A 53-year-old woman presented with a history of neck pain for several months, occipital headache, restricted neck rotation, and right upper limb and face paraesthesias. The neurological examination revealed mild and diffuse deep hyper-reflexia. The patient was otherwise healthy and denied any history of trauma. Inflammatory indicators were not altered.

**Imaging Findings:**

Cervical magnetic resonance imaging (MRI) demonstrated osteostructural alterations, low signal on both T1- and T2-weighted images (Fig 1) and intense paramagnetic contrast enhancement on T1-weighted images (Fig 2), especially at the apical portion of the dens and the right hemi-portion of the anterior arch of the atlas. A computed tomography (CT) was performed to complete the diagnosis and showed irregular calcifications in the soft tissue near the odontoid process without apparent involvement of the transverse ligament of atlas (TLA), bone surface erosions and diffuse cervical degenerative joint disease (Fig 3). A trans-pharyngeal endoscopic biopsy of the odontoid process lesion demonstrated the presence of calcareous concretions in a fibrocartilaginous matrix.

**Discussion:**

The crowned dens syndrome (CDS) is characterised by the association of radiological calcifications of the cruciform ligament around the odontoid process and cervical pains with restricted neck rotation, fever and increase in inflammatory indicators. Neurological complications can rarely occur if large cervical calcifications determine spinal stenosis or cervical myelopathy [1]. The crowned dens deposits can be caused either by calcium pyrophosphate dehydrate (CPPD) or by hydroxyapatite. About 65% of patients have articular CPPD depositions within knee, wrist and ankle joints [2].

Cervical CT is the gold standard imaging modality in that it can show irregular calcifications crowning the dens apex and bone erosions of the dens [3]. In particular, it is important to scan every single part of the cruciform ligament: the
transverse ligament of the atlas (TLA) and its vertical extensions (superior and inferior longitudinal fibres), the two alar ligaments and the apical ligament.

Cervical MRI is generally useless in making the diagnosis; however the use of paramagnetic contrast can demonstrate the inflamed pannus and the cord compression.

The spontaneous duration of these clinical manifestations is very variable, but symptoms usually subside within a few weeks [4].

Nonsteroidal anti-inflammatory drugs (NSAIDs) are the gold standard treatment, as they provide rapid pain relief within a few days [5].

CDS should be considered in the differential diagnosis of a possible aetiology for fever, headache and cervical pain of unknown origin [6], in order to avoid invasive and unnecessary investigations (such as biopsy or lumbar puncture), erroneous treatment and prolonged hospitalisation.

Written informed patient consent for publication has been obtained.

**Differential Diagnosis List:** Crowned dens syndrome, Polymyalgia rheumatica, Meningitis, Giant cell arteritis, Discitis, Cervical spondylosis, Rheumatoid arthritis, Ankylosing spondylitis

**Final Diagnosis:** Crowned dens syndrome

**References:**


Description: T2-Weighted Sagittal MRI showed osteostructural alterations and low signal at the apical portion of the dens and diffuse cervical degenerative joint disease. Origin: Department of Radiology Sant'Anna Hospital, Ferrara, Italy
Description: T1-Weighted Sagittal MRI showed osteostructural alterations and low signal at the apical portion of the dens and diffuse cervical degenerative joint disease. Origin: Department of Radiology Sant'Anna Hospital, Ferrara, Italy
Description: T1-Weighted Sagittal MRI with gadolinium showed intense paramagnetic contrast-enhancement at the apical portion of the dens. Origin: Department of Radiology Sant'Anna Hospital, Ferrara, Italy
Description: T1-Weighted Coronal MRI with gadolinium showed intense paramagnetic contrast-enhancement at the apical portion of the dens. Origin: Department of Radiology Sant'Anna Hospital, Ferrara, Italy
Description: Coronal CT examination showed bone surface erosions of the dens and irregular calcifications in a crown-like distribution around the odontoid process. Origin: Department of Radiology Sant’Anna Hospital, Ferrara, Italy
Description: Sagittal CT examination showed bone surface erosions of the dens, irregular calcifications around the odontoid process and diffuse cervical degenerative joint disease. Origin: Department of Radiology Sant'Anna Hospital, Ferrara, Italy
**Description:** Axial CT examination showed bone surface erosions of the dens and of the right hemi-portion of the anterior arch of the atlas and irregular calcifications around the odontoid process. **Origin:** Department of Radiology Sant'Anna Hospital, Ferrara, Italy
Description: Coronal CT examination: it is helpful to measure CT density to discriminate between a normal TLA (35–110 HU) and the calcifications around the TLA (202–258 HU). In our case, the CT density was about 252 HU. Origin: Department of Radiology Sant'Anna Hospital, Ferrara, Italy
Description: Axial CT examination showed the transverse ligament of the atlas. Origin: Department of Radiology Sant'Anna Hospital, Ferrara, Ital