



Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en



Original article

Percutaneous surgery for thoraco-lumbar fractures in ankylosing spondylitis: Study of 31 patients

S. Bredin^{a,*}, M. Fabre-Aubrespy^b, B. Blondel^b, J. Falguières^b, S. Schuller^c, A. Walter^c,
S. Fuentes^d, P. Tropiano^b, J.-P. Steib^c, Y.-P. Charles^c

^a Department of Orthopaedic Surgery, CHU Maison-Blanche, 45, rue Cognacq-Jay, 51092 Reims cedex, France

^b Service de chirurgie du rachis, université Aix-Marseille, CHU Timone, 264, rue Saint-Pierre, 13005 Marseille, France

^c Service de chirurgie du rachis, hôpitaux universitaires de Strasbourg, 1, place de l'Hôpital, BP 426, 67091 Strasbourg, France

^d Service de neurochirurgie, université Aix-Marseille, CHU Timone, 264, rue Saint-Pierre, 13005 Marseille, France

ARTICLE INFO

Article history:

Received 30 March 2017

Accepted 18 July 2017

Keywords:

Percutaneous

Ankylosing spondylitis

Thoraco-lumbar vertebral fracture

ABSTRACT

Background: The risk of vertebral fracture is increased 4-fold in patients with ankylosing spondylitis (AS). Diagnostic challenges and the vulnerability associated with AS combine to generate high morbidity and mortality rates. The objective of this study was to assess the outcome of percutaneous thoraco-lumbar fracture surgery in patients with AS, in terms of quality of life, fracture healing, and complications.

Hypothesis: Percutaneous surgery used to treat thoraco-lumbar fractures in patients with AS reliably provides fracture healing, preserves self-sufficiency, and minimises post-operative complications.

Methods: Two centres included 31 patients with AS who were managed by percutaneous surgery for thoraco-lumbar fractures in 2013–2015. The data were reviewed retrospectively, although admission data were collected prospectively. Clinical outcomes were assessed by comparing the values at baseline and last follow-up of three variables: the Parker score, the visual analogue scale (VAS) pain score, and the EuroQol five dimensions (EQ-5D) quality-of-life score. Computed tomography was performed 1 year after surgery to evaluate bone healing, screw position, and implant loosening. Intra- and post-operative complications were recorded.

Results: The 31 patients had a mean age at surgery of 75.1 years, a mean follow-up of 35.6 months, and a minimum follow-up of 12 months. Three patients died during follow-up. Mean hospital stay duration was 6 days. Cemented screw fixation was used in 18 patients. At last follow-up, all patients had recovered their self-sufficiency; the mean Parker score was 7.14, compared to 6.73 at baseline, the mean VAS pain score was 1.8, and the mean EQ-5D score decrease versus baseline was 0.07 ($P=0.02$). Bone healing was consistently achieved. Loosening of an uncemented pedicle screw was noted in 1 patient. Of the 228 screws implanted, 6 (2.6%) were improperly positioned, including 1 within the spinal canal in a patient free of neurological manifestations. Asymptomatic cement leakage was noted in 2 patients.

Discussion: Percutaneous fixation of thoraco-lumbar fractures in patients with AS is a reliable method that produces a high healing rate and allows prompt patient mobilisation with preservation of self-sufficiency. The post-operative complication rate is low.

Level of evidence: IV, retrospective observational study.

© 2017 Elsevier Masson SAS. All rights reserved.

1. Introduction

Ankylosing spondylitis (AS) is a chronic inflammatory joint disease associated with the HLA-B27 gene. The prevalence of AS ranges from 0.1% to 1.4% [1]. AS predominantly involves the spine, where chronic inflammation of the facet joints and intervertebral discs

limit the motion range. In advanced AS, complete intervertebral fusion produces a characteristic radiographic appearance known as bamboo spine, with thoracic kyphosis [2]. Vertebral bone loss occurs in AS, increasing the risk of fractures after trivial trauma [3]. Thus, compared to healthy individuals, patients with AS have a 4-fold higher risk of vertebral fractures [4,5].

Low-energy trauma can cause vertebral fractures in patients with AS. The most common site is the cervical spine between C5 and C7, which accounts for 75% of traumatic spinal injuries and carries a high risk of neurological compromise [6]. At the thoraco-lumbar

* Corresponding author.

E-mail address: bredin.sim@gmail.com (S. Bredin).

spine, flexion and extension are the main fracture mechanisms. The behaviour of the fused spine can be likened to that of a long bone. As a result, vertebral fractures involve all three spinal columns, causing marked instability [7,8].

Fractures caused by low-energy trauma may prove challenging to diagnose. Diagnostic delays are common and the fracture is diagnosed at a distance from the trauma in 19% to 60% of cases. The result is a high risk of secondary displacement with major neurological complications.

Many classical anatomical landmarks are no longer visible on radiographs of the AS spine, making the detection of vertebral fractures extremely challenging. Multidetector computed tomography is the diagnostic reference standard, although the images may be difficult to interpret [9]. In non-displaced fractures, magnetic resonance imaging may be helpful, with T2-weighted STIR images showing oedema at the fracture site as high signal and T1-weighted images allowing an evaluation of the fracture line [10].

Although non-operative treatment has been reported [11], bracing is challenging in patients with an unyielding kyphotic deformity. Thus, spinal stabilisation in a brace is inadequate in most patients. Open surgery is the standard of care for many surgical teams. However, conventional open surgery has been criticised [12,13] based on its high post-operative morbidity rate of up to 51% [14]. Among post-operative complications, pedicle screw loosening is common due to the limited bone stock, with a frequency of up to 15%. Furthermore, immune response impairments in patients with AS translate into a 14% infection rate. Thus, percutaneous fixation may constitute an appealing alternative to open surgery, by ensuring stabilisation of the spine while limiting the risk of complications [15–17].

The objective of this study was to assess the reliability of percutaneous fixation used to treat thoraco-lumbar fractures in patients with AS. Quality of life was assessed and rates of bone healing and complications were recorded. Percutaneous surgery used to treat thoraco-lumbar fractures in patients with AS reliably provides fracture healing, preserves self-sufficiency, and minimises post-operative complications.

2. Material and methods

A retrospective observational study was conducted at two university hospitals, in Strasbourg and Marseille, France. Inclusion criteria were documented AS and thoraco-lumbar fracture without sensory or motor impairments (ASIA E) managed by percutaneous cemented or uncemented instrumentation. Consecutive patients were included from January 2013 to December 2015. Data on admission for surgery were entered prospectively into a database.

The data were collected using questionnaires. Pre- and intra-operative information was abstracted from the medical files. The American Society of Anesthesiologists (ASA) score was obtained from the anaesthesiology records. The post-operative data were recorded retrospectively. The patients were re-evaluated during a physician visit at least 12 months after surgery.

The following clinical variables were recorded at hospital admission (baseline) and at the follow-up visit: visual analogue scale (VAS) score for pain (0–10 cm), Parker score to assess self-sufficient mobility, and EuroQol five-dimensions three-level (EQ-5D-3L) score to assess quality of life.

The post-operative imaging study work-up consisted of antero-posterior and lateral standing radiographs and computed tomography (CT) imaging with sagittal, axial, and coronal reformations. Slice thickness was 0.6 to 0.8 mm. The images were read independently by two surgeons who had no role in surgical patient management. Fracture healing was assessed on the sagittal and

coronal CT reformations (Fig. 1). The axial reformations were used to assess screw malposition, defined as a pedicle cortex breach > 2 mm, and screw loosening, defined as a lucent line around the screw.

Intra- and post-operative complications were abstracted from the medical files. Special care was taken to identify post-operative anaemia requiring blood transfusion, impaired wound healing, post-operative infection, neurological impairments, systemic complications, implant loosening, cement leakage requiring revision surgery, and death.

The statistical analyses were performed using SPSS 18.0.0 software (IBM, Armonk, NY, USA). Qualitative variables were described as number and percentage and quantitative variables as mean \pm SD and range. Normality of variable distribution was assessed by applying the Kolmogorov-Smirnov test and checked graphically by creating a histogram. Comparisons of baseline and follow-up values of the VAS pain score, Parker score, and EQ-5D-3L score relied on the non-parametric Wilcoxon test. Values of *P* lower than 0.05 were taken to indicate significant differences.

3. Results

Of the 31 consecutive patients with AS who underwent percutaneous surgery to treat thoraco-lumbar fractures during the study period, 3 died within 3 months after surgery. Thus, follow-up data were available for 28 patients. Table 1 lists their main features.

The fractures were located between T6 and L4. T9 and L1 were the main sites of involvement, with 22.6% and 25.8% of fractures, respectively (Fig. 2). The mechanism was flexion or extension in 28 (90.4%) patients, whereas a rotational component was also present in 3 (9.6%) patients.

Internal fixation of five or more levels was performed in 24 (77.4%) patients, with instrumentation of at least two vertebrae on either side of the fractured level (Fig. 3). The mean number of screws per instrumentation was 7.6 ± 1.2 (range, 4–12). In the 18 (58.1%) patients with intra-operative evidence of osteoporosis, the pedicle screws were cemented to enhance stability. No patient underwent instrumentation of the fractured level (Fig. 4).

Table 2 reports the clinical score values. The mean VAS pain score did not change significantly from baseline to last follow-up. Self-sufficiency was preserved after surgery, as shown by the absence of change in the Parker score between baseline and last follow-up. The EQ-5D-3L quality-of-life score decreased by a mean of 0.07 (*P* = 0.02).

Fracture healing and screw position at last follow-up were assessed by CT in the 28 survivors. Fracture healing was documented in all patients. Of the 228 implants used, six (2.6%) screws were considered misplaced, with a 2-mm pedicle cortex breach in four cases, including 1 within the spinal canal; the remaining two screws were in a lateral extra-pedicular position and produced no clinical manifestations. Loosening was noted for a single screw (0.4%), which was not cemented and did not require revision surgery. Lateral cement leakage was noted in two (11.1%) of the 18 patients who underwent cemented instrumentation but produced no symptoms.

Among post-operative complications, anaemia requiring a blood transfusion occurred in one (3.2%) patient. No patients experienced neurological complications or significant medical complications. Surgical-site infection was not seen in any patient.

Download English Version:

<https://daneshyari.com/en/article/8802383>

Download Persian Version:

<https://daneshyari.com/article/8802383>

[Daneshyari.com](https://daneshyari.com)