Pelvic insufficiency fractures are fairly common in elderly patients and can be a source of major functional impairment, particularly when they involve the ilium. Early rehilitation with adequate pain relief has been the traditional method of treatment. The recently developed S2 alar iliac technique involves placing pelvic fixation into the ilium through a pathway from the sacral ala. The bony channel between the second dorsal sacral foramen and the anterior inferior iliac spine is used to provide rigid sacropelvic fixation for adult and pediatric spine deformities. The authors describe a new minimally invasive approach that allows percutaneous stabilization of an iliac fracture with 2 S2 alar iliac screws. A 65-year-old woman with a history of rectal carcinoma that was treated with pelvic radiation had an iliac stress fracture that progressed to nonunion. Extensive nonoperative treatment was unsuccessful, and the patient continued to have symptoms 5 years after the initial diagnosis. An open approach vs a minimally invasive technique was debated. The S2 alar iliac screws were used to stabilize the fracture through a minimally invasive approach. Most of the symptoms resolved in 2 months, with radiographic evidence of union at 6 months. To the authors’ knowledge, this report is the first to describe a percutaneous approach for stabilizing iliac insufficiency fractures. This technique provides a safe surgical option for treating iliac stress fractures in some patients for whom nonoperative treatment fails while avoiding the complications and soft tissue compromise associated with open procedures. Longer follow-up and a larger series are needed to show the safety and efficacy of this technique.
Pelvic insufficiency fractures, which can cause major functional impairment, are typically located in the body of the pubis (parasymphysis) or the sacral ala, or both. Elderly patients with these fractures can use substantial health care resources. The treatment is predominantly nonsurgical and may include hospitalization for pain management and progressive mobilization. To the authors’ knowledge, there are no reports of internal fixation to treat this problem. However, percutaneous sacropelvic fixation with screws placed through the ala of the sacrum into the ilium was recently described; the technique consists of finding a pathway from the sacrum into the ilium with fluoroscopic guidance. The current article reports 1 patient who was successfully treated with this technique.

CASE REPORT

The patient agreed to have information about the case submitted for publication. A 65-year-old woman with a history of metastatic rectal carcinoma was referred for evaluation of an iliac insufficiency fracture. Five years previously, she underwent a hemicolectomy followed by radiation therapy. Extensive nonoperative treatment with protected weight bearing, physiotherapy, calcium, and vitamin D3 supplementation did not improve her pain, and there was no evidence of radiographic healing. At presentation, she ambulated with a cane and was taking narcotic pain medications daily. Pelvic computed tomography (CT) scan showed a fracture extending through the right iliac bone into the sacroiliac joint, with cystic changes consistent with nonunion (Figure 1). Treatment with osteoblastic-activity–enhancing medication, such as teriparatide, was contraindicated by the patient’s history of cancer. Because of the morbidity and poor outcome associated with open treatment of nonunited pelvic fractures, the authors elected to stabilize the fracture with a percutaneous technique.

Under fluoroscopic guidance, with the patient on a Jackson table (Mizuho OSI, Union City, California), a 2.5-cm midline incision was made in the skin opposite S2 (Figure 2). A Jamshidi needle (Manan Medical Device Technologies, Inc, Gainesville, Florida) was used to find the starting point in line with the second dorsal foramen. The needle was advanced, and a teardrop view confirmed its position in the middistal part of the teardrop. This fluoroscopic view, used in transiliac screw insertion, is a combined Judet obturator oblique and outlet view that results in overlap of the anterior and posterior superior iliac spines (Figure 2). A guide-wire was introduced through the needle; this step was repeated to insert a second wire parallel and proximal to the first. A 7-mm cannulated tap was used over the distal guidewire across the fracture, followed by an 8-mm tap to prepare the pathway of the screw. Two 9×100-mm screws were placed, starting with the distal screw, providing rigid fixation across the fracture line. A short rod was placed to connect the 2 screws (Figure 3).

On postoperative day 1, the patient was allowed to bear weight as tolerated with a cane and was discharged home on oral therapy.
pain medication. At the 2-week follow-up visit, the patient’s pain had diminished by approximately 50% and her medication requirements had decreased by more than 50%. At 6 weeks, the pain had completely resolved and the patient had returned to her previous work. At 9 months, she remained pain-free, with no activity restrictions, and CT scans showed a united fracture (Figure 4).

DISCUSSION

Pelvic insufficiency fractures are common in elderly patients; predisposing factors for iliac insufficiency fractures are osteoporosis, rheumatoid arthritis, steroid therapy, and previous pelvic irradiation.2,9 Various treatment options have been explored for pelvic insufficiency fractures. Polymethylmethacrylate bone augmentation seems to be effective for pain relief.10 However, its outcome for managing iliac insufficiency fractures has not been adequately described.11 In this patient, percutaneous S2 alar iliac screws were chosen because of the characteristics of the fracture line and its proximity to the sacroiliac joint. The S2 alar iliac trajectory is perpendicular to the fracture line and stabilizes the sacroiliac joint. A minimally invasive technique avoids the morbidity associated with open procedures and potential devascularization of bone already compromised by radiation. This technique may promote healing by moving healthy cancellous bone into the fracture site. Studies with more patients and longer follow-up are needed to document the safety and effectiveness of this procedure.

CONCLUSION

The technique of S2 alar iliac percutaneous screw fixation under fluoroscopic guidance is viable and safe for obtaining rigid fixation of iliac insufficiency fractures. This report can help to expand the indications for minimally invasive surgery techniques to include more complex abnormalities that require rigid pelvic fixation. Mastery of this technique offers surgeons a less invasive, but equally efficacious, method of pelvic fixation.

REFERENCES