CASE REPORT

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# Surgical Treatment of the Atlantoaxial Osteoarthritis

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Atlantoaxial facet joint osteoarthritis is rare, often undiagnosed because it may be misdiagnosed as occipital neuralgia, or degenerative cervical spondylosis. Unilateral occipitocervical pain aggravated by head rotation is a specific symptom. Conservative treatment is usually effective. But when the patient complains of intractable neck pain localized to occipitocervical junction and unresponsive to medical therapy, surgical treatment should be considered. Though a few reports of surgically treated atlantoaxial osteoarthritis has been published, surgical outcome is favorable. A case of a surgically treated atlantoaxial osteoarthritis is presented with a review of the literatures.

**KEY WORDS :** Intractable occipitocervical pain · Atlantoaxial osteoarthritis · Atlantoaxial arthrodesis.

## Introduction

Atlantoaxial facet joint osteoarthritis is a unique clinical syndrome that is often unrecognized due to the difficulties related to the diagnosis of this disease.

It's prevalence ranges from 4-18% in peripheral and spine osteoarthritis[5,11]. It is a degenerative disease often seen in elderly patients. But, trauma related atlantoaxial osteoarthritis can occur[4]. Patients typically complain of unilateral neck pain occurring with the slightest head rotation to the lesion side. The pain ascends unilaterally to the occiput, the parietal skull even to the eye[10]. Because most patients respond to the conservative treatment, only a few cases treated surgically have been reported in the literature[4,5,9]. To our knowledge, this is the first case report of surgically treated atlantoaxial osteoarthritis in Korea.

## Case Report

A 39-year-old woman presented with severe occipitocervical neck pain for 3 years. The patient has suffered severe pain when she flexed and rotated her head to the left side. She experienced severe contusion on her neck in car accident three years ago. Severe neck pain persisted for two months after the trauma. No specific medical treatment was given at that time. She then suffered intermittent neck pain that was worsened since last year. Despite the treatments from private pain clinic her severe neck pain did not respond to treatments including C1-C2 facet block. She was initially diagnosed as an occipital neuralgia, and cervical spondylosis. She was then diagnosed as atlantoaxial osteoarthritis after a careful physical examination and imaging studies in our hospital. On physical examination, audible crepitation was noted when she rotated her head to the left side. Head rotation to the left side was limited to 15 degrees. Laboratory studies (C-reactive protein, rheumatic factor, ESR) done to rule out the systemic inflammatory disease revealed to be normal. Neurologic examination was normal except severe limitation of neck motion to the left side. Plain X-Ray of open mouth view revealed left atlantoaxial joint space narrowing with subchondral sclerosis (Fig. 1). On coronal com-

**Fig. 1.** Left atlantoaxial joint space narrowing is demonstrated on open mouth view.

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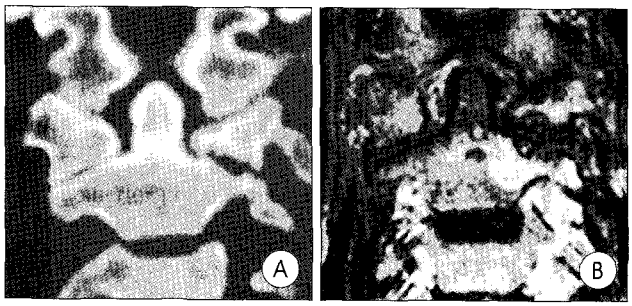


**Fig. 2.** A : Coronal Computed Tomography showing irregular atlantoaxial joint space subchondral sclerosis. B : Coronal Magnetic Resonance Image revealing subchondral bone marrow change (fibrosis with edema) with osteoarthritis.

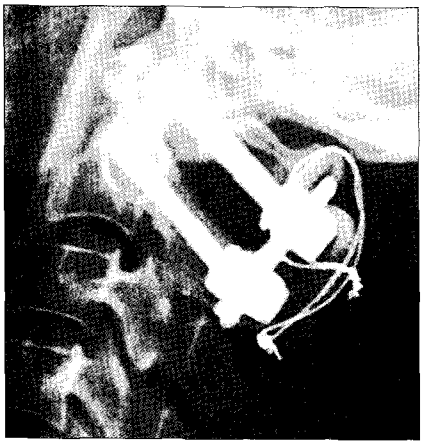

**Fig. 3.** Postoperative film after posterior C1 lateral mass-C2 pedicular screw fixation with iliac bone graft.

puted tomography scan, left C1-C2 facet joint space narrowing with irregular margin were demonstrated (Fig. 2A). On T2 coronal magnetic resonance image, left C1-C2 facet joint space narrowing with subchondral fibrosis was delineated (Fig. 2B).

C1-C2 posterior screw fixation with iliac bone graft was performed (Fig. 3). Immediately after the surgery, the patient's previous severe neck pain was subsided though wound pain lasted for 10 days. She is free of neck pain 3 months following the surgery.

## Discussion

Degenerative osteoarthritis of the subaxial cervical spine which induce neck pain, shoulder pain or radicular pain is common in primary care medicine. The upper cervical spine pathology as a source of severe neck pain has often been underestimated and undiagnosed[7,8,10]. The upper cervical spine is commonly involved in many diseases, including rheumatoid arthritis, infection, primary and metastatic tumor, trauma, and various forms of instability. Little attention has been paid to osteoarthritis affecting the atlantoaxial lateral mass articulation, and no uniformly effective treatment has been described[1,5].

The most common disease affecting upper cervical spine is rheumatoid arthritis and degenerative osteoarthritis. In rheumatoid arthritis, occipitocervical junction is the most frequently involved site. Halla et al reported 9% of the rheumatoid arthritic patients were diagnosed as atlantoaxial lateral facet joint arthritis[5]. Although the atlantoaxial joint is often involved in rheumatoid arthritis. It is usually diagnosed before the manifestation of the cervical symptom[3,7]. In our case, the patient did not show any manifestation of systemic arthritis in other sites and rheumatic factor was negative. Degenerative osteoarthritis usually involve lower cervical spine but atlantoaxial osteoarthritis is also often reported. Harata et al described atlantoaxial osteoarthritis in 31 patients but only 4 patients had isolated lateral mass involvement[6]. The remainder of their patients had isolated atlanto-odontoid disease or combined atlanto-odontoid and lateral mass involvement. Halla et all reported a high incidence of osteoarthritis involving C1-C2 on routine cervical radiographs in patients with peripheral osteoarthritis or degenerative arthritis of the spine. Recently, Schaeren et al reported successful surgical treatment of painful atlantoaxial osteoarthritis[4,9]. Most of the reported cases in atlantoaxial osteoarthritis are degenerative change usually seen in elderly patients. There are few reports about trauma related atlantoaxial osteoarthritis. In our case, the patient did not have neck pain before the trauma and after the trauma chronic intermittent neck pain was gradually aggravated. The patient's past history and clinical symptom implied trauma related atlantoaxial osteoarthritis.

The prevalence ranges from 5.4% in the sixth to 18.2% in the ninth decade of life in patient with osteoarthritis of the spine. Most patients are females presenting with a unilateral arthritis[4]. It is a degenerative disease although trauma related case has been reported. Atlantoaxial osteoarthritis is usually presented with a typical unilateral severe occipital neck pain that aggravates by head rotation. Head rotation is usually markedly reduced. The pain is usually localized to the upper cervical spine extending to the occiput, and occasionaly radiating frontally behind the eyes. It is often undiagnosed and misdiagnosed as occipital neuralgia. Patients frequently complain a painful audible crepitation with head rotation.

The diagnosis is primarily made by an open mouth view, showing the narrowing of the C1-C2 joint space. A cervical CT (computed tomography) scan can be helpful in revealing joint space pathology, especially coronal and saggital CT scan. In our case coronal CT revealed the left atlantoaxial joint space narrowing and subchondral sclerosis. Cervical MRI (magnetic resonance imaging) is also important in revealing joint problem. In our case left atlantoaxial joint space narrowing, subchondral sclerosis, adjacent bone marrow change were demonstrated on coronal cervical MRI.

The first treatment option is conservative as long as it is effective and the symptoms are tolerable. Surgical treatment such as atlantoaxial arthrodesis is indicated when pain is intractable and conservative treatment fails. Severe occipitocervical pain should be corroborated by radiologic evidence and

physical examination.

Operative decision in atlantoaxial osteoarthritis is of concern and important in managing the patient. Star et al described a greater than 50% loss of cervical rotation as pathognomonic clinical sign[10]. Diagnostic intraarticular C1-C2 blocks can be helpful in delineating pain focus[7]. Atlantoaxial arthrodesis can be performed in various ways. In the 1980th, Posterior C1-C2 wiring with bone graft, recently posterior C1-C2 transarticular screw fixation, posterior C1-C2 pedicular screw fixation have been introduced. Fusion rate of posterior C1-C2 transarticular fixation or posterior screw fixation is 96% while fusion rate of posterior C1-C2 wiring with bone graft is 82%[2]. Surgical outcome is favorable regardless of type of operation. Shaeren et al reported in their five surgically treated atlantoaxial osteoarthritis that all patients felt immediate relief of their incapacitating occipitocervical pain postoperatively and remained free of this particular stabbing pain after the surgery[9]. Others also have shown favorable results with immediate pain relief after the surgery[2,10]. Grob et al reported that 24(83%) patients out of 29 surgically treated atlantoaxial osteoarthritis patients were satisfied with their surgical result[4]. In our case, the patient's severe neck pain was subsided after the surgery. This may be due to the fact that repetitive movement on pathologic atlantoaxial joint is a main pain focus and immobilization with arthrodesis eliminated this cause. The patient is free of neck pain at 3 months postoperatively.

## Conclusion

Atlantoaxial osteoarthritis is a unique clinical entity manifested by severe occipitocervical neck pain, often neglected in primary care medicine, misdiagnosed as occipital neuralgia, cervical spondylosis. Although first treatment option is conservative management including immobilization with brace, analgesics, pain block, atlantoaxial arthrodesis may be considered when these treatments fail.

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