Introduction

Severe osteoarthritis of the hip may cause abnormal spinopelvic alignment. Therefore, spinal alignment may change after total hip arthroplasty (THA); however, there have been no prospective clinical reports on the influence of preoperative lumbar lateral flexibility on the improvement of spinal alignment. The purpose of this study was to examine the effect of preoperative lumbar lateral flexibility on spinal alignment after THA.

Methods

A total of 93 patients who underwent THA were submitted to this prospective study. There were 72 women and 21 men, with a mean age of 63.3 years (range: 38-83 years). We used a computed tomography-based navigation system for all cases and equalized the leg length. We obtained preoperative and 3, 6, and 12 month postoperative posteroanterior radiographs of the spine in standing position. Coronal balance and Cobb angle were measured as parameters of spinal alignment on the radiographs of the spine. Coronal balance was measured as the distance between the C7 plumbline and the center of the S1 vertebra (Figure 1). Thus, a low value for coronal balance indicated good spinal alignment.

We also obtained lateral-bending radiographs with the patient standing. The correction ratio in lumbar Cobb angle was measured as a parameter of lumbar lateral flexibility. For patients with right-curved scoliosis, the correction ratio was defined as the percentage improvement in scoliosis when bending right, and for left-curved scoliosis, when bending left. We classified patients according to the preoperative correction ratio in lumbar Cobb angle into two groups: a flexible group (correction ratio ≥100%; n=87) and a rigid group (correction ratio < 100%; n=6) (Figure 2, 3). Chronological changes in coronal balance were investigated postoperatively in each group, and the effect of preoperative lumbar lateral flexibility on spinal alignment after THA was examined.

Results

Coronal balance in the flexible group was a mean 11.4±8.6mm, 6.3±14.5mm, 4.6±13.2mm, and 0.5±11.2mm, before and at 3, 6, and 12 months after THA, respectively, whereas that in the rigid group was a mean 17.2±13.4mm, 12.5±18.8mm, 9.8±11.7mm, and 8.3±19.1mm.

Discussion

Spinal balance tended to improve after THA, more significantly in patients with flexible spines than patients with rigid spines. Consequently, special attention is required when performing THA on patients with poor preoperative lumbar flexibility. There is a possibility that we need to control leg length when considering postoperative spinal balance, especially for patients with preexisting spinal deformity and limited flexibility.