,
Dad.)*

to my wife Usha (nothing happens without you)

to my children, Priya and Devin (the best ever)

to Joginder and Bala (also the best)

to Dr. Krishna Kumar and Shubha Kumar (both inspirations).

...I love you all

This book was written in collaboration with:

Dr. Kim L. Farina

Dr. Melia Paizi

Sonya E. Melcher

PREFACE

The Nath Method of Treatment of brachial plexus injuries in the newborn has arisen out of my experience of over 10 years and 5 000 patients. It relies on understanding the anatomic and physiologic bases for the most common abnormalities of function that arise from these injuries. Since the deformities that do arise are predictable given the nerves that are involved, it is most logical to present the basic scientific facts as a prelude to critically discussing management. I believe that knowing the root cause of a particular problem will allow a more comprehensive understanding of the reasons for a given treatment plan, rather than accepting it blindly. Clinical management consists of diagnosis and treatment and these will be discussed together, in Chapter 5, within the context of a simple question-and-answer format that should allow a clearer vision of how all the involved elements are integrated.

I have purposely kept the format simple and brief. The long-term plan is to add components to the initial monograph so that it will constantly evolve to reflect the most modern information and treatment protocols.

The overall perspective presented is a very personal one and does reflect my views on a very diverse field; others may disagree with some or all of what is presented. I believe that everything I do or say is based on the strongest evidence available. Everything is based on my own experience with management of several thousand patients as well as my observations of those managed by other doctors and centers.

I hope that this book will be useful to a wide variety of interested parties, and that the overall impact will be to improve the quality of life of children and adults who have suffered this injury. Many protocols presented are simple and straightforward and will allow application of the management plans to patients in developing countries where treatment is often not attempted because of the daunting complexity of some traditional surgical and therapeutic measures.

The overall theme of this book is simplicity. Far too many words on brachial plexus injury have been written and spoken based on inadequate information. It has been my experience that simple solutions offer the best results. I believe that the available evidence bears out this truth.

One keystone of my treatment protocols is the understanding that the shoulder is the most commonly affected element of the extremity and that effective management of the shoulder is critical to the overall outcome of limb function. The placement of the hand in space and the direction of biceps and triceps action are all influenced directly by the development and health of the shoulder.

Several additional important points regarding shoulder function are:

- (1) Vertical restrictions of movement are related to the presence of soft tissue abnormalities.

Contractures in the latissimus dorsi, teres major, pectoralis and other muscles of the axilla and chest are formed and adduction deformity of the shoulder is the result. Surgical management is required in significant cases and is aimed at release and transfer of contracted muscles.

(2) Horizontal restrictions of shoulder movement are related to the presence of bony abnormalities. Elevation and abnormal lateral rotation of the scapula develops due to rhomboid weakness and medial rotation of the humerus and arm is the result. Surgical management is required in significant cases and is aimed at release of the humerus from the abnormally placed scapula.

(3) The Scapula forms the cornerstone of glenohumeral joint development and health. An abnormally-situated scapula will influence the position and function of the arm and hand and result in severe developmental abnormalities of the joint. Treatment must be aimed at the scapula and its relationship to the humeral head within the glenoid fossa.

The impact of a major nerve injury on the developing limb cannot be underestimated, and the long-term sequelae of early derangements of growth are predictable and severe. The natural corollary of this statement is that early therapeutic and surgical intervention should result in improved adult quality of function and life. That is perhaps the most important message of this book, and I believe that long-term tracking of such patients will prove this statement.

I will welcome suggestions and comments for improving the contents and layout of the book. The current version does not contain detailed therapy and electrical stimulation information, but my experience has certainly been that both are critically important to achieve the best outcomes in patients with nerve injury. Future editions of the book will devote significantly more space to detailed descriptions of these modalities.

I would also like to point out the valuable resources available at my website: <http://www.drnathbrachialplexus.com>, including links to volunteers who have been through the processes and obstacles of dealing with a brachial plexus injury in their child.

<http://www.drnathbrachialplexus.com/vnu/index.php>

<http://www.drnathbrachialplexus.com/forum>

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序

Nath 法治疗新生儿分娩性臂丛神经损伤,是基于笔者十多年的临床经验和 5 000 多例病例的积累。由神经损伤所致的畸形是可以预知的,因此,应用现有的医学知识来探讨治疗方案的可行性十分必要。其中,解剖学和生理学知识是理解这类神经损伤所致功能异常的基础。笔者坚信,弄清楚一个特定疾病产生的原因,将会加深理解针对这一疾病所采取的治疗方案,避免盲从。分娩性臂丛神经损伤的临床处置包括诊断、治疗两个方面,有关内容将在第五章进行综合讨论,其中带有病例图片的问题式习题,将有助于检查对这类疾病认识与掌握的程度。

本书图文并茂,内容简洁明了,并不断在原有版本的基础上增加新的内容和治疗方案。

书中的观点是笔者个人对新生儿分娩性臂丛神经损伤的看法,其他专家可能会持有不同的观点。但本书介绍的内容,均源自笔者及其同事,以及同行专家对数千病例临床实践的总结,这些是最具有说服力的。

真诚希望本书对从事该领域工作,并对此怀有浓厚兴趣的同行们有所裨益。能帮助长期忍受这类疾病折磨的儿童,以提高他们的生活质量。与传统的治疗方案相比,本书介绍的方法简便易行,适合在发展中国家推广应用。

简明扼要是本书的一大特点。目前,有关分娩性臂丛神经损伤的论述大多内容繁杂且缺乏条理性。笔者的临床治疗经验是,简化的解决方案会取得最佳的疗效。这在临床实践中,也得到充分的证明。

本书所提出治疗方案的基本理论是:肩是影响整个上肢功能最主要的因素。肩的发育健康与否,将直接影响肱二头肌、肱三头肌运动和手的位置。此外,肩还具有以下主要功能:

(1) 肩垂直运动受限与软组织的异常有关。背阔肌、大圆肌、胸大肌及腋窝和胸部其他肌肉的挛缩均可导致肩内收畸形。对于严重病例,手术的目的是松解挛缩的肌肉。

(2) 肩水平运动受限与骨骼畸形有关。菱形肌肌无力将导致肩胛骨上移和侧旋异常,

表现为肱骨和上臂内旋。外科治疗的目的是恢复因肩胛骨位置异常导致的肱骨移位。

(3) 肩胛骨的结构是肩关节健康发育的基础。肩胛骨位置异常将影响臂和手的功能与位置,并导致肩关节畸形。临床治疗应着眼于肩胛骨以及肩胛骨与肱骨头在肩关节中位置关系的处理。

神经损伤对肢体发育的影响不可低估,而早期发育异常引起的远期后遗症具有可预见性。可以肯定,早期治疗和手术干预将改善患者成年后肢体的功能,并提高生活质量。希望本书能够为以上目标的实现提供帮助,相信患者长期随访的结果将会证实笔者的预言。

衷心希望各位同仁对本书提出宝贵意见,以利于今后的不断完善。尽管本书当前版本内容中没有涉及分娩性臂丛神经损伤的详细治疗方案以及电刺激疗法,但实践证明,这些治疗对患者的预后有着积极的影响,本书再版时将会用更多的篇幅详细介绍这方面的内容。

欢迎各位朋友与同仁光临笔者的网站:<http://www.drnathbrachialplexus.com>,在这里,您将会搜索到更多有价值的信息,并可以与一些有治疗和护理分娩性臂丛神经损伤经验的志愿者进行链接,以解决实际工作中遇到的问题。

<http://www.drnathbrachialplexus.com/vnu/index.php>

<http://www.drnathbrachialplexus.com/forum>

Rahul K. Nath, M. D.

于美国德克萨斯州休斯顿

FOREWORD

Brachial plexus injuries in the newborn are as diverse as the individual infants themselves. This is obvious when the anatomy of the brachial plexus is examined and seen to be as complex as any anatomical area in the human body. However, certain patterns do arise and if identified, can allow simplified diagnosis and, ultimately, treatment. The key to management of these injuries is pattern recognition. After that, therapeutic and surgical plans can be picked from a menu of available choices that suit the particular child and his or her patterns.

The structure of this book is therefore designed to present the anatomy the common patterns and the treatments that will benefit the large majority of affected children. An interested caregiver will come to understand and appreciate how anatomy dictates function and how restoration of anatomy is the key to good outcomes. Since anatomy is the basis for management, it will be apparent that certain such derangements are amenable to therapy and others are not. Unlike weakness, stiffness and abnormal motor patterns, contractures and bony deformities are not amenable to therapy alone.

All the elements of weakness, stiffness, abnormal movements, contractures and bony deformities can be expected and predicted in this population of patients because of one important fact; children at the time of birth grow at an exponential rate. Since growth is influenced by nerve supply, it is logical that growth impairment occurs with nerve injury in children, especially younger ones. In an adult, without growth issues, this degree of nerve injury might be trivial in many cases. In a newborn, even relatively minor nerve injuries will exact a toll in extremity growth and development. Another important factor is the asymmetry of nerve injury: usually the upper part of the brachial plexus is injured, while the lower part is less affected, resulting in asymmetric development of the extremity. This is what leads to contractures and bony deformities and an understanding of this point allows effective management of the injury.

前 言

由于人体臂丛神经解剖结构复杂,因而新生儿分娩性臂丛神经损伤的临床表现因人而异,多种多样。然而,通过对特定症状的鉴别,可以使诊断乃至治疗简单化。处理神经损伤的关键是确定其损伤的类型,然后根据每位患儿的特点,选择合适的治疗方法和手术方案。

为了便于理解,本书在设计上提供了解剖学图谱以及相应的治疗措施。通过对本书的学习,医护人员也将更进一步了解解剖结构对功能的影响,加深理解为什么结构的恢复是良好预后的关键。解剖学是治疗学的基础,能帮助我们确定哪些畸形可以通过治疗恢复,哪些不能恢复。我们知道,与肌无力、僵直及运动异常不同,肌肉挛缩和骨骼畸形需要采用综合的治疗方案。

各种原因造成的肌无力、僵直、运动异常、肌肉挛缩和骨骼畸形,对患者群体的影响是可以预知的,主要原因是:一定时期内的婴儿的出生率是固定的。机体的生长发育受神经支配的影响,儿童时期尤其是在婴幼儿时期的神经损伤,必然引起生长发育的缺陷。在新生儿期,即使是微小的神经损伤也会导致肢体生长发育的畸形;而在成人期,由于不存在生长发育的问题,所以这种损伤就显得微不足道了。此外,另一个重要因素是神经损伤的不对称性。臂丛神经上干是最常见的损伤部位,而下干较少累及,这样就造成上肢的不对称性生长发育,导致肌肉挛缩和骨骼畸形。因此,对这一问题的认识,有助于制订有效的治疗方案。

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