Ossification of the Posterior Longitudinal Ligament 8 Years after 2-Level Cervical Disc Replacement - an Unusual Cause of Neurological Symptoms

Rajashulakshana R*, Arafin Siddiqui MM and Beng Tan S

Department of Orthopaedic Surgery, Singapore General Hospital (SGH), Singapore

Abstract

Objective: To highlight that OPLL can occur at the same level as an artificial disc replacement, years after a successful index surgery, and can be a rare cause of new-onset myeloradicular symptoms.

Summary of background data: Heterotopic ossification after insertion of an Artificial Disc Replacement (ADR) in the cervical spine is rare and has been reported to occur at C3/4 levels. Ossification of the posterior longitudinal ligament (OPLL) spanning the ADR, extending proximally and distally behind the vertebral body, has not been reported.

Methods: We report a case of a patient who was initially treated with a C4/5 C5/6 artificial disc replacement, who later presented with new neurological symptoms secondary to OPLL 8 years after initial surgery.

Results: This is the first reported case of OPLL developing years after an artificial disc replacement, at the same level as the index operation.

Conclusion: Ossification of the posterior longitudinal ligament after ADR is extremely rare but may cause neurological symptoms in a patient. It should be recognized and differentiated from heterotopic ossification, which occurs mainly at the disc space, as the management may be different.

Keywords: Cervical myelopathy, Ossification of posterior longitudinal ligament; Heterotopic ossification; Computer tomography; Magnetic resonance imaging; Artificial disc replacement

Introduction

Ossification of the Posterior Longitudinal Ligament (OPLL) is a progressive condition and a common cause of cervical myelopathy in Asians [1,2]. The prevalence of OPLL is 0.4% to 3.0% in Asians [3]. It usually involves the cervical spine but sometimes it can affect the rest of the spine [4]. Heterotopic ossification after a cervical disc replacement is rare and has been reported to occur at C3/4 after a disc arthroplasty [5-7]. There are no reports of patients who have developed ossification of the posterior longitudinal ligament at the operated levels, after cervical disc replacement.

Case Presentation

Madam X is a 40 year-old female who presented with right sided shoulder and forearm pain associated with paraesthesia and weakness of the right hand in 2007. Spurling’s test was positive. Neurological examination revealed right-sided upper limb weakness (power 4/5) with diminished sensation. Neurological examination of the left upper limb and lower limbs were unremarkable. Cervical X-rays showed minimal bone spurs at C5 (Figure 1). Magnetic Resonance Imaging (MRI) showed C4/5 and C5/6 prolapsed disc and absence of hypertrophic or ossified posterior longitudinal ligament (Figure 2). Patient underwent anterior cervical discectomy at C4/5 and C5/6 followed by Artificial Disc Replacement (ADR) at the 2 levels with Prestige LP. Patient’s sensory and motor symptoms improved postoperatively.

Eight years after initial surgery, patient developed numbness over the left upper limb. Examination revealed left-sided upper limb weakness (power 4/5) with diminished sensation. Patient did not have any other symptoms or signs of myelopathy. Cervical X-rays showed bony spurs at C6/7 but no implant loosening or subsidence (Figure 3). MRI and Computed Tomography (CT) scan of the cervical spine showed ossification of the posterior longitudinal ligament at C4/5 and C5/6 with indentation of the cord at C4/5 (Figures 4 and 5). Patient was advised for a posterior cervical decompression and fusion but decided against surgery. Patient was educated about possible progression of symptoms and is on close follow-up (Figure 6).

Figure 1: Anterior-Posterior and Lateral X-rays of the cervical spine in 2007.
Discussion

The incidence of Ossification of the Posterior Longitudinal Ligament (OPLL) causing myelopathy in Asians is reported to be as high as 17 percent with males being more commonly affected [8-9]. Though it can affect the entire spine, it is more commonly found in the cervical region, usually from C4 to C6. The etiology of OPLL can be divided into two categories primary and secondary [11]. Secondary OPLL are associated with rickets, osteomalacia and endocrine disorders such as hyperparathyroidism and acromegaly [11]. Most cases however are primary or idiopathic, but may have an association with obesity and diabetes mellitus [12,13]. OPLL is characterized by hyperplasia of cartilage cells with endochondral ossification of the posterior longitudinal ligament. It is classified into 4 types: continuous, segmental, and mixed and circumscribed [14-16].

Ossification of the posterior longitudinal ligament may be a cause of new onset of radicular or myelopathic symptoms, after artificial disc replacement in the cervical spine. Our patient developed new onset of left-sided upper limb symptoms 8 years after the ADR. Prior to the index operation, our patient had only right-sided symptoms, which had resolved post-operatively. There was no evidence of hypertrophic or ossified posterior longitudinal ligament prior to surgery. Continuous-type ossification of the posterior longitudinal ligament occurring 8 years after artificial disc replacements, at the previous surgical levels, has not been reported in the literature. Thus, OPLL occurring posterior to the ADR, may be a rare cause of new neurological symptoms after artificial disc replacement in the cervical spine.

It is important to distinguish OPLL from Heterotopic Ossification (HO), which has been reported to occur with disc arthroplasty at the level of C3/4 [17-19]. Heterotopic ossification is usually confined to the proximity of the disc space while OPLL can extend posterior to the vertebral body. Our patient developed widespread OPLL extending both proximally and distally from the operated disc spaces into the space posterior to the vertebral bodies. This was best seen on a CT scan, which is superior to an MRI when assessing OPLL [20-24]. Management of HO may be treated with an anterior cervical decompression and fusion after removal of the artificial disc. However, for OPLL occurring posterior to the ADR with widespread proximal and distal extension, a posterior decompression and fusion may avoid the morbidity of multi-level corpectomy and fusion [25-27].

Conclusion

Ossification of the posterior longitudinal ligament occurring at the same level as artificial disc replacement, years after index surgery, may be a rare cause of new neurological symptoms after an initial successful ADR. It should be recognized and differentiated from heterotopic ossification which occurs mainly at the disc space. Surgical management for extensive OPLL occurring posterior to the ADR may be treated with a posterior decompression and fusion while HO can be managed effectively with removal of the artificial disc, anterior decompression and fusion.


