

Contents

Preface: Hot Topics in Emergency Radiology

xv

Jennifer W. Uyeda and Scott D. Steenburg

Multi-Energy CT Applications: Problem-Solving in Emergency Radiology

1

Jeremy R. Wortman and Mara Kunst

Multi-energy computed tomography is a technology that is being increasingly used in the emergency room (ER) setting and has many applications that can impact patient care, including virtual monoenergetic imaging and material-specific imaging. It is important for radiologists to understand this technology, and how it can be optimally used in the ER setting.

Multienergy Computed Tomography Applications: Trauma

23

Hei Shun Yu, Abhishek Keraliya, Sachiv Chakravarti, and Jennifer W. Uyeda

Computed tomography (CT) plays an important role in trauma because imaging findings directly impact management. Advances in CT technology, specifically multienergy CT, have allowed for simultaneous acquisition of images at low and high kilovolt peaks. This technique allows for differentiation of materials given that materials have different absorption behaviors. Various multienergy CT postprocessing applications are helpful in the setting of trauma, including bone subtraction, virtual monoenergetic imaging, iodine-selective imaging, and virtual noncontrast imaging. These techniques have been applied from head to toe and have been used to improve image quality and increase conspicuity of injuries, which increases diagnostic confidence.

The Use of Enteric Contrast in the Emergency Setting

37

Mohamed Z. Rajput, Suraj Kapoor, Alec J. Wright, Daniel D. Friedman, Michael N. Patlas, and Vincent M. Mellnick

Historically, computed tomography of the abdomen and pelvis had been performed routinely with enteric contrast to help improve diagnostic accuracy. However, the utility of enteric contrast has been called into question recently, particularly in the high-patient-volume setting of the emergency department. This article reviews the role of enteric contrast in the emergency setting. Particular emphasis is given to specific clinical scenarios in which enteric contrast provides value. These include the identification of abdominal postsurgical complications such as anastomotic leaks and fistulas, detection of penetrating bowel injuries, evaluation of acute appendicitis, and assessment of small-bowel obstructions.

Update on the Role of Imaging in Detection of Intimate Partner Violence

53

Anji Tang, Andrew Wong, and Bharti Khurana

Intimate partner violence (IPV) is a major public health problem with adverse health and mental consequences. Patient- and clinician-related barriers to screening include underreporting, misattribution of IPV to other causes, and patients not seeking help or facing social stigmas and discrimination. Radiology may help overcome these barriers through objective imaging evaluation, noting mismatches between image findings and provided clinical history. Recognizing injury patterns specific to IPV on imaging aids early identification and intervention even when the patient is not forthcoming. This article examines the ways radiologists have adapted to meet an ever-increasing demand for diagnosis and reporting of IPV.

Elder Abuse

65

Mihan Lee, Aisara Chansakul, Jessica A. Rotman, and Anthony Rosen

Elder abuse, defined as “harm inflicted on an older person in a relationship where there is an expectation of trust, and/or when the person is targeted based on age or disability,” can be challenging for clinicians to identify. Radiologists can help raise appropriate suspicion for elder abuse based on a patient’s imaging. This article reviews common distributions and radiographic patterns of injury sustained in physical elder abuse. It also discusses limitations and unique challenges to the radiologic assessment of elder abuse, including issues of communication with frontline providers, and broad overlap in the appearance of abusive and accidental injuries in the setting of old age and deconditioning.

Oncologic Emergencies in the Head and Neck

71

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Patients with head and neck cancers are susceptible to emergencies related to tumor infiltration, systemic disorders, or treatment. Computed tomography plays a major role in imaging assessment and MRI provides further characterization. Hematologic disorders may lead to hemorrhage, thrombosis, or ischemia. Patients are susceptible to metabolic derangements that are often not recognized. Complications in the neck are threatening due to compromise of vascular structures and airway.

Oncologic Emergencies in the Chest, Abdomen, and Pelvis

91

Lokesh Khanna, Daniel Vargas-Zapata, Christine ‘Cooky’ Menias, and Venkat Katabathina

Oncology patients can present with acute, life-threatening conditions that may arise either due to underlying malignancy or secondary to cancer therapy. Select oncologic emergencies show characteristic imaging findings on radiographs, ultrasound, computed tomography, and MRI that helps in timely diagnosis. Radiologists need to be aware of typical imaging findings in such patients in an emergency setting and should be able to guide the clinicians for proper patient management. Appropriate knowledge of the treatment and its timing is pivotal in diagnosing treatment-related complications.

Starting an Emergency Radiology Division: Scheduling and Staffing, Compensation, and Equity and Parity

111

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Establishing an emergency radiology division in a practice that has long-standing patterns of operational routines comes with both challenges and opportunities. In this article, considerations around scheduling and staffing, compensation, and equity and parity are provided with supporting literature references. Furthermore, a panel of experts having established, grown and managed emergency radiology divisions in North America and Europe share their experiences through a question and answer format.

Understanding Ballistic Injuries

119

Noah Ditkofsky, Jaykumar Raghavan Nair, Yigal Frank, Shobhit Mathur, Bipin Nanda, Robert Moreland, and Jessica A. Rotman

Understanding the pathophysiology of a disease allows physicians to make a diagnosis, alter its natural course, and develop and implement appropriate preventative

and management strategies. With ballistic injuries, an understanding of how the mechanism of injury translates to the injuries observed makes it possible to make sense of what can, at times be a complex imaging appearance and mitigate against the long-term complications of gunshot wounds. In this article, the authors describe the different types of ballistic projectiles, their mechanism of injury as well as the injury patterns they cause. In addition, both lead arthropathy and MR imaging safety in patients with retained ballistic debris are discussed.

Imaging of Trauma in Pregnancy

129

Devang Odedra, Vincent M. Mellnick, and Michael N. Patlas

A pregnant patient with acute trauma is not commonly encountered by clinicians and radiologists. A multidisciplinary approach is key. Although radiography and ultrasound examination are frequently used modalities in the setting of maternal–fetal trauma, the fear of radiation should not preclude from carrying out a thorough diagnostic workup of the patient with a computed tomography scan. MRI mainly serves as a problem solving and follow-up modality. After stabilizing the mother, fetal well-being should be assessed with external fetal monitoring and a dedicated obstetric ultrasound examination. Radiologists should be familiar with the sonographic and computed tomography findings of catastrophic entities.

Computer Tomography Angiography of Peripheral Vascular Injuries

141

Fabio M. Paes and Felipe Munera

Peripheral vascular injuries are a rare finding in the setting of trauma but an important source of morbidity and mortality when present. Fast and accurate diagnosis followed by rapid repair of vascular injuries are important for achieving the best clinical outcomes. The advancements in computer tomography (CT) and decades of experience in vascular imaging have allowed radiologists to become important contributors for the diagnosis and characterization of peripheral vascular injury. We review the epidemiology of peripheral vascular injuries, indications for imaging, ways to optimize CT technique, imaging findings, and common challenges for accurate diagnosis of such injuries.

Imaging of Soft Tissue Infections

151

Ninad Salastekar, Andres Su, Jean Sebastien Rowe, Aravind Somasundaram, Phillip K. Wong, and Tarek N. Hanna

Although superficial infections can often be diagnosed and managed clinically, physical examination may lack sensitivity and specificity, and imaging is often required to evaluate the depth of involvement and identify complications. Depending on the area of involvement, radiography, ultrasound, CT, MR imaging, or a combination of imaging modalities may be required. Soft tissue infections can be nonnecrotizing or necrotizing, with the later having a morbid and rapid course. Infectious tenosynovitis most commonly affects the flexor tendon sheaths of the hand, characterized by thickened and enhancing synovium with fluid-filled tendon sheaths.