How to diagnose and treat symptomatic anterior cervical osteophytes?

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Introduction: Forestier disease, a cervical anterior form of diffuse idiopathic skeletal hyperostosis (DISH) is electively diagnosed in the elderly population. ENT symptoms are likely prevalent (dysphagia, and less frequently dysphonia, dyspnea, etc.), but diagnosis and the relation between symptoms and anterior longitudinal ligament ossification can be difficult to demonstrate. Starting from two clinical cases and a review of the literature, the authors propose a diagnostic and therapeutic course of action.

Materials and methods: A typical description of Forestier disease is related based on the cases of two 80- and 79-year-old men referred with gradually worsening swallowing problems leading to dysphagia. Both underwent surgical resection of cervical osteophytes via a lateral cervical approach after failure of the medical treatments.

Discussion: Based on the clinical presentations and the analysis of the literature, the authors describe the clinical features of the cervical anterior form of DISH presenting with ENT symptoms. The diagnosis and conservative therapeutic, and surgical management of anterior cervical hyperostosis based on ongoing gradual solutions are described.

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Introduction

Spinal osteophytosis is a frequent disease in the elderly population. More than 75% of people aged 65 years and older experience cervical vertebra modification. Osteophytes are present in 20–30% of the general population but most often remain asymptomatic [1].

The development of anterior cervical osteophytes mainly involves the cartilage-periosteum attachment and capsule-ligament traction areas. This is a non inflammatory enthesisopathy of the anterolateral regions of the spinal cord, predominating at the thoracic level and in the elderly subject. A number of factors are responsible for the local osteogenesis, notably mechanical factors [2]. Anterior cervical osteophytes can be isolated or diffuse; they are most often idiopathic and part of a form called Forestier disease (diffuse idiopathic skeletal hyperostosis). It may also be a traumatic or iatrogenic form (particularly following spinal surgery).
The presence of anterior cervical osteophytosis most often presents no symptoms. Non-specific painful manifestations of the cervicalgia type are possible in the symptomatic forms. The neurological signs (neuralgias, pyramidal syndrome, posterior cord syndrome) are exceptional except in cases of association with hyperostosis with posterior vertebral development [3].

The specific ENT symptoms vary. The problem is most frequently revealed by discomfort when swallowing, progressively evolving toward dysphagia. According to Grandville et al. [4], 10.6% of people presenting dysphagia have cervical osteophytes. Other causes of dysphagia (expansive neoplastic processes, injury, neurological impairment, diverticula, pharyngeal or esophageal stenoses) should be ruled out before retaining osteophytic compression as imputable. Dysphagia related to cervical osteophytes appears progressively, initially with solids and then with fluids. It can increase to the point of aggravating and producing aphagia with weight loss and alteration of the patient’s general health. The laryngeal signs described in the literature are dysphonia or stridor; dyspnea with exceptionally acute respiratory distress is possible. A cough and bronchopulmonary aspiration have also been reported [5]. Food blockages can also be found with lower anterior cervical osteophytosis. Compression of the anterior vertebral arteries can participate in the onset of dizziness, but the imputability thereof does not appear to be irrefutable [6].

Based on two clinical cases and the data published in the literature, the authors propose a practical diagnostic and therapeutic strategy for the ENT physician examining a patient with symptomatic anterior cervical osteophytosis.

**Clinical cases**

Patient 1 was a 79-year-old male, followed for progressive dysphagia for solids, who was referred to the ENT department of the Nantes University Hospital for aphagia lasting 48 hours, accompanied with inspiratory dyspnea that was well tolerated. The patient’s history indicated known Forestier disease lasting several years, blindness due to age-related macular degeneration (ARMD), and a vallecular cyst diagnosed 1 year before admission. The patient did not consume alcohol and did not smoke.

The clinical examination with the tongue depressor immediately showed a firm mass of the posterior pharyngeal wall coming in contact with the base of the tongue and interfering with tongue protraction. This firm mass had a bony consistency upon palpation.

The nasal endoscopic examination confirmed this firm mass extending from the posterior pharyngeal wall to the junction with the hypopharynx (Fig. 1), hiding the glottis whose mobility was preserved. No suspicious neoplastic lesion was observed.

The patient had already undergone several explorations for his dysphagia:

- **Plain lateral X-rays of the cervical spine found marginal anterior hypertrophic osteophytosis centered on C3–C4;**
- **Esogastroduodenal fibroscopy showed extrinsic compression with normal mucous membrane, a hiatal hernia with stage I peptic esophagitis mucosa, and bulbar inflammation with alveolar and polypoid mucosa;**
- **Esogastroduodenal transit examination showed signs of extrinsic compression of the posterior wall of the hypopharynx opposite C3–C4 and an absence of Zenker diverticula;**
- **The cervical CT demonstrated the characteristics of anterior marginal osteophytosis that had developed involving C3, C4, and C5 as hypertrophy on the right of 1.5 cm in the anteroposterior plane, 3 cm wide, and 4.5 cm high.**

Before being referred to the Nantes University Hospital, the patient had been treated medically for upper dysphagia with hygiene and dietary measures (adaptation of the diet) and non-steroid anti-inflammatory drugs (NSAIDs) intermittently for 15 months.

When symptoms abruptly worsened with aphagia associated with inspiration dyspnea, antibiotic treatment combined with oral corticosteroid therapy were prescribed and maintained for 6 days. This treatment reduced the dyspnea and oral intake of soft foods was resumed.

Surgical treatment was performed under general anesthesia with uncomplicated orotracheal intubation. Resection consisted in partial anterior vertebral corporectomy via a retrolaryngeal lateral cervical approach (Fig. 1). Suction drainage was maintained for 48 hours. The resected specimen measured 4.7 × 2.8 × 1.8 cm in its largest dimensions, corresponding to the modified bone with a thick and fissured cortex and zones of cartilaginous differentiation. Solid food was resumed in the evening of the surgery with no problems. Respiratory function was normalized by the early postoperative period. The nasogastric tube was removed on day 1. One month after the operation, the patient was eating normally with no dysphagia and the clinical and nasal endoscopic examinations were normal.

Patient 2 was an 80-year-old male who presented progressive dysphagia assessed at least 4 months after onset. The patient’s history included non-insulin-dependent diabetes, hypertension, an operated lumbosacral herniated disc, and a cholecystectomy. No alcohol consumption or smoking were found upon questioning the patient.

At the time of questioning, the dysphagia was invalidating and responsible for weight loss totaling 5 kg over 3 months, bronchopulmonary aspiration, as well as intermittent nocturnal dyspnea.

The clinical examination of the oral cavity and the oropharynx were normal. The nasal fibroscopy examination found a firm mass at the posterior pharyngeal wall beginning at the height of the laryngeal edge, extending into the hypopharyngeal area. Larynx mobility was preserved.

The cervical CT exam showed left anterior marginal osteophytosis involving C3 and C4 compressing the posterior wall of the hypopharynx in contact with the epiglottis (Fig. 2).

Treatment was surgical, preceded by a panendoscopic exam at the beginning of the procedure to rule out any other etiology. Otorhachal intubation was uncomplicated. Partial anterior vertebral corporectomy with a left cervicotomy via the retrolaryngeal approach allowed us to resect an osteophytic fragment measuring 2 × 2 × 2.8 cm (Fig. 3). The exposed anterior vertebral wall was reamed and bony
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Figure 1  Endoscopy and surgical resection of the osteophyte. A. Preoperative view of the oropharynx: firm mass of the posterior pharyngeal wall related to cervical osteophytosis; the base of the tongue is at the front (*). B. Preoperative view of the oropharynx after intubation visualizing the larynx in front (arrow) and the esophagus at the back (arrowhead), partly hidden by the osteophytosis. Note the presence of the nasogastric tube. C. Operative view of the osteophytosis. D. Osteophytosis being resected with an osteotome.

Figure 2  CT imaging. A. Axial view of cervical spine, C3. Left anterior cervical osteophyte, C3. B. Medial sagittal view of cervical spine. Anterior beak-shaped cervical osteophyte cervical at C3–C4, in contact with the epiglottis and reducing calibre of the aerodigestive tract.
hemostasis was promoted with Horsley bone wax. Suction drainage was maintained for 48 hours.
There were no postoperative complications and food intake was resumed the same evening with no respiratory discomfort observed.

**Discussion**

According to the data published in the literature, anterior cervical osteophytosis is responsible for dysphagia (the most frequent symptom) in 6–28% of these patients [5,7,8]: it most often remains totally asymptomatic. Dysphagia is isolated in nearly 75% of the cases and associated with dyspnea in 14% of patients; stridor is only reported in 3% of cases. Swallowing impairment with aspiration is found in 9% of cases, cervical pain and cough in 3%. Dysphonia is a rare symptom, found in 2.5% of patients; sleep apnea syndrome [9], reflex otalgia, rhinolalia [10], and cervical emphysema [11] are reported more anecdotally. The literature reports only five cases of patients with symptomatic osteophytes revealed by dyspnea without associated dysphagia [6,12—14]. Isolated or diffuse osteophytosis is sometimes reported as being the source of intubation difficulties [15,16].

The physiopathological mechanisms to explain the symptomaticity are simple and dominated by the hindered peristalsis caused by the osteophytosis at the posterior pharyngeal wall [17]. Food is blocked for the most part at the piriform sinus, thus causing dysphagia. Reduction of epiglottis mobility and limited elevation of the larynx can participate in the onset of dysphagia as well as in aspiration. Dyspnea may result not only from the obstacle narrowing the airway, but also retrocricoid inflammation that can lead to reduced vocal cord mobility, also explaining cases of dysphonia and/or stridor in dysphagia.

Clinical examination should always be completed by nasal endoscopy, which can demonstrate the firm mass of the posterior pharyngeal wall in nearly all the cases described.

The complementary exams described are mainly plain lateral X-rays of the cervical spine, esophagoduodenal transit, and cervical CT. Some authors perform magnetic resonance imaging (MRI) looking for intramedullary involvement. In cases with preponderant respiratory signs, respiratory function tests, thoracic imaging (plain X-ray and CT) are recommended. Most teams recommend a panendoscopic exam with biopsy of the pharynx and larynx to rule out neoplastic etiology [13]. In our experience, this test can be performed during surgery.

It is important to remember that there has been no correlation reported between the size of the osteophyte and patient symptoms, but rather between patient age and symptoms. This brings to the forefront the importance of underlying presbyphagia as a contributing factor that can make Forestier disease symptomatic [18].

Analysis of the main publications shows that a variety of therapies are used: most often, medical management is initiated with hygiene and diet measures, ideally with the assistance of a dietician capable of defining the patient’s calorie needs. Mixed, soft, semiliquid foods or the use of food complements are highly useful solutions for managing elderly patients with often major comorbidities. These measures can obviate the need for general anesthesia and surgery for the least symptomatic patients for this slowly progressing disease. Monitoring the patient’s weight is the main concern in these patients in whom aggressive therapies should be avoided. Antalgics, myorelaxants, and NSAIDs in case of mild to moderate dysphagia and cervical pain seem to improve symptoms [4]. In cases of laryngeal edema, antireflux agents and steroidal anti-inflammatory medications can also be given as a therapeutic test.

Surgery can be envisioned when dysphagia is severe and approaches aphagia, or if the patient has experienced substantial weight loss. In this severe symptomatic situation, in patients whose general health is deemed too precarious, particularly in terms of anesthesia, surgery carries a not insignificant risk. The alternative is to propose enteral nutrition via nasogastric tube and particularly gastrostomy, which can most often be percutaneous, endoscopic, or radiologic. Parallel to the indications based on the digestive symptoms, the presence of neurological signs of compression (myelitis), obstruction of the upper airway, and finally failure of the other therapeutic solutions make up the classic indications for surgery [19].

With acute respiratory distress, primary tracheotomy is sometimes reported to reopen the airway; tracheotomy can also appear necessary in cases of uncertain diagnosis, particularly if the larynx cannot be visualized before
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the intervention. Surgical resection of the osteophytes involved is performed under general anesthesia after the aforementioned primary tracheotomy [14]. The majority of the resections involve C3–C4 or C4–C5. The classically described resection can be considered non neurosurgical since it only includes osteophyte resection with no dissec- tomy or spinal fixation [20]. The endo-oral approach is not used because of the resulting mucosal wound, which para- doxically complicates the post-surgical period more than the external extramuscular approach. Cervicotomy is more often laterocervical. Only a single case in the literature mentions a posterior cervical approach that may facilitate exposure of the C3–C6 according to the authors [21].

The classical surgical risks described are the following:

- hematoma;
- resection or compression of the superior and/or infe- rior laryngeal nerves, the marginal mandibular branch of the facial nerve, the hypoglossal nerve or its descending branch, and the cervical sympathetic nerve;
- salivary fistula following mucosal lesion;
- esophageal perforation and infection [22].

The vast majority of articles report no postoperative complications and disappearance of the symptoms. In our experience, food intake can be resumed the evening of surgery. Patients who were initially tracheotomized were all extubated in the 2 months following osteophyte resec- tion surgery. Only one case of intraoperative death has been described in the literature, a patient treated with partial anterior vertebral corporectomy [7]. It is accepted that it is not necessary to perform postop- erative imaging since the evaluation criteria are above all symptomatic, in particular ease of food intake and weight.

**Diagnostic and therapeutic course of action**

Asymptomatic isolated or diffuse (Forestier disease) anterior cervical osteophytosis requires simple monitoring. It actu- ally goes undetected in most cases. With dysphagia, it can be imputably shown by the range of arguments provided by the nasal fibroscopy exam, the esogastroduodenal transit exam, plain lateral X-ray of the cervical spine, and CT of the cervical spine. The other causes of dysphagia (neoplasm, diverticula, neurological disorders, stenosis) should be ruled out during the clinical and paraclinical examina- tion, completed by a panendoscopy with biopsy samples if any doubt remains. The presence of cervical pain or dysphagia with no repercussions on weight first requires hygiene and dietary measures (mixed, softened foods with dietary comple- ments), antalgics, and myorelaxants associated with NSAIDs. The latter can be used intermittently if there is no contra- indication related to the patient’s background and age (in particular gastroduodenal ulcers or renal failure).

In cases of therapeutic failure, increased dysphagia with weight loss, the appearance of laryngeal signs (dyspnea, dys- phonia, cough, aspiration), the patient should be referred to a surgical team for possible osteophyte resection. Asso- ciation with respiratory signs should raise the suspicion of possible abrupt decompensation if there are additional fac- tors of local inflammation (gastroesophageal reflux, upper airway infection, smoking) that may require tracheotomy, most often temporary. Neurological signs (signs of focaliza- tion through compression), although rare, must be sought given their severity and the need for neurosurgical manage- ment.

The preferred approach is lateral cervicotomy on the side of the osteophyte, via the pre sternocleidomastoid and then retrolaryngeal approach, paying particular attention to preserving and not elongating the recurrent laryngeal nerve. Disinsertion of the long muscle of the neck from the vertebra- l body, without going beyond their lateral edges and pushing the tracheal and digestive track aside exposes the anterior wall of the vertebral body [21]. The pharyngeal mucosa is delicately dissected using an elevator so that it is not injured during osteophyte resection. Resection limited to the salient part of the osteophytes toward the pharynx is sufficient. Neither disectomy nor spinal stabilization is necessary in this case. Depending on their size and their pro- jection, the osteophytes can be resected using an osteotome and/or reaming. The patient should always be informed of the risks of tracheotomy if intubation is difficult upon waking. Fiberscopically guided intubation can be proposed, but exposure of the larynx only seems hindered late in the procedure.

**Conclusion**

Anterior cervical osteophytosis is an unexceptional occur- rence, encountered electively in the elderly subject. It is most often asymptomatic, revealed characteristically by the progressive appearance of ENT symptoms such as dysphagia and more rarely by dysphonia and dyspnea. Com- plementary exams are indispensable to the positive and differential diagnosis. Initial management is medical and always reserved for the symptomatic forms. Anterior verte- bral corporectomy surgical treatment is effective and can be pro- posed in cases of serious signs, substantial weight loss, or failure of medical treatment if the patient’s general health makes it feasible. When the general health is too precari- ous and there are no respiratory signs, enteral feeding with gastrostomy should be envisioned.

**Conflicts of interest**

None.

**References**


