

## **Original Article**

### **Radiographic evaluation of cervical spine**

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#### **ABSTRACT**

##### **Objective**

To determine utility of cervical spine radiograph, clinical notes writing trends, and find out radiograph abnormalities seen.

##### **Methods**

One Thousand cervical spine X-Rays were studied at the department of radiology POF Hospital Wah Cantt from November 1, 2008 to April 25, 2009. Clinical notes provided with x-ray request and abnormalities seen on films were noted.

##### **Results**

Three major symptoms of patients were neck pain (21%), numbness (4.5%) and brachalgia (1.7%). No significant findings were seen in 48% films. Spondylosis (37 %) cervical rib (3.9%) congenital block vertebra (2%) and Kimmerle anomaly (2%) were the major radiological findings.

##### **Conclusion**

Neck pain was commonest reason for requesting cervical spine x-ray. Spondylosis was the commonest radiological finding seen in our study.

##### **Key Words**

Cervical spondylosis, brachalgia, cervical rib.

## **INTRODUCTION**

Cervical spondylosis is a universal problem with aging. Symptoms include neck pain, numbness of the arms or limited neck movements. Foraminal encroachment by osteophytes causes cervical radiculopathy.<sup>1</sup> Systemic diseases such as rheumatoid arthritis, spondyloarthritis and polymyalgia should be excluded in appropriate patients. Plain films are indicated in patients with neck complaints who are older than 50, have history of trauma or have signs of radiculopathy. Indications for further imaging studies by CT or MRI include neurological impairment. This study was designed to find out the workload share of radiology department made by cervical spine x-ray in tertiary care center, clinical notes writing trends of referring physicians and percentage of radiographs showing abnormalities.

## **PATIENTS AND METHODS**

The study was carried out at POF Hospital, Wah Cantt from November 1, 2008 to April 25, 2009 and included 1000 cervical spine X-Rays. Patients of both genders and all ages and both indoor and outdoor were included. 1000 mAs-150 KV general-purpose x-ray machine was used with vertical and horizontal Bucky. Radiographs were taken on 24cm into 30 cm size films. Automatic processing was done in all the cases. Age, gender and clinical information provided on the request form were noted. A record of radiographic views advised and referring OPD/Ward was kept. All the films were examined to determine radiological findings.

## RESULTS

Total radiological investigations during the study were 25000 and C Spine x-ray made 4% of the workload. One thousand cervical spine x-ray were examined. Most of them (583) were female. Ages of patients ranged from 1 year to 80 years. Clinical information was provided in 40% of the cases (Table 1).

**Table 1. Symptoms of the study subjects (n=1000).**

Clinical Information available	<b>394</b>
No Clinical Information available	606
Neck pain	213
R/O Spondylosis	75
Numbness	45
Brachalgia	17
Chest Pain	10
Vertigo	16
Trauma	13
Dysphagia	05

Majority (647) had age more than 40 years (Table 2). About 54% ladies were wearing earrings or other ear ornaments. In one patient there were four ornaments per ear. In none of these patients any useful information was hidden by the ornaments.

**Table 2. Age and Gender of the study subjects (n=1000).**

Female with ornament	316
Female without ornament	267
<b>Total Female</b>	<b>583</b>
<b>Male</b>	<b>417</b>
Under 20 years	23
21 to 40 years	330
Above 40 years	647
Total	1000

Three main symptoms of patients were neck pain (21%), numbness (4.5%) and brachalgia (1.7%). Repeat film rate was 0.9%. Majority (52%) of the cervical spine x-rays were normal (Table 3).

**Table 3. Radiological findings (n=1000).**

<b>Normal X-ray</b>	<b>520</b>
<b>Spondylosis</b>	<b>370</b>
Spondylosis C3/4 Space	24
Spondylosis C4/5 Space	66
Spondylosis C5/6 Space	147
Spondylosis C6/7 Space	58
Spondylosis C5/6/7 Space	75
<b>Others</b>	<b>110</b>
Cervical Ribs Bilateral	023
Cervical Rib Right	006
Cervical Ribs Left	010

Congenital Block Vertebra	022
Caries 3/4/4	001
Kimmerle Anomaly	021
Goiter	008
DISH	006
Lytic Lesion	002
Hyperextension Injury	001
Fracture Base of Dens	001
Repeat Film	009

No abnormal findings were seen in 48% x-rays. Spondylosis (37%) cervical rib (3.9%) congenital block vertebra (2%) and Kimmerle anomaly (2%) were the major radiological findings (Table 3).

## **DISCUSSION**

Flexion is centered in the area of C5-C6, and extension in C6-C7. These areas are particularly vulnerable to degenerative changes and we found that out of 366 spondylosis cases, 276 radiographs showed C5-C6 and C7 involvement. Cervical spondylosis is a common degenerative condition. Radiographic findings of spondylosis are osteophytes, disc space narrowing and facet disease, however, correlation between the degree of radiographic changes and severity of pain is poor.<sup>2,3</sup>

The evaluation of neck pain includes a complete history, physical examination, and imaging studies. At a minimum, radiographic evaluation must include lateral, AP, and open-mouth odontoid.<sup>4</sup> The lateral view demonstrates vertebral alignment, the degree of osteoarthritis at the facet joints, disk space narrowing, or compression fracture. CT provides better definition of foraminal encroachment. MRI is more useful detecting disc herniation.

The need for cervical spine radiography in alert and stable trauma patients is debatable. The Canadian c-spine rule recommends radiography in patients with age 65 years old, dangerous mechanism of injury, axial load to the head such as diving, motor vehicle accident, paresthesia in the extremities.<sup>4</sup> The NEXUS (National Emergency X-Radiography Utilization Study) criteria recommend cervical spine radiography in all patients with trauma unless they meet all of the following criteria: no posterior midline cervical spine tenderness, no evidence of intoxication, a normal level of alertness and no focal neurological deficits.<sup>5</sup> Canadian c-spine rules are more specific than the NEXUS criteria. Patients who satisfy the Canadian c-spine rules for clinical clearance of the neck do not need cervical spine radiography.<sup>4</sup> This can safely reduce the number of cervical spine radiographs in acute trauma.<sup>6</sup>

Vertebral body compressions are identified by plain radiographs and further clarified by CT. Dynamic flexion-extension views are obtained if ligamentous injury is suspected.<sup>7</sup> Less common causes of neck pain include rheumatoid arthritis, diffuse idiopathic skeletal hyperostosis (DISH), and congenital spinal stenosis. DISH most characteristically affects cervical and thoracic spine.<sup>7</sup> There is massive bone deposition in the ligaments and tendons with relative preservation of disc heights. Dysphagia due to anterior cervical hyperostophytosis (ACH) is uncommon; however, DISH and spondylosis can be responsible for ACH-induced dysphagia.<sup>8</sup>

Congenital anomalies of cervical spine include cervical rib, Kimmerle anomaly and congenital block vertebra. Kimmerle anomaly is also called ponticulus posticus, retroarticular canal or foramen arcuale.<sup>9</sup> It is an anatomical variant of the first cervical vertebra. Ossification of atlantooccipital ligament turns the vertebral artery sulcus into

canal. The retroarticular canal compresses the vertebral artery passing through it.<sup>10</sup> This affects vertebrobasilar circulation and patients suffer from tension-type headache.<sup>10</sup> There is a significant correlation of ponticulus posticus with migraine.<sup>11</sup> Congenital Block vertebra leads to hypermobility and degenerative arthritis above and below the fused cervical region.<sup>12</sup> Acquired fused cervical vertebrae are associated with tuberculosis, juvenile rheumatoid arthritis and trauma.<sup>13</sup> Cervical rib presents as bony element or fibrous tissue band passing from C7 to the first rib. The subclavian artery and brachial plexus are displaced upward over such a rib. The pressure on neurovascular structure causes thoracic outlet syndrome and leads to neck pain and neurovascular manifestations.<sup>14</sup>

## **CONCLUSION**

We found normal cervical spine x-rays in 48% patients sent for radiography. Spondylosis was most common radiologic finding in our series. Thus, X-ray cervical spine can be a valuable investigation in patients with neck pain. Optimum usefulness of radiographs increases when clinical information is provided.

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