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Computed tomography is not the most frequent radiologic imaging procedure, but is arguably the most important in terms of clinical impact. CT is used extensively for emergencies, cardiovascular, pulmonary, gastrointestinal, endocrine, neurological, orthopedic and other applications - often as the first and only imaging procedure needed for diagnosis. The chances are very high that a patient will have a CT scan in the emergency department, as an outpatient or as an inpatient for a multitude of indications - pain, trauma, suspected infection or malignancy, and frequently to clarify or resolve a question raised by another abnormal test, such as an EKG abnormality or ultrasound finding. Despite the universality of CT in hospitals and clinics as well as free-standing imaging centers, the technology continues to evolve with greater coverage, faster acquisition and multienergy sources or detectors. The most demanding imaging applications are cardiovascular, where complex motion and small morphologic features coexist, so imaging methods that are very satisfactory elsewhere in the body may not be successful. Clinical cardiac CT consists of administering toxic materials, e.g., contrast media, while monitoring the EKG and illuminating the body with high brightness x-rays. Larger area detectors and higher frame acquisition rates are welcome improvements, but don't solve all of the problems encountered with variability due to respiratory, random body, and cardiac motion, especially in a spectrum of patients from infant to massively obese adult sizes (< 1 kg to 250 kg or more). The challenges and pitfalls in CT will be delineated and evaluated relative to current and future technology.