Perioperative Considerations and Positioning for Neurosurgical Procedures

A Clinical Guide

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Foreword

"It wasn't raining when Noah built the arc."
Howard Joseph Ruff *(December 27, 1930–November 12, 2016), financial adviser and author of the investing newsletter The Ruff Times*

The importance of preparation and attention to detail in the field of neurosurgery cannot be overemphasized. Perhaps in no other endeavor of surgery is there so little tolerance for error.

In the history of medicine, the chapter on neurosurgery is among the most interesting. Archaeological evidence proves that humans were performing trephinations since prehistoric times. Despite the early genesis of surgery on the human skull and brain, the specialty of neurosurgery is a relatively recent evolutionary product of the broader field of general surgery. The field made little progress until Harvey Cushing established neurosurgery as a unique discipline in the twentieth century. Our specialty was limited by a poor understanding of pathology, archaic imaging of that pathology, primitive anesthesiology, limited intraoperative visualization, and marginal postoperative care.

The past few decades have witnessed dramatic improvements in all of these important facets of neurosurgical care: introduction of the operating microscope, mind boggling advances in neuroimaging, development of the subspecialty of neuroanesthesiology, introduction of neurocritical care, neuroendovascular therapy, neuromodulation and molecular biology, to name a few. Despite these remarkable advances, the practicing neurosurgeon must never lose sight of the basic surgical principles and details that often determine the outcome for our patients.

The attention to detail required for success in neurosurgery begins with patient selection and continues throughout the patient's hospital course and postoperative care. Once the decision for surgery has been agreed upon, every detail matters and proper preparation will influence the outcome. The natural tendency to focus on high-tech issues may create complacency and neglect of the basics.

The editors have provided the first monograph dedicated to the important, but often trivialized, issue of surgical positioning in neurosurgical procedures. This seemingly routine issue may have a profound influence on the outcome of an otherwise well-planned procedure.

Although certain standard positions are typically used for most common neurosurgical procedures, the positioning must be tailored to the individual patient body habitus and comorbidities. Selection of the appropriate

position must balance patient comfort, surgeon comfort, and a vast array of physiological issues and therefore must be tailored to the unique patient and their procedure.

The contributing authors have created an authoritative reference book that includes a balanced presentation of the positions commonly utilized in neurosurgery, alternative positions for unique situations, and a comprehensive discussion of the potential complications associated with all positioning options. This treatise should be read and studied by neurosurgeons of all levels of training and experience as well as those anesthesiologists who are so vitally important in determining the outcomes of our procedures.

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Preface

"I would like to see the day when somebody would be appointed surgeon somewhere who had no hands, for the operative part is the least part of the work."

—Harvey Cushing

If a neurosurgical patient isn't positioned well, it can make operating with both hands unfeasible for the surgeon. Neurosurgical positioning errors can make surgery difficult or impossible in a myriad of ways. Aside from making the pathology inaccessible, improper positioning can result in increased blood loss, cardiopulmonary complications, and herniation.

Patients undergoing a procedure at the hands of any type of surgeon must be positioned properly to allow access to the surgical pathology and to keep the patient safe during the procedure. Most surgical specialties involve one or two "standard" and well-described positions that allow surgical access. In some surgical specialties, positioning requires consideration as a means of minimizing blood loss. Some surgical specialties must even give consideration to positioning with regard to using gravity as a means of minimizing retraction on eloquent tissues. Neurosurgery requires that we consider all of these factors and how they are impacted in a number of different positions.

The neurosurgeon is confronted with variations in pathology that are constantly requiring adjustments to "standard" positions. Thus, a full working knowledge of how to position patients to achieve the above desired goals, the expected results of the applied position, the complications of the applied position, and means of minimizing and/or avoiding those complications is necessary. This working knowledge must incorporate existing recommendations and guidelines and be applied with a reciprocal knowledge of the operating room nurses and anesthesia personnel for maximum surgical benefit with minimum surgical complications. As certain positions are infrequently used and operating room personnel and anesthesia providers are often changing, the neurosurgeon can sometimes find themselves the party most acquainted with the position and its attendant risks and benefits.

Our intent is that this work helps to advance the understanding of neurosurgical positioning and improve the safety of surgery for neurosurgical patients.

This book owes a great debt to Dr. John Martin and Dr. Mark Warner for their pioneering work in the three editions of *Positioning in Anesthesia and Surgery*.

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