PERCUTANEOUS AUTOMATED NUCLEOTOMY IN THE DIAGNOSIS AND TREATMENT OF A HERNIATED JUVENILE CERVICAL INTERVERTEBRAL DISC CALCIFICATION : CASE REPORT *

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ABSTRACT :

A nine-year old female patient with a resistent neck pain and torticollis had a mass lesion compressing the dura at C2-3 disc level. We performed percutaneous automated nucleotomy technique easily under local anesthesia either to decompress dura, and to make differential diagnosis. She had a rapid relief of pain and spasm after surgery, and the decompression was satisfactory on her postoperative cervical magnetic resonance images. The bacteriological investigations were negative, and the histopathological diagnosis was a calcified and degenerated disc tissue. So, we recommend nucleotome as an alternative procedure in approaching certain cervical spine pathologies for either diagnosis or treatment.

Key Words: *Automated percutaneous discectomy, discitis, intervertebral disc, spinal calsification.*

INTRODUCTION

Nucleotome is an instrument which has been desined and used for disc excision. The disc tissue is cut and aspirated by it (7). The decrease in the intradiscal pressure results with decompression of the involved nerve root and regression of the symptoms (15). It has been published that nucleotome can be used for the diagnosis and treatment of either lumbar osteomyelitis, or discitis (11). In these cases, using percutaneous automated nucleotomy instead of a simple needle biopsy technique, provides not only the aspiration of more material for the histopathological and bacteriological examinations, but also leads to a rapid improvement of the symptoms after evacutaion of pus (16).

We used nucleotome in a case with probable juvenile cervical intervertebral disc calcification for either diagnosis, and treatment. Juvenile intervertebral disc calcification is a very rare condition and characterized by the transient calcification in one or more nucleus pulposus of children (4). The symptoms due to the inflammatory response resulting from the intradiscal calcification, include fever, malaise, limitation of motion due to neck pain and spasm, and are associated with an elevated erythrocyte sedimentation rate, and occasionally, leucocytosis (13). The spontaneous resorbtion of this distrophic calcification is inevitable. But surgical decompression is recommended in cases with resistent radicular pain with an increasing intensity, or spinal cord compression signs (12, 14). Our indication for surgical therapy was her severe neck pain and torticollis which have not been overcome by medical therapy. For this purpose, we used nucleotome and microbiological examinations. The excellent result made us to present this case for impressing the importance of this procedure in diagnosis and treatment of some selected diseases of cervical spine.

CASE REPORT

A nine-year old female patient had a neck pain with a sudden onset. When fever was observed three days later, she was brought to a local hospital. Her physical examination revealed acute tonsillitis. She didn't have any neurological deficit. Among her laboratory investigations, erythrocyte sedimentation rate was 5mm/h, ASO was 1280 IU/cc, and peripheral smear revealed lymphositosis. Agglutination tests for brucellosis, ppd test, C-reactive protein and rheumatoid factor were negative. Plain chest roentgenogram and electrocardiogram was normal. Cervical plain roentgenograms showed an enlargement at the atlantoaxial joind distance, cervical 2-3 (C2-3) and C4-5 disc calcifications, and the irregularity of the endplates of the second, third and the fourth cervical vertebrae (Figure 1). After these initial investigations, computed tomography of the cervical spine had been studied in this local hospital, and a right posterolateral

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herniation of C2-3 disc was delineated in addition to the findings observed on plain x-rays. Then, bone scan which demonstrated "hot spots" in C2 and C3 vertebrae, had been performed for the differential diagnosis of neoplastic, infectious or degenerative processes. Finally, diagnostic evaluation had been finished with magnetic resonance processes. Finally, diagnostic evaluation had been finished with magnetic resonance imaging. The observation of a right posterolateral of C2-3 disc, intradiscal calcifications of C2-3 and C4-5 discs and hyperostosis were in accordance with a sequele of a previous trauma or infection. After all of these investigations, she had been treated with oral penicilline against a probable cervical discitis. When her repeated ASO was under 200 IU/cc after three weeks, antibiotherapy was discontinued. Although she have been using a collar, and analgesic, antiinflammatory and myorelaxant drugs for six months, she couldn't have had relief of neck pain. Moreover, an associated torticollis have appeared.

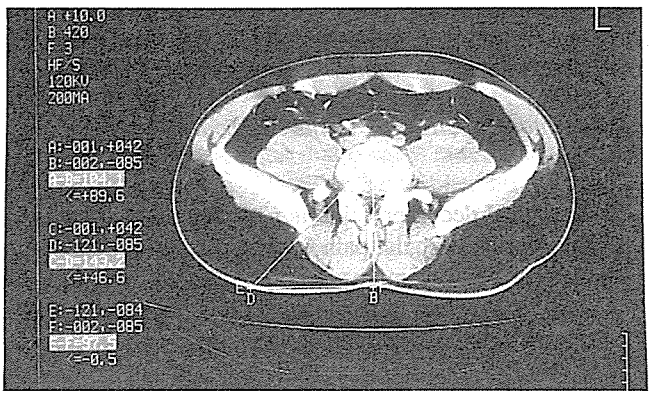

Figure 1: Lateral cervical roentgenogram revealed straightening of the cervical lordosis, calcification in C2-3 and C4-5 disc spaces, and the irregularity of the end-plates of second, third, and fourth cervical vertebraeae.

Then she was brought to our hospital. She still had a severe neck pain and torticollis to right side. She was not able to move her head to its neutral position due to cervical muscle spasm. We couldn't detect any sign of nerve root or spinal cord compression during her neurological examination. Erythrocyte sedimentation rate and ASO were 5 mm/h and <200 IU/cc, respectively. Peripheral smear, microbiological and immunological test didn't reveal any abnormality as an evidence of infection. A right posterolateral mass lesion which have been obliterating the neural foramen, and compressing dure anteriorly at C2-3 disc level, seemed the only pathological neuroradiological finding that could have been leading to pain and spasm. Since she has not respond to antibiotherapy, and there was no evidence of infection among her blood tests, our probable diagnosis appeared as a herniated juvenile cervical intervertebral disc calcification. But the appearence of this lesion could have been the result of a benign or malign tumorous process. Thus, the consultant of pediatric oncology department recommended biopsy from this

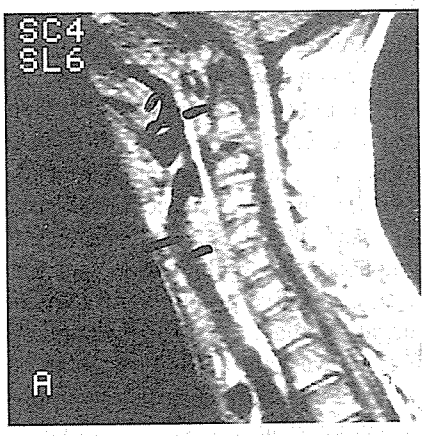

Figure 2 A

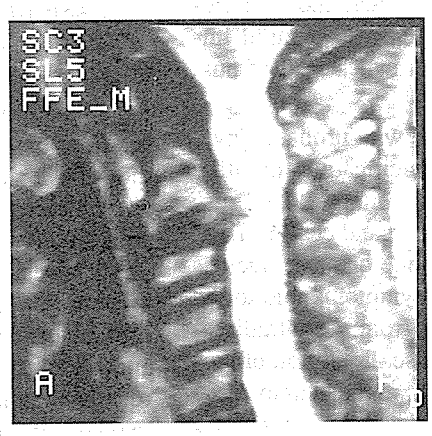

Figure 2 B

Figure 2: On preoperative
A. T1- and, B. T2-weighted MR images there was a mass lesion obliterating the anterior subarachnoidal space at the level of C2-3 disc in which distrophic calcification was also situated.

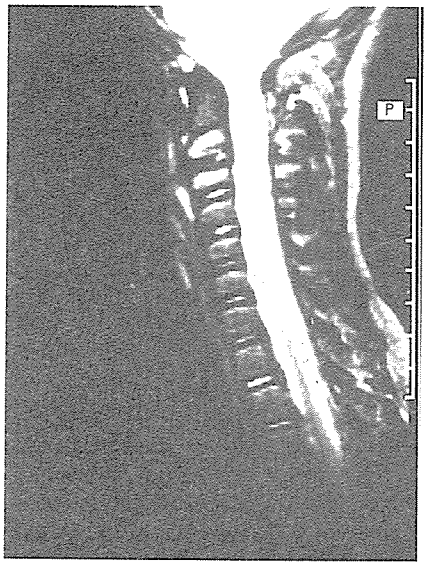

Figure 3 A

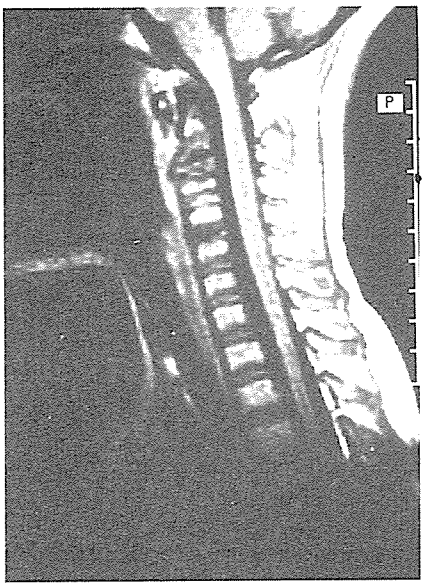

Figure 3 B

Figure 3: Postoperative
A. T1- and, B. T2-weighted MR images showed complete removal of the herniated disc and the opening of the anterior subarachnoidal space.

lesion compressing dura anteriorly at the level of C2-3 disc. Because she had a resistent neck pain and associated torticollis, percutaneous automated nucleotomy was preferred either to decompress dura, and aspirate material for histopathological and microbiological investigations.

The procedure was performed under local anesthesia with the patient in the prone position using a fluoroscopic C-arm. We didn't use antibiotics for prophylaxis. An 18-gauge trocar was first introduced through a small skin incision on the anterior aspect of neck and advanced medially to the common nerve-vessel sleeve to the anterior edge of C2-3 intervertebral disc. Then, a cannula and dilator were placed over the trocar down to the disc space. The dilator was removed and through the cannula and over the trocar a trephine was placed, incising the disc. The trephine and trocar were removed, and the nucleotome was placed into C2-3 disc space to cut and aspirate the tissue. 1 cm3 of material was obtained for histopathological and bacteriological examinations. Finally, surgery was finished after removing the nucleotome and canulla.

Patient had a rapid relief of pain in the immediate postoperative period, and didn't have any neurological deficit. But the reduction in cervical muscle spasm has delayed untill the second postoperative week. Histopathological diagnosis of the material was a disc tissue exhibiting degeneration and calcification, and for the aspiration fluid was an acellular smear. No microbiological agent was observed with gram or Ziehl-Neelsen stains. Also the cultures grew no agent. The cervical MR on her seventh postoperative day showed the disappearance of lesion compressing dura at C2-3 disc level, and posterior longitudinal ligament was in its normal localization. At the end of first postoperative week, her latest ASO and erythrocyte sedimentation rate were <200 IU/CC and 6 mm/h respectively. Seven months have passed after her discharges, and she has no complaint or neurological deficit and her torticollis was completely disappeared. Her latest plain cervical roentgenograms were still demonstrating calcification in C4-5 disc space.

DISCUSSION

Nucleotome was first described for the treatment of lumbar disc herniations by Onik (9, 10) in 1985. Derised disc space is approached percutaneously under fluoroscopic guidence with local anesthesia. Because of a continuous aspiration, disc tissue enters into a small window at the tip of nucleotome, and is cutted there by a pneumatic knife (7). The decrease in the intradiscal pressure results with the decompression of the affected nerve root (1). Percutaneous needle biopsy is widely used in the diagnosis of vertebral osteomyelitis and tumors (3, 5, 6). But the obtained materials are usually very small (6), and this limitation leads to negative cultures and unsatisfactory evacuation of infectious material (3). For these reasons, Onik (11) in 1990 and YU (16) in 1991, have begun to use nucleotome in cases with lumbar vertebral osteomyelitis either for microbiological diagnosis and decompression by evacuating the pus, serosanginous material and the disc tissue. Not only they have observed a rapid improvement in the symptomatology of their cases, but

also obtained adequate material for identifing the responsible microbiological agent, and the specific antibiotic for it.

We performed surgical decompression with automated nucleotome in a patient with juvenile cervical intervertebral disc calcification. Although it is a benign process and the symptoms resolve in 95% of cases during six months (4, 8), our case have been suffering from a resistent and increasing neck pain and torticollis for seven months. Because the distrophic calcification of discs had been thought to be triggered by a local infection with the associated clinical features and laboratory investigations, antibiotherapy was given to her in a local hospital. The failure of this therapy led us to perform surgery either to decompress the disc space, and to obtain samples for histopathological and microbiological investigations. For this purpose, we prefferred nucleotome since it has minimal morbidity and can be used with the infiltration of a local anesthetic (2). The diameter of cannula was over 3 mm and this could be a problem in approaching the involved disc between important anatomical structures of cervical region. Because the distance from the skin was short, we approached C2-3 disc space quickly with the help of a trocar, and then easily placed the cannula over it. Patient didn't have any significant discomfort while we were evacuating material from the disc space under fluoroscopic guidance. As soon as the procedure was finished, almost all of her neck pain have been disappeared. Her postoperative cervical MR showed the excellent decompression at C2-3 disc level, and this was in accordance with the clinical improvement. Because the bacteriological investigations were negative, the trigerring factor for intradiscal distrophic calcification could have been a local trauma (13, 14) or an extensive decrease in critical blood supply of nucleus pulposus during this period of life (8, 14). But, the bacteriological investigations could be negative since the biopsy could have been performed during the period in which autoimmune responses had been developed (4).

CONCLUSION

We believe that nucleotome which had been designed for the treatment of lumbar disc herniations, could be used also in selected cases with cervical disc disease for either diagnosis or treatment.

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