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Cervical spine disc herniation at C2-C3 level: Study of a Clinical Observation and Literature Review

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Abstract: Cervical C2-C3 herniated disc is rare. It is characterized by its clinical polymorphism. Several surgical approaches have been described for the discectomy of a herniated disc. This work aims at discussing through personal observations and literature review clinical semiology and surgical treatment.

Key words: C2-C3 herniated disc/ clinical presentation / surgical treatment

Introduction

The cervical herniated disc is common especially in the C5-C6 and C6-C7 lower segment; as for the C2-C3 segment, it occurs in the elderly and results in common clinical symptomatology. Its diagnosis and management remain delicate. Indeed, as it is difficult to perform the C2-C3 disc exposure, this makes it difficult to carry out exeresis, and leads to an obsession for surgeons. We are hereby reporting a case of C2-C3 herniated disc in a young patient.

Clinical Presentation

A 34-year-old patient complained of neck pain associated with distal weakness in upper limbs, located in fingers.

This clinical history started a month ago with a neck pain (torticollis) felt when in

sitting position for long periods. Then, the patient found out about her hands being weak when making gestures and trying to grasp, predominantly on the right-hand side.

No spine trauma history was found during history taking.

Clinical examination found a distal brachial paresis affecting C8 and T1 roots with a motor deficit on a side at 3/5 left and 2/5 right. Deep tendon reflexes were normal in all limbs. There was no sign of a pyramidal syndrome.

MRI and CT scan of the spine revealed a posterior medial C2-C3 herniated disc lateralized to the right, compressing the cervical spinal cord and the thecal sac (Figures 1 and 2).

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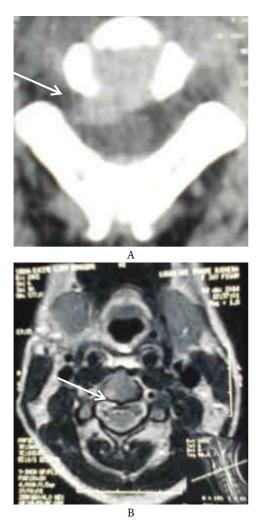


Figure 1 - TDM axial section showing a posterior median C2-C3. And axial MRI sequence showing the C2-C3 disc herniation



Figure 2 - T2 sagittal MRI sequence (A) showing C2C3 disk herniation and (B) post-operative control showing the freedom of the dural sheath and highlighting the cage in place within the disc space C2-C3

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Figure 3 - CT scan in front of view(A) and sagittal view after removing (A) C2-C3 disk herniation and (B) post-operative control highlighting the cage in place within the disc space C2-C3

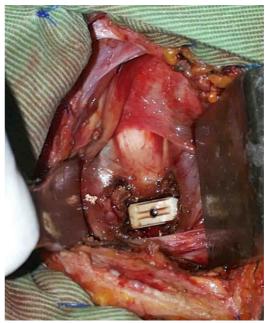


Figure 4 - Peroperative view

Surgical technique

The incision primarily chosen was right anterolateral and pre-sternocleidomastoid. The procedure was performed under fluoroscopy and surgical microscope.

Under general anaesthesia and naso tracheal intubation, the patient was installed in the supine position, head on a headrest, hyperextension and turned to the left at 45°, a block under the shoulders, arms along the body. After rigorous asepsis, a C2C3 level fluoroscopy tracking, then the front edge of the sterno-mastoid muscle fluoroscopy tracking by palpation was performed.

The incision was made from a curved line with dorsal concavity along the anterior edge of the right sterno-mastoid muscle towards the right mastoid. (Figure 3)

After separating the platysma muscle, we performed a gradual dissection to the upper

thyroid artery we ligated. Installing spacers enabled reclination of the sterno- cleido mastoid, homo-hyoid muscles and nervous vascular package outside and inside aerodigestive tracts exposing the anterior longitudinal ligament. A C2-C3 discectomy was performed with an intersomatic cage set up.

At the end of the operation a check through imaging was performed to verify whether the thecal sac was free and the mounting stable (Figures 4, 5, 6 and 7).

Discussion

The C2-C3 herniated disc is very rare [11, 16]. To our knowledge this case represents the thirtieth (30th) case published in the literature [1-12; 15-19] (Table No. 1). Its incidence is estimated at 0.45% [11]. The most frequently affected are C5-C6 and C6-C7 levels. Indeed in the young patient, the cervical spine will recover its maximum mobility in lower segment undergoing more stress during a movement. As senescence occurs, bone remodelling (uncocervicarthrose) and discal remodelling (degeneration) takes place resulting in a fusion of the lower discs, which significantly reduces the mobility of the lower segment and increases the load distribution to the C2-C3 and C3-C4 disc [16]. Therefore, the C2-C3 disc herniation is a condition for the elderly with a mean age of onset at 67 [5, 7]

Except for the strain, strenuous activity, repeated lifting of heavy loads [8], no other factor

favouring has been incriminated in our patient.

Its late onset, usually in the context of degenerative damage, reflects the diversity of clinical signs, from simple sensory and / or motor radiculopathy to Brown Sequard syndrome or severe myelopathy [1, 3, 5, 11]. The distal brachial paresis noted would be the expression of an incipient myelopathy.

In many cases imaging reveals an excluded hernia with retro odontoid migration leading to the issue of differential diagnosis with the masses among which there are metastases, meningiomas, neurolemmomes and synovial cysts [1, 4,5-19]. The simple hernia without migration form is diagnosed early, justifying the brevity of the clinical history of the patient; (Table 1).

Several surgical approaches have already been described but there is no consensus as regards the choice of the first one. This is the area around posterior Trans dural [16] and epidural, of the Trans oral odontoidectomy [2], and the anterolateral area.

The major limitation of the posterior tract is the risk of neuro-aggressiveness and reduced stability due to non-economic resections of parts of posterior columns of Denis [16, 17,19]

The oral trans odontoidectomy is aggressive and requires occipital cervical fusion; it is indicated in cases of excluded hernia with retro dens migration. Strict lateral approach is very rarely practiced and thus limited to the lateral foraminal hernia [14].

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TABLE 1

Review of cases published in literature

ACDF: Anterior cervical discectomy + autograft fusion

	Number		Location of the		Outcome
Authors and Year		Presentation	disc material	Surgical technique	
Espersen et al, 1984	1		C2-C3 level	Cloward's technique	
Jomin et al, 1986	2		C2-C3 level	ACDF	
Rosemberg et al, 1991	2	Myelopathy	Retro-odontoïd	Posterior transdural	1 improved, 1 stable
Nishizawa et al, 1996	1	Myelopathy	Retro-odontoïd	Posterior transdural	
Chen and Luis, 1997	1	Myelopathy	Retro-odontoïd	Transoral odontoidectomy+C1-C2 fusion	improved
Nishizawa et al, 1999	3	Myelopathy	2 Retro-odontoïd 1 C2-C3 level	Posterior transdural	all improved
Antich et al, 1999	1	Myelopathy	C2-C3level	ACDF	improved
Campbell, 2000	1	Myelopathy	Retro-odontoïd	Transoral odontoidectomy	
Chen, 2000	8	Myelopathy	C2-C3 level	ACDF	6 improved 2 stable
Matsutano et al, 2004	1	Myelopathy	Retro-odontoïd	Far lateral	
Deshmukh et al, 2004	1	C2 Radiculopathy	Retro-odontoïd	Posterior extradural	improved
Türe et al, 2007	1	C3 radiculopathy	C2-C3 level	Anterolateral extradural approach	improved
Chan et al, 2009	1	Myelopathy	C2-C3 level	C3 transcorporeal	
Kotil et al, 2011	5	Myelo-radiculopathy C2-C3	C2-C3 level	Discectomie antérieure + greffe	3 improved, 2 stable
N'Dri et al, 2014	1	Myelo-radiculopathy	C2-C3 level	Anterolateral extradural approach	improved

The choice of the anterolateral approach in our patient is supported by the initial seat of the compression and the effectiveness of past approaches in cases where the two approaches are possible [13,10]. Indeed a retrospective study conducted in hospitals [7] has confirmed the efficacy of surgical treatment of cervicarthrosic myelopathy by anterior decompression in the event of pain and predominant and posterior brachialgia if

patients are in bedridden or precarious condition. The deep location of C2-C3 disc, the control of the vertebral artery V2 segment and obesity makes it very difficult to expose the disc and makes its surgery a challenge [11, 13]. Although its anatomy is not different from the other discs, practitioners avoid the introduction of osteosynthesis material at its level [10,16]. Our gesture being limited to discectomy, the intersomatic cage was the best

anatomy restoration means compatible with spinal stability and satisfactory mobility.

Conclusion

The C2-C3 herniated disc is very rare and usually occurs in the elderly. When it occurs in young subjects its treatment offers the patient the preservation of mobility, reduction in the degeneration of adjacent segments and a significant clinical improvement.

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