Computed tomography-guided screw fixation of a sacroiliac joint dislocation fracture: a case report

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Abstract  A 19-year-old woman sustained a vertical shear type pelvic fracture. Sacroiliac fixation using computed tomography (CT)-guided cannulated screws was performed for a left sacroiliac dislocation fracture, and a satisfactory result was obtained over time. Patients who have posterior instability of the lateral compression or vertical shear type do not obtain adequate stability by fixation of the anterior part alone; and they often have persistent residual pain, necessitating internal fixation of the posterior part later. Advantages of CT-guided sacroiliac screw fixation include precise evaluation of the degree of reduction and absence of nerve and vascular damage during the time the screw is inserted into the sacral body. This procedure is a useful, safe method owing to its minimal invasiveness in patients with unstable pelvic fractures that are reducible by manual manipulation or traction.

Key words Dislocation of sacroiliac joint · CT-guided · Sacroiliac screw fixation

Case report

A 19-year-old woman complained of pain in the buttocks. She had collided with an automobile while riding her bicycle, fell down, and sustained an injury on August 22, 2001. She was quickly brought to our hospital by ambulance. Upon arrival, the patient was alert but in a preshock state with her SaO₂ at 90% and systolic pressure at 70 mmHg. She complained of severe pain from the left hip to the buttock, and swelling was evident. Slight internal rotation and shortening were observed in the lower left leg.

A radiograph of the pelvis showed a left lateral process fracture of the fifth lumbar vertebra, dislocation-fracture of the sacroiliac joint, and bilateral ischiopubic fracture. The left ilium was displaced to the cephalad side relative to the sacroiliac joint, and a vertical shear type pelvic fracture was noted (Fig. 1). Also observed were dislocation and fracture of a right index finger proximal interphalangeal (PIP) joint, open dislocation of the metaphalangeal (MP) joint of the right middle finger, and fracture of the proximal phalanx of the right ring finger. CT scans showed internal rotation and cephalad displacement of the ilium and separation of the sacroiliac joint (Fig. 2). Pneumothorax of the right lung was also noted following bilateral lung contusion.

Based on these findings, the patient was admitted to the hospital on the same day and underwent thorough examination of her general condition, including measures for hemorrhagic shock, reduction of finger dislocations on the right hand, and closure of open wounds. Skeletal traction of the left femur was performed. Radiographs obtained on August 24 showed that under 8 kg of skeletal traction there remained slight internal rotation of the ilium, although the cephalad displacement had been reduced. On August 27, under axillary block anesthesia, the volar plate of the right middle finger was repaired, and the fracture of the proximal phalanx of the right ring finger was fixed with wires.
Circulatory dynamics and the lung contusion improved; and on September 12, under spinal anesthesia, CT-guided percutaneous fixation of the sacroiliac joint by cannulated screws was performed.

Manipulation by skeletal traction was applied in a prone position, and the degree of reduction was verified by CT. Angiographic catheters were affixed at 1-cm intervals from the posterior iliac spine parallel to the body axis as markers. The place, angle, and depth of the guide pin to be inserted were measured by the markings (Fig. 3a). Under local anesthesia, two cannulated screw guide pins were inserted while a surgical staff member kept the fracture in the reduced position. CT was performed with the needle used for local anesthesia kept in place; and after verifying the proper insertion direction, a guide pin was inserted along the needle. The proper insertion direction was confirmed by subsequent CT, where the guide pin passed through the sacroiliac joint (Fig. 3b). The indwelling screw length was measured. While still in the prone position, the patient was transferred to the operating room, where 5.0- and 6.5-mm cannulated screws with washers were inserted under spinal anesthesia (Fig. 4). The screw insertions were performed under an image intensifier, and the screws were inserted at least 1 cm (by measurement). The entire procedure took 30 min with little blood loss.

Three weeks after surgery the patient was allowed to move about in a wheelchair. After 4 weeks, non-weight-bearing gait was permitted followed by partial weight-bearing gait at 6 weeks and full weight-bearing at 10