

## Imaging investigations in trauma patient

Only essential radiographic investigations are ordered during this period (Never send unstable patient for imaging). These tests can provide critical data regarding injuries sustained in a trauma, but their performance should not get in the way of ongoing physical examinations and interventions.

### Plain radiography

#### Blunt trauma

Patients who have sustained blunt trauma with major energy transfer require chest and pelvic radiographs. If time permits and the patient is stable, a formal three-view cervical spine series (lateral, anteroposterior, and odontoid) should be obtained. If there is not any evidence of spinal or pelvic injury, an upright chest x-ray should be obtained because it provides crucial information with regard to hemothorax, pneumothorax, mediastinal widening, and subdiaphragmatic gas that sometimes cannot be gleaned from a supine film. Finally, plain radiographs should be obtained of any area of localized blunt trauma, especially if fractures are suspected on the basis of physical exam.

#### Penetrating trauma

Patients who have sustained penetrating injuries require regional plane radiographs to localize foreign bodies and exclude perforation of gas-filled organs (e.g., intestines, lungs). When these films are being obtained, all entrance and exit sites should be identified with a radiopaque marker. This technique gives insight into the trajectory of the penetrating object and the potential organs injured.

#### Trauma ultrasonography

Many trauma centers now employ focused abdominal sonography for trauma (FAST) as an initial radiographic screening evaluation for all trauma following the primary survey. As the name implies, it is a focused examination designed to identify free intraperitoneal fluid and/or pericardial fluid. An ultrasound machine is used to take multiple views of six standard areas on the torso: (1) right paracolic gutter, (2) Morison pouch, (3) pericardium, (4) perisplenic region, (5) left paracolic gutter, and (6) suprapubic region. Free fluid in the abdomen and within the pericardium appears anechoic. FAST has many advantages: it is portable, rapid, inexpensive, accurate, noninvasive, and repeatable. Its disadvantages include operator variability as well as difficulty of use in morbidly obese patients or those with large amounts of subcutaneous air. It is most useful in evaluating patients with blunt abdominal trauma, especially those who are hypotensive. It may not be as useful in evaluating children or patients with penetrating trauma. It is important to note that if a FAST exam is negative, it does not exclude major intra-abdominal injury. Finally, some trauma centers are using sonography to evaluate the thorax for traumatic effusions and pneumothoraces.

#### Computed tomography (CT)

Occasionally, a severely injured patient may require immediate CT evaluation before completion of the secondary survey. For example, patients with severe head injury in whom a compressive intracranial lesion is suspected should

undergo emergent CT evaluation to rule out an operable (and potentially lifesaving) condition (e.g., epidural or subdural hematoma). In general, however, the use of CT scan for evaluation of the abdomen or pelvis has become a standard of care, and the availability of more rapid scanners has allowed for the development of protocols in some centers that call for the scanning of trauma patients with a complete body scan (i.e., head, cervical spine, chest, abdomen, and pelvis). Radiology investigation protocols for the trauma setting continue to evolve but usually remain dependent on the availability of equipment and skilled technicians or radiologists in any particular institution.

*Muqdad fuad*