

# Heterotopic ossification and clinical outcome in nonconstrained cervical arthroplasty

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Anterior cervical discectomy and fusion (ACDF) has long been accepted as a gold standard surgical treatment for patients with cervical spondylotic radiculopathy. On the other hand, many recent studies have pointed that cervical disc arthroplasty (CDA) was superior to ACDF in terms of maintaining the range of motion (ROM) and preventing the adjacent segment degeneration (ASD) (1-3). It seems quite obvious that CDA can provide better, at least non-inferior, clinical outcome than ACDF because of the preservation of ROM at index segment by reproducing similar kinematics to normal condition (4). However, the development of heterotopic ossification (HO) has been considered one of the major obstacles of CDA. The incidence of HO after CDA ranges from 14.8% to 94.1% (5). HO was first identified in 1883 by Riedel, a German Physician and HO was later described as “paraosteoarthritis” by French physicians Dejerne and Ceillier based on observations of patients with traumatic paraplegia in World War I (6). The HO is defined any bone formation in the soft tissues outside the skeletal system that develops after surgery or without a well-defined precipitating event (7). The etiology of HO is unknown and the predisposing factors for HO in hip and knee arthroplasty have been well studied as male, ankylosing spondylitis, diffuse idiopathic skeletal hyperostosis, spinal cord injury, prior hip surgery, and different fracture type (8).

Since McAfee *et al.* adopted “HO” in lumbar arthroplasty, the studies related to HO after CDA has been reported. Several randomized studies about HO after CDA with nonconstrained core published the incidence of HO were

more than 50% within in 24 months’ follow-up period (9). Yi *et al.* showed the predisposing factor after CDA were gender and prosthesis type (10). Previous clinical and finite element studies have identified HO formation as bone remodeling process similar to the formation of degenerative osteophytes for spinal instability (5). In other words, the main etiology of HO after CDA may be mechanical adaptation that induces bone remodeling to stabilize energy stabilization on endplate area similar process of degenerative osteophyte.

The results of this study indicated high-grade HO and spontaneous fusion 2 years after CDA were observed in a significant number of patients but the degree of ossification did not influence the clinical outcome. Albeit the results were similar to other studies, this result of a randomized controlled trial (NORCAT) using uniform implant (Discovery<sup>®</sup>, DePuy Spine Inc., Raynham, MA, USA) affords more convincing data on postoperative HO. Now, future direction of HO after CDA should be directed to the etiology and the way to reduce HO. We hope the authors to have the future study with enrolled patients in NORCAT to resolve these issues.

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## Footnote

*Conflicts of Interest:* The authors have no conflicts of interest

to declare.

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