Imaging Acute Neurologic Disease

A Symptom-Based Approach

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Contents

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Preface

Acute neurologic diseases encompass a wide spectrum of medical illnesses with neurological manifestations which require rapid clinical, paraclinical, and laboratory evaluation as patients are assessed in the emergency department or acute care clinics. In the last decade, imaging has assumed far greater importance in the initial assessment of these patients, and is responsible for much of the cost and resources in the early, critical evaluation. However, the optimal approach to utilization of imaging for thorough, yet efficient and cost-responsible, care remains poorly defined for many acute neurologic presentations.

Many radiologic texts provide an invaluable overview of the many important details of the pathology of neurologic disease. But patients present to the emergency room or clinic with symptoms which typically are thoughtfully considered and guide the clinician through a decision-making process that ultimately determines the type, order, and priorities for further testing, including imaging when indicated. We have therefore prioritized a symptom-based approach to imaging in acute neurologic disease, based on the practice parameters developed by experts in the field, combining expert clinicians and imagers for each chapter. The task of developing symptom-based imaging algorithms is not always straightforward, and it is recognized that there are many potential variations in approach that are equally valid. The reader will observe that each team of authors has developed a personalized approach to the question based on their practice pattern and expertise. The approaches described in each chapter should provide a framework that we hope can be utilized by the reader to refine their approach, suggest alternative pathways, or encourage and stimulate discussion in the clinical and imaging circles that can ultimately result in more optimal clinical care. While the imaging details and differential considerations are not meant to be comprehensive, we hope that imagers will also benefit from this symptom-centric approach to disease; in the reading room evaluation always starts with consideration of history, symptoms, and signs, and imaging is an interactive process that benefits from repeated clinical input, especially in complex and unusual neurological presentations.

Currently, conventional computerized tomography (CT), magnetic resonance imaging (MRI), and nuclear medicine techniques are used to facilitate diagnosis, therapeutic decisions, to provide information regarding prognosis, and to monitor therapy response. Furthermore, the advent of quantitative CT and MRI techniques, notably diffusion and perfusion imaging, have introduced new opportunities for diagnosis of neurological diseases on the basis of objective findings. The improved and more advanced techniques offer unique anatomical as well as pathophysiological information that provides insight into neurological diseases. However, the practical value of various neuroimaging techniques in routine clinical practice in an individual patient is not as yet well defined.

The scope of this book is designed to provide a comprehensive survey of best practice for experienced clinicians and imagers as well as resident housestaff in fields such as emergency medicine, neurology, radiology and neuroradiology, neurosurgery, and critical care. The symptom-based imaging aims to guide the emergency physician in the choice of imaging tools for a correct and cost-efficient diagnosis of the common and complex neurological disorders. The integrated approach to examination algorithms includes the most common symptoms likely to be encountered in the emergency or acute care setting, ranging from global symptoms such as headache and syncope through focal neurologic symptoms such as hearing loss and paralysis. It should be emphasized that this volume is designed to provide practical algorithms and guidelines for the emergency setting. The work is not intended to discuss all possible differential diagnoses, their pathogenesis, and immediate management or treatment. For many neurologic conditions, final diagnosis is in fact not achieved in the initial or emergency department evaluation.

Preface

The organization of the book is such that the first three chapters consider evaluation of patients with altered states of consciousness: delirium, agitation, and intellectual dysfunction. The subsequent two chapters are concerned with assessment of patients with pain, a common presenting complaint for patients in an emergency department. The remaining chapters examine the frequent acute neurological complaints which are secondary to brain damage and manifest as either focal or multifocal neurological presentations. Approaches to symptoms suggestive of involvement of the spinal cord and peripheral nervous system are also considered.

Our hope is that this volume is appreciated as a comprehensive source of information and also provides an educational framework for trainees and a reference for practicing neurologists and radiologists seeking direct and authoritative answers to questions. We have encouraged authors to introduce illustrative and tabular material, including flow charts. We hope that readers will find this issue of practical relevance and a stimulus to more in-depth reading and investigation in this field.

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