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## Cervical pain and dysphagia: Is it hyperostosis or anterior cervical HNP?

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### SUMMARY

**Background:** Dysphagia along with cervical pain may be due either to large osteophytes of the cervical vertebrae or to an anteriorly herniated cervical disk. **Objectives:** Identifying the clinical and radiological features of cervical osteophytosis and anterior disk herniation severe enough to cause dysphagia. **Methods:** Seventy nine patients with neck pain and dysphagia were studied, 49 women (62%) and 30 men (38%). Twenty two of them (28%) were diagnosed with skeletal hyperostosis, 21 (26%) had isolated osteophytosis and 36 (45%) had an anterior herniated cervical disk between C2 and C7. A medical history and physical exam were performed, plus an MRI, 3D or regular CAT scan and a cervical spine x-RAY series. Barium swallow was done in patients with painful swallowing (odynophagia). Nerve conduction studies plus evoked potentials were performed in patients with brachial radiculopathy. **Results:** Out of 79 patients, 62 (65.8%) had foreign body sensation in the pharynx and 27 (39%) had difficulty swallowing solid foods; 14 (51%) of the latter had pain on swallowing. Of these 52 patients, 49 (94%) had hypertension with moderate obesity. Out of the latter, 41 (78.8%) had moderate obesity (between 20 and 39% over the ideal body weight [BW]) and 11 (21%) had severe obesity (> 40% over the ideal BW). Twenty seven patients below their ideal BW had difficulty swallowing, out of which 12 (33.7%) had odynophagia. Those with radiculopathy usually had lateral foramen impingement of nerve roots. **Conclusions:** The association of neck pain and dysphagia needs a complete work-up to determine its origin and extent and to identify the predominant symptom, which may require surgical fusion or conservative interventional therapy.

**Key words:** Dysphagia, odynophagia, neck pain, osteophytosis, cervical disk herniation.

### RESUMEN

**Introducción:** La disfagia junto con el dolor cervical pueden ser secundarios a grandes osteofitos de las vértebras cervicales o a una hernia discal cervical. **Objetivos:** Identificar las manifestaciones clínicas y los hallazgos radiológicos de la osteofitosis cervical y de la herniación discal anterior como causa de disfagia. **Métodos:** Se estudiaron 79 pacientes con dolor cervical y disfagia. Cuarenta y nueve mujeres (62%) y 30 hombres (38%). Veintidós fueron diagnosticados con hiperostosis esquelética, 21 tenían osteofitosis aislada y 36 tenían un disco cervical anterior herniado entre C2 y C7. Se realizó historia clínica y examen físico, resonancia magnética nuclear, tomografía computada regular o tridimensional y radiografías simples de la columna cervical. En pacientes con odinofagia se practicó trago baritado. En pacientes con radiculopatía del plexo braquial se practicó velocidad de conducción y potenciales

evocados. **Resultados:** De los 79 pacientes, 62 (65.8%) tenían sensación de cuerpo extraño en la faringe y 27 (39%) dificultad para deglutir sólidos; 14 de éstos tenían dolor a la deglución. De estos 52 pacientes, 49 (94%) tenían hipertensión y obesidad. Cuarenta y uno (78.8%) tenían obesidad moderada (entre 20 y 39% del peso ideal) y 11 (21%) tenían obesidad grave (> 40% del peso ideal). Veintisiete pacientes por debajo de su peso ideal tenían dificultad en la deglución, de los cuales 12 tenían odinofagia. Los enfermos con radiculopatía cursaban con compresión de las raíces a nivel del foramen lateral. **Conclusiones:** La asociación de dolor de cuello y disfagia requiere de una revisión completa para determinar su origen, identificar el síntoma predominante y valorar su extensión. El tratamiento puede requerir cirugía o terapia intervencionista conservadora.

**Palabras clave:** Disfagia, odinofagia, cervicalgia, osteofitosis, hernia discal cervical.

## INTRODUCTION

The association of pain in the neck and difficulty in swallowing was first recognized by Zahn<sup>(1)</sup> in 1905; this symbiosis is not uncommon in patients with degenerative cervical spine disease with radiculopathy and in presence of osteophytosis; nevertheless, they are not frequently considered as having a common origin<sup>(2)</sup>. We studied 79 patients in whom these associated symptoms were present in cases of severe osteophytosis and degenerative cervical disc disease (in one or more intervertebral spaces) of the cervical spine.

## MATERIAL AND METHODS

In a five-year period, out of 634 adult patients found to have cervical radiculopathy in our clinic, 79 (12.4%) complained of pain at swallowing and/or dysphagia. In addition to their usual work-up including MRI, plain cervical spine series, and a complete history and physical exam were performed. Three-dimensional and regular CAT scans of the cervical spine were done whenever MRI was contraindicated. Barium swallow studies were done in those patients with pain at swallowing (phagodynia).

There were 49 (62%) women and 30 (38%) men with a mean age of 54.3 (SD  $\pm$  3.4) and 61.4 (SD  $\pm$  2.6) years, respectively. The diagnosis according to the criteria stipulated by Camisa et al.<sup>(3)</sup> and Marks et al.<sup>(4)</sup> included 22 (28%) patients who could be diagnosed as having diffuse idiopathic skeletal hyperostosis, 21 (26%) who had isolated osteophytosis and 36 (45.5%) had anteriorly herniated cervical nucleus pulposus. These lesions were noted anywhere from C<sub>2</sub> to C<sub>7</sub>.

The concomitant lesions in the cervical spine are depicted in table I. The previous diagnostic interventions performed on the patients as well as other spinal illnesses, confirmed by plain roentgenograms, CAT scan, or MRI and any other pathology, other surgical and diagnostic intervention are shown in table II. Barium swallows were performed in

the cases with severe obstructive symptoms. Sleep apnea studies were conducted when indicated.

## RESULTS

Of the 79 patients evaluated, 52 (65.8%) had a sporadic sensation of having a foreign body (FB) in their throat, while 27 (34%) others also had difficulty in swallowing solid foods and of these, 14 (51%) had pain upon swallowing. Of fifty-two patients having FB sensation, 49 (94.2%) had arterial hypertension with obesity of either moderate degree (> 20-39% of their expected body weight), in 41 patients (78.8%) or severe degree (> 40% of their expected body weight) in 11 others (21%). Forty-four patients (84.6%) had

**Table I.** Radiologic findings in patients with dysphagia and neck pain\*.

Hyperostosis (diffuse)	22
Isolated osteophytes	21
Anterior HNP	36
Posterior HNP degeneration	27
Uncovertebral disease	16
Facet joint hypertrophy	31
Cervical spinal stenosis	4
Lateral foramina narrowing**	34
Bilateral foramina narrowing	13

\* Most patients had more than one radiological finding

\*\* Unilateral

**Table II.** Previous related surgical interventions.

Anterior cervical fusion	21
Posterior cervical decompression	4
Endoscopies of pharynx and esophagus	36
Dilatation of esophagus	9

developed late onset diabetes. Of these, 15 (34%) received insulin therapy and 29 others (65%) managed their diabetes with diet and oral antiglycemic medications. The 27 patients who were below their expected body weight had difficulty swallowing solid food, frequently cleared their throat, and 12 (33.7%) had pain at swallowing. All of these patients were found to have extrinsic esophageal obstruction at barium swallow. The radiologic findings listed in table I, included severe osteophytosis (Figure 1) and multiple disc herniations at various levels (Figures 2 and 6).

In one severe case of extensive multiple osteophytosis, the barium swallow revealed almost 80% esophageal extrinsic occlusion (Figure 3) with considerable weight loss experienced by this patient. This same patient presented difficulty for orotracheal intubation requiring a fiber optic bronchoscope to achieve it. Six patients with sleep apnea were found to have partial upper airway obstruction at sleep. In these patients, nerve conduction studies showed that the signs and symptoms of radiculopathy were present in patients with lateral foramina compromise.

**Treatment:** Multiple level surgical intervention (Figures 4 and 5) was needed in only thirteen patients with severe multiple osteophytosis, consisting of excision of the osteophytes by an anterior exposure route followed by a vertical wedge multiple level cervical spine fusion with complete relief of the symptoms (Figure 5). Six of the patients with one level osteophytes and 19 with a herniated nucleus pulposus had anterior fusions. Other measures consisted of a soft cervical collar worn when traveling in an automobile, and for two hours in the morning and two hours in the evening; isometric exercises of the neck and shoulders, lozenges, and non-steroidal anti-inflammatories. In the patients with degenerative disc disease with minimal radiculopathy, treatment consisted of a series of cervical epidural blocks with either steroids or with indomethacin<sup>(5)</sup> in diabetic patients. Of these 25 patients, eight (31.6%) had temporary relief of their symptoms with recurrence of their neck pain within 6 months, but not of the dysphagia. Four of them, who also had brachial radiculopathy had anterior cervical fusions.

## DISCUSSION

Severe spondylosis, multiple osteophytes and anterior herniation of intervertebral cervical discs (AHICD) have usually been considered irrelevant. However, we have found these patients to be frequently symptomatic with complaints of dysphagia without anatomical or functional abnormalities of the pharynx or esophagus; some of them also had pain at swallowing, headaches and metabolic disturbances deserving special attention. Not uncommonly patients undergo unnecessary procedures (pharyngoscopy, esophagoscopy in search for non-existent intrinsic, pathology.

Cervical osteophytosis has a peculiar course; it usually begins with the sensation of having a foreign body in the throat that cannot be cleared, coughed up, or swallowed. A common denominator is a prior traumatic event to the cervical spine<sup>(2,4)</sup>, but repeated microtrauma may also cause it<sup>(6)</sup>. Pain may occur when swallowing solids then progressing to mostly soft foods, and then even when liquids are ingested, being worse during neck extension<sup>(7)</sup>.

Some of these patients may also have dysphonia<sup>(8)</sup>, hoarseness, throat irritation, stridor, choking, limited range of motion of the neck; depending on the location of the osteophytes (at what intervertebral space are they located). Signs and symptoms of cervical radiculopathy<sup>(9,10)</sup> may also be present with some acromegalic features<sup>(7,8)</sup>, vertebrobasilar insufficiency, obesity, arcus senilis, xantomas, arterial hypertension and peripheral edema. Hypothyroidism, adult-onset diabetes mellitus<sup>(11)</sup> and sleep apnea<sup>(12)</sup> are less common.

Differential diagnosis include:

- Diffuse idiopathic skeletal hyperostosis or Forestier disease<sup>(13)</sup> as seen in middle-aged and elderly individuals who develop ligament ossification, periarticular osteophytosis and bone production on tendon insertions<sup>(12,16)</sup> occurring in different locations of the spine
- Cervical disc disease with intervertebral discs herniating anteriorly
- Esophageal disease from strictures or tumors that can produce progressive dysphagia
- Carcinoma of the posterior tongue or pharynx
- Soft tissue tumors extrinsically compressing the upper esophagus which are usually unilateral
- Spine tumors such as chondromas of the vertebral bodies

Other laboratory studies that could assist in the specific diagnosis include calcium, phosphorus, magnesium and uric acid determinations with rheumatology profile, erythrocyte sedimentation rate and growth hormone.

Final diagnosis may be derived from the history of a previous traumatic event to the cervical spine (including surgical procedures) followed years later by progressive dysphagia and phagodynia, in which case cervical hyperostosis may be suspected<sup>(15,16)</sup>. Radiographic confirmation would include cervical spine series (especially lateral views), and MRI which would reveal the extent of the process as well as the involvement of intervertebral discs, ligaments and apophyseal joints, and in advanced cases, compressive myelomalacia. If the disc height is preserved, the diagnosis of hyperostosis is confirmed, whereas in the case of anterior disc herniation, it would be reduced<sup>(4)</sup>. This is important as the type of treatment may differ. Video fluoroscopy may show the dynamic limitations produced by osteophytosis as well as ligament calcifications.



**Figure 1.** Axial CT-scan at C<sub>3</sub>-C<sub>4</sub> level showing calcification of the anterior longitudinal ligament (L) as a part of a skeletal hyperostotic mass (O) (between arrow heads). There is marked compression to the aero-digestive tract.



**Figure 2.** Sagittal view of an MRI of the cervical spine demonstrating considerable cervical spondylosis with osteophytic formation from C<sub>1</sub> to C<sub>7</sub>. There is severe esophageal compression by the spondylitic formation.



**Figure 3.** Barium swallow depicting an almost complete block of the esophagus (E) at the C<sub>3</sub>-C<sub>4</sub> level where the osteophyte formation was the largest.



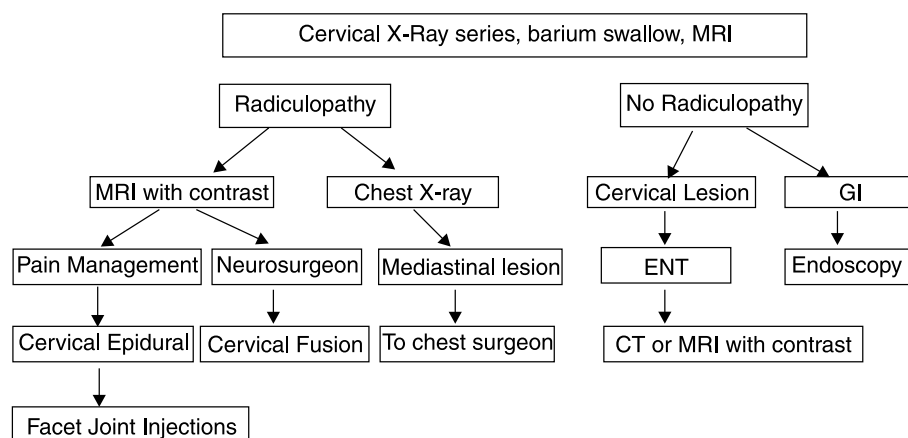
**Figure 4.** Transoperative lateral view of the cervical spine showing an endotracheal tube (T) in place and a metal surgical probe (P) displacing anteriorly a large osteophyte indenting the endotracheal tube and compressing the esophagus.



**Figure 5.** Postoperative lateral view of the cervical spine without the osteophyte with a triangular bone graft fusion (f).



**Figure 6.** Sagittal view of the cervical spine demonstrating an anterior cervical disc herniation at C<sub>2</sub>-C<sub>3</sub> level, plus osteophyte formation with calcification of the anterior longitudinal ligament. The epiglottitis (e) indicates narrowing of the airway (between arrows).



**Figure 7.** Algorithm to diagnose patients with neck pain and dysphagia.

In chronic severe cases, to rule out pharyngeoesophageal pathology, a barium swallow (Figure 3) and esophageal motility studies are indicated; endoscopy of the pharynx and upper esophagus are indicated only if needed. When soft tissue tumors are suspected, a CAT scan of the neck and thorax may be helpful. Bone scans with scintigraphy may reveal the involvement of other tendinous, osseous structures<sup>(17)</sup>. Kiss et al.<sup>(18)</sup> found frequent hyperuricemia questioning the term “idiopathic” that has been given to this disease<sup>(7)</sup>. The pathophysiology is usually characterized by a progressive wearing of the anterior intervertebral cartilage that is gradually replaced by new bone (osteophytes). As the water content of the cartilage decreases (desiccation), it becomes brittle. In the cervical spine, uncovertebral joint disease occurs mostly from C<sub>3</sub> to C<sub>7</sub><sup>(19)</sup>, but may also affect the apophyseal joints with deterioration of the cartilage and narrowing of the joint surfaces. Calcification of the anterior and/or posterior longitudinal ligament may take place. Rosenbloom and Silverstein<sup>(20)</sup> proposed that formation of advanced glycation-end products as a result of non-enzymatic reaction of glucose with proteins may cause stiffening and induration favoring calcium deposition. The clinical syndrome may include headaches, neck pain, occipital neuralgia or cervical brachioradiculopathy, from nerve root compression by osteophytes located at different points of the lateral foramina with irregular spur formation<sup>(2,17)</sup>. For guidance in making the diagnosis, an algorithm was constructed (Figure 7).

Since a metabolic disorder has been suspected, Shengy et al.<sup>(7)</sup> and Julkunem et al.<sup>(21)</sup>, related this disease to hyper-

glycemia, hyperinsulinemia<sup>(15,21)</sup>, obesity and adrenal gland disorders, indicating a complete endocrinological work-up. When several intervertebral levels are involved a vertical bone wedge may be needed after excision of the osteophytes. In the case with a large osteophyte that nearly obstructed the esophagus (Figures 2, 3, 4 and 5) tracheal intubation by direct laryngoscopy was difficult, requiring fiberoptic endoscopy to insert the endotracheal tube. Patients with this condition may also have sleep apnea with partial airway obstruction requiring special precautions<sup>(8,22-24)</sup>, when patients undergo anesthesia for other operative procedures or in the perioperative period of the corrective operation.

Other diagnosis might have to be ruled out, such as ossification of the anterior longitudinal ligament<sup>(25)</sup> or the so-called “pivoting larynx”<sup>(26)</sup> as a cause of dysphagia. Since anterior HNP and severe osteophytosis may be concurrently present in the same patients; it is important to identify them specifically so an operative plan can be devised for each intervertebral space. The frequency (44%) of lateral foramina narrowing predisposes to the high recurrence of radiculopathy symptoms in this group of patients<sup>(8)</sup>. Airway compromise can occur manifesting itself during deep sedation, endoscopies, tracheal intubation<sup>27,28</sup>.

Recognition of this pathology focuses attention to this hazardous complication of cervical osteophytosis and degenerative disc disease, requiring specific diagnosis of the cervical spine pathology plus cardiovascular and/or metabolic derangements and specific treatment of the above.

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