

Anesthetic Management for the Pediatric Airway

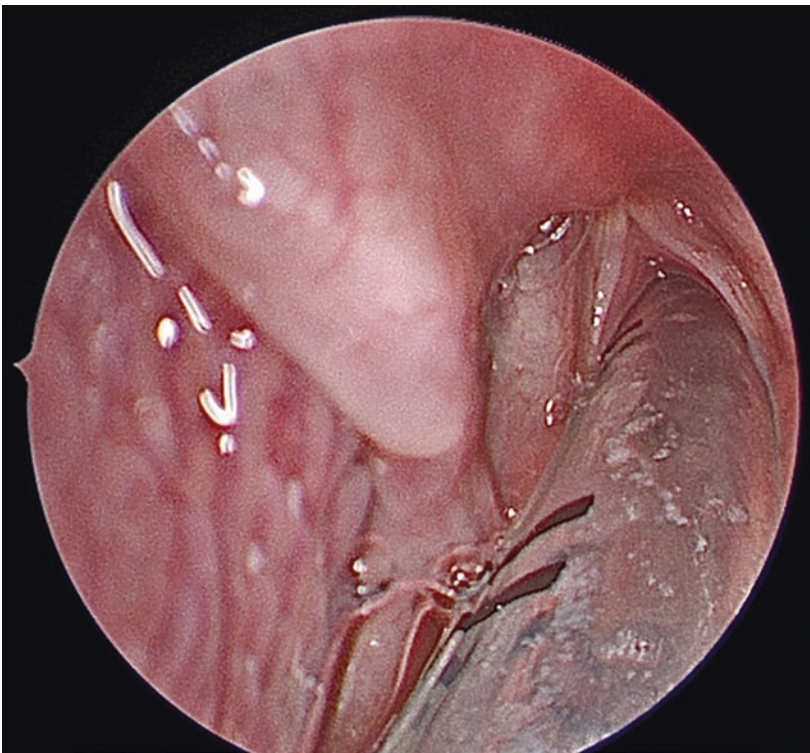
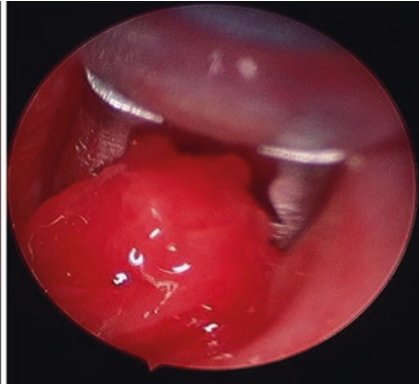
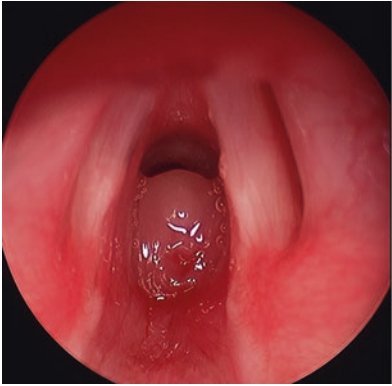
Advanced Approaches
and Techniques

Diego Preciado
Susan Verghese
Editors

 Springer

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This book is dedicated to all of our former and current teachers, colleagues and patients: Thank you all for enriching our lives!

Preface

The management of pediatric airway disorders has seen tremendous progress in surgical techniques and advancements over the past 30 years. From the introduction of novel endoscopic instrumentation, to improved open airway reconstructive techniques, the evolution of surgical approaches to improve outcomes in children with airway pathology has been substantial. Undoubtedly, many of these advances in surgical techniques have been fueled by dramatic refinements in optimal anesthetic management of children undergoing surgery in their airway. The textbook intends to be of great interest to both the pediatric anesthesiologist as well as the pediatric otolaryngology surgeon as it aims to combine the salient aspects of both specialties and describe the ideal and safe management of the pediatric patient undergoing anesthesia. Difficult airway scenarios; including subglottic stenosis, pharyngeal airway obstruction, laryngeal airway obstruction, obesity and sleep apnea, thoracic airway obstruction, among others will be covered in detail. To date there is no other leading textbook focusing primarily on the anesthetic management of children with these pathologies, yet often the anesthesiologist's level of expertise in these scenarios is as critical (if not more important than) the surgeon's. Chapters are by experts from both pediatric anesthesia and pediatric otolaryngology; focusing on scenarios where the skills and expertise of both specialists are being continually tested. This book will hopefully serve as a state of the art compendium of the anesthetic management of pediatric airway patients.

Washington, DC, USA

Susan T. Verghese
Diego A. Preciado

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Editor's Biography

Susan Thomas Verghese is a professor of Anesthesia and Pediatrics at Children's National Health System and George Washington University. She is a pediatric anesthesiologist who works at Children's National Medical Center in Washington, DC after completing her fellowship in pediatric Anesthesia in 1981. She earned her Bachelor of Medicine at Christian Medical College, Vellore, in Tamilnadu, India and her internship and residency in anesthesia at the Peter Bent Brigham Hospital in Boston, Massachusetts.

Dr. Verghese has authored numerous book chapters and contributed many scientific papers in anesthesia journals as well as served as a reviewer of manuscripts for many academic journals including Pediatric Anesthesia, Anesthesiology, Anesthesia and Analgesia, Critical Care Medicine and Urology. She is a member of the Editorial Advisory Board for Anesthesiology News.

She has been an invited speaker to many scientific pediatric anesthesia meetings held internationally in different parts of the world. For the last two decades, she was invited regularly to serve as a moderator and facilitator of the pediatric Anesthesia scientific sessions at the annual American Society of Anesthesiologists (ASA) and the International Anesthesia Research Society–(IARS) meetings in different cities USA and Canada. Her interest in creating and being a lead discussant in Problem Based Learning Discussion–(PBLD) sessions allowed her to help mentor junior staff to create and facilitate many such academic sessions at the ASA and the Society of Pediatric Anesthesia (SPA). Dr. Verghese has served at the ASA national leadership level as the Chair of the Scientific Abstract Review subcommittee on Pediatric Anesthesia from 2012 to 2014.

She has been active in the District of Columbia Society of Anesthesiologists (DCSA) in different capacities – serving as its president for 2 years (2006–2008) its delegate and alternate director to the ASA for a 3 year term and currently as its treasurer.

Above all, Dr. Verghese is grateful to God for the opportunity to serve as a caring pediatric anesthesiologist at CNMC in Washington, DC – a place she calls her “home” for the last 37 years.

Diego A. Preciado is a Professor with tenure at Children's National Health System and George Washington University. He serves as Vice-Chief of the Division of Pediatric Otolaryngology as well as Program Director of the

ACGME accredited pediatric otolaryngology fellowship at Children's National. His clinical practice is focused on pediatric airway reconstruction, childhood hearing loss/cochlear implants, and velopharyngeal insufficiency. He has authored over 100 vpeer-reviewed manuscripts, 10 book chapters and 2 edited books. An active basic science researcher, Dr. Preciado runs an otitis media translational laboratory funded through numerous intramural and extramural awards including R01, U01, and R21 grants from the NIH. Finally, he has served on numerous national committees including the American Society of Pediatric Otolaryngology Board of Directors and the Executive Committee for the Section of Otolaryngology of the American Academy of Pediatrics.



Evolution of Anesthesia for Pediatric Airway Surgery: From Ether to TIVA and Current Controversies

Susan T. Verghese

Evolution of Anesthetic Agents in Pediatric Anesthesia

General anesthesia revolutionized the practice of surgery in adults and children. The history of anesthesia from its humble origin to its present-day specialty is an incredible story of fearless pioneers and heroes who discovered new drugs and invented ingenious devices and novel routes to facilitate their delivery.

Surgery before the advent of anesthesia was a barbaric torture inflicted by bold speedy surgeons on hapless patients writhing in agonizing pain while being restrained by strong men.

The dawn of modern anesthesia begins with the discovery of two powerful inhalational agents: ether and chloroform – gases discovered within a year of each other [1–13].

In 1772, an English scientist and clergyman Joseph Priestley (1733–1804) discovered nitrous oxide, a year after he had discovered oxygen. The anesthetic and analgesic properties of nitrous oxide were not discovered until 1799 by an English scientist, Humphry Davy. He inhaled nitrous oxide gas as an experiment and to his surprise found that it made his body relax while making him giddy and cheerful forcing him to

laugh. After experiencing the euphoric effect of this exhilarating gas firsthand, he named it “laughing gas.” Although nitrous oxide had been used in dentistry since 1844, it lacked the anesthetic potency of diethyl ether in causing insensibility. On December 11, 1844, Horace Wells (1815–1848) a dentist and a pioneer in dental anesthesia tried to demonstrate for the first time albeit unconvincingly that the use of nitrous oxide could produce insensitivity to pain during a wisdom tooth extraction. This failed demonstration humiliated Wells, and he did not venture further to prove the effectiveness of other drugs in public even though he was experimenting with ether [4, 6]. However, this failure spurred him and others to search for a better agent. A fellow dentist William T. G. Morton (1819–1868) who was in attendance during the demonstration began investigating the effect of ether inhalation to produce insensibility for surgery. A knowledgeable chemist, Dr. Charles Thomas Jackson (1819–1868) who was a Harvard lecturer and a mentor, was able to guide him during his experiments with ether to produce a purified vapor of sulfuric ether [6].

On October 16, 1846, William T. G. Morton induced anesthesia with ether enabling John Collins Warren (1778–1856), a renowned surgeon and chief of surgery at Massachusetts General Hospital (MGH), to remove a vascular tumor from the neck of his patient, Edward Gilbert Abbott. This was the first public

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