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RESEARCH ARTICLE

NAVIGATION ASSISTED CERVICAL SPINE OSTEOID OSTEOMA EXCISION: A CASE REPORT

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Abstract

Introduction: Osteoid osteoma is a rare benign bone-forming tumor which is typically found in a patient less than 30 years of age. Males are more commonly affected than females with a ratio of 2:1. [1]. Spinal involvement accounts for about 10% of all osteoid osteomas, with the lumbar spine being the most affected area, followed by cervical spine.

Case Presentation: A 16 years old male presented to our hospital with 18 months history ofneck pain with occasional left upper limb numbness. There was no history of trauma or injury to the neck. Neck pain is worsened at night and improves with NSAIDs. Physical examination revealed decreased sensation over left C5 dermatome distribution and positive spurling test, and the rest of the physical examination was unremarkable. There were no signs of myelopathy.MRI was done for the patient in another hospital, which showed a C4 vertebral body lesion in the left neural foramen and paraspinal soft tissue measuring 2.7 x 1.8cm. Upon these findings, we admitted the patient to evaluate possible neoplastic or infectious causes. Laboratory tests, TB-PCR, acid-fast bacillus, inflammatory markers were all within the normal range. CT cervical, chest, abdomen and pelvis was done for the patient, and it was unremarkable except for what was found in MRI. As a result, further investigation such as a bone scan was done and it showed Osteoid osteomas. As conservative treatment was ineffective in relieving the patient's symptoms, we planned surgical excision. Due to the tumor's location, we preferred todo a posterior approach with a navigation-assisted excision system. The patient received general anaesthesia and was placed on a prone position. The posterior neck was prepped and draped in the usual manner. Under fluoroscopic guidance, entry point was located. After exposure of the posterior cervical spine from C3 proximally to C5 distally, a navigation marker with navigation was inserted, and then we excised osteoid osteoma in one piece . The resected tissue was sent for histopathologic examination and confirmation of osteoid osteoma. Postoperatively, the patient tolerated surgery well and mobilized the following day. A cervicalx-ray was done before discharge on day three post-operation.

Conclusion: Osteoid osteoma is a rare benign bone-forming tumor which is typically found in a patient less than 30 years of age. Spinal involvement accounts for about 10% of all osteoid osteomas, The difficulty of cervical osteoid osteomas is that it lies near adjacent vital

structures such as vertebral artery, spinal cord, and nerve roots. The navigation served us several advantages in resecting the osteoid osteoma, we were able to utilize a less invasive approach with a smaller incision, we are able to visualize and remove the thick sclerotic cortex to gain access to the tumor, without violating the facet joint and cause an iatrogenic instability.

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Introduction:-

Osteoid osteoma is a rare benign bone-forming tumor which is typically found in a patient less than 30 years of age. Males are more commonly affected than females witha ratio of 2:1. [1]. Spinal involvement accounts for about 10% of all osteoid osteomas, with the lumbar spine being the most affected area, followed by cervical spine. (2) The prevalence of cervical spine osteoid osteoma is about 26.8 % of all spinal osteoid osteomas. (2) the most common symptom is pain which is dull and aching in nature. Usually, pain starts as mild but progresses with time to become severe and tends to worsen at night. In spine, the tumor could compress nearby nerve roots which leads toradiculopathy pain. Computed tomography (CT) is the modality of choice for the diagnosis of osteoid osteoma. CT typically will show a nidus, highly vascularized central zone, surrounded by reactive sclerosis. If CT is inconclusive, a bone scan is usedto diagnose osteoid osteoma as it has 100% sensitivity. (3) Conservative treatment withNSAIDs is effective in about 50% of cases, however, if patient is not improved, surgicalintervention is indicated. The difficulty of cervical osteoid osteomas is that it lies near adjacent vital structures such as vertebral artery, spinal cord, and nerve roots. We reporta case of 16 years old male with C4 osteoid osteoma treated with navigation-assisted excision.

Case Presentation:

A 16 years old male presented to our hospital with 18 months history of neck pain with occasional left upper limb numbness. There was no history of trauma or injuryto the neck. Neck pain is worsened at night and improves with NSAIDs. Physical examination revealed decreased sensation over left C5 dermatome distribution and positive spurling test, and the rest of the physical examination was unremarkable. Therewere no signs of myelopathy. MRI was done for the patient in another hospital, whichshowed a C4 vertebral body lesion in the left neural foramen and paraspinal soft tissuemeasuring 2.7 x 1.8cm. Upon these findings, we admitted the patient to evaluate possible neoplastic or infectious causes. Laboratory tests, TB-PCR, acid-fast bacillus, inflammatory markers were all within the normal range. CT cervical, chest, abdomen and pelvis was done for the patient, and it was unremarkable except for what was foundin MRI. (Fig. 1) As a result, further investigation such as a bone scan was done and it showed Osteoid osteomas. (Fig. 2) As conservative treatment was ineffective inrelieving the patient's symptoms, we planned surgical excision. Due to the tumor's location, we preferred to do a posterior approach with a navigation-assisted excision system. The patient received general anaesthesia and was placed on a prone position. The posterior neck was prepped and draped in the usual manner. Under fluoroscopic guidance, entry point was located. After exposure of the posterior cervical spine from C3 proximally to C5 distally, a navigation marker with navigation was inserted, and then we excised osteoid osteoma in one piece (Fig. 4). The resected tissue was sent forhistopathologic examination and confirmation of osteoid osteoma. Postoperatively, thepatient tolerated surgery well and mobilized the following day. A cervical x-ray was done before discharge on day three post-operation. (Fig. 3)

Discussion:-

Osteoid osteoma is a benign skeletal neoplasm that has similar histologicfeatures with osteoblastoma [4]. Osteoid osteoma and osteoblastoma can be differentiated through the size of the nidus if it is less than 15mm then it is Osteoid osteoma and if it is more than 15mm it is osteoblastoma [4]. The lesion in our patient was diagnosed as Osteoid osteoma. Osteoid osteoma can be treatedconservatively without any surgically intervention in many cases [5].

Conservative treatment is based on NSAIDs specifically celecoxib for 6 monthsup to 4 years depending on the case [5]. However, some cases fail conservative treatment and require surgical intervention to remove the tumor [6]. Our patient completed 18 months on NSAIDs and did not respond to medication andpresented with decreased sensation over left C5 dermatome distribution later. Osteoid osteoma can occur in easily excisable locations such as proximal femur,tibial diaphysis, or scaphoid [6].

In those cases, percutaneous radiofrequency ablation which is minimally invasive surgery can be used [7]. But in our case, the tumor was located in the cervical spine and specifically in C4 which is challenging for most surgeons dueto neurovascular damage that could happen, and, in this case, percutaneous radiofrequency ablation is not recommended. Another reason for not using percutaneous radiofrequency ablation in spine cases especially cervical spine is incomplete resection of the tumor which will make the tumor recur. For this reason, posterior approach with a CT navigation-assisted excision system was preferred in this case. the navigation served us several advantages in resecting the osteoid osteoma, we were able to utilize a less invasive approach with a smaller incision, we are able to visualize and remove the thick sclerotic cortex to gain access to the tumor, without violating the facet joint and cause an iatrogenic instability, moreover, we were able to insure complete and en bloc removal of the nidus, aiming for the optimal surgicaloutcome of pain relieve and low recurrence rate. we were able to perform post excision intraoperative CT images to rule out any residual tumor, all of these advantages might not be feasible using the conventional approach with c arm images. 1 year post operative follow up show no recurrence, no instability and the patient was pain free.

Conclusion:-

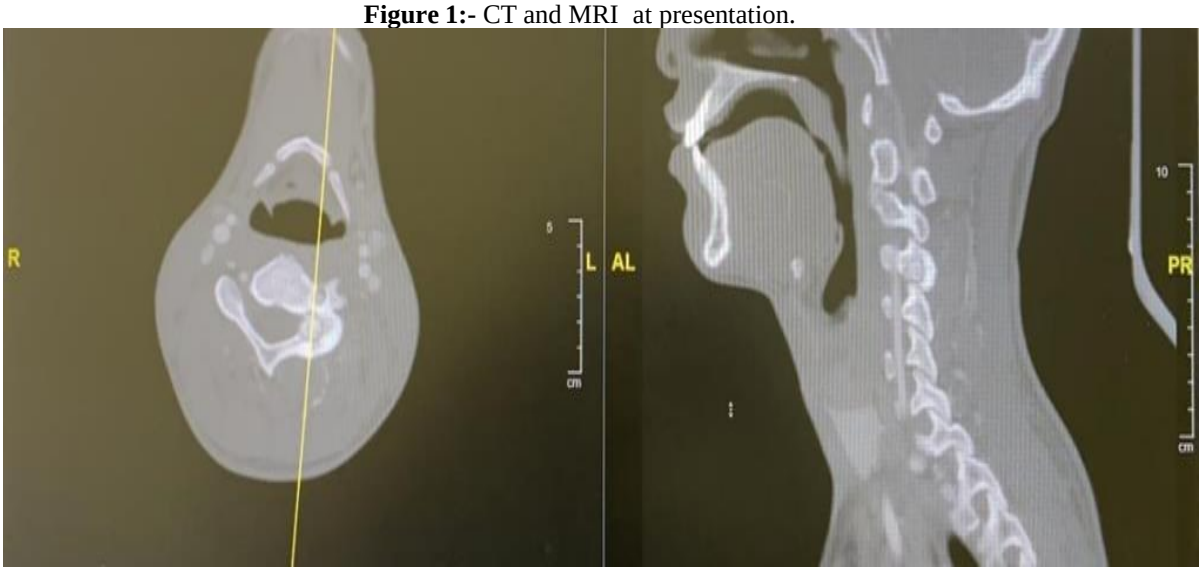
Osteoid osteoma is a rare benign bone-forming tumor which is typically found in a patient less than 30 years of age. Spinal involvement accounts for about 10% of all osteoid osteomas, with the lumbar spine being the most affected area, followed by cervical spine. In spine, the tumor could compress nearby nerve roots which leads to radiculopathy pain. Computed tomography (CT) is the modality of choice for the diagnosis of osteoid osteoma. Conservative treatment with NSAIDs is effective in about50% of cases, however, if patient is not improved, surgical intervention is indicated. The difficulty of cervical osteoid osteomas is that it lies near adjacent vital structures such as vertebral artery, spinal cord, and nerve roots. The navigation served us severaladvantages in resecting the osteoid osteoma, we were able to utilize a less invasive approach with a smaller incision, we are able to visualize and remove the thick scleroticcortex to gain access to the tumor, without violating the facet joint and cause an iatrogenic instability.

Clinical Message:

Osteoid osteoma are small, benign, osteogenic bone lesions. typically present between ages 5 and 25 with regional pain that worse at night and improve with NSAID, diagnosed is made by radiographically by characteristic is less than 1.5 cm in diameter with a sclerotic margin and radiolucent nidus, treatment is usually non- operative with observation and NSAID for pain control, radiofrequency ablation or surgical resection

Figures:

Figure 1:- CT and MRI at presentation.



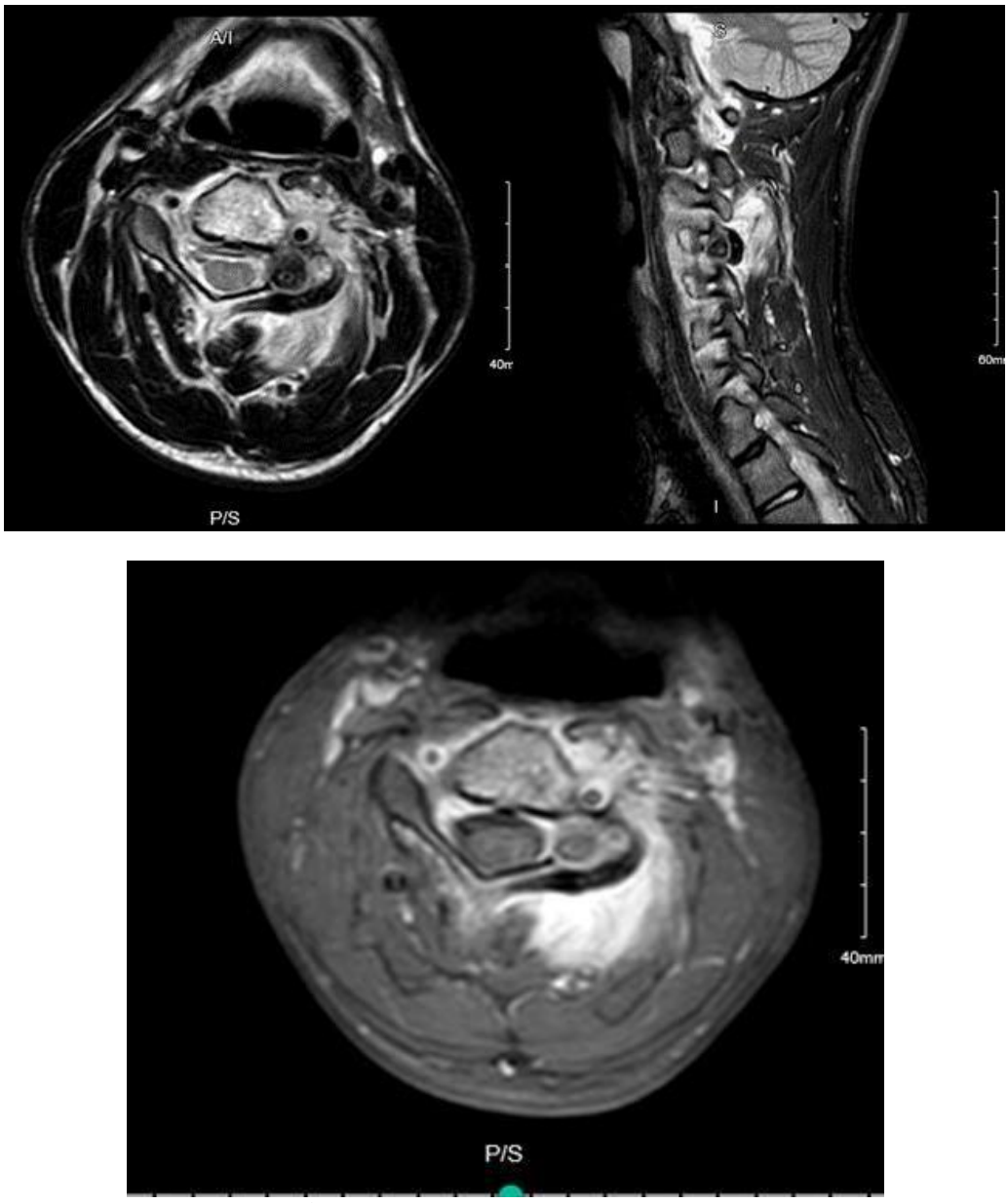


Figure 2:- Bone scan at presentation.

Figure 3:- Pre-operative and post operative lateral view cervical spine x-ray.

Pre OP

Post OP

Figure 4:- Intra-operative picture showing osteoid osteoma specimen.

Competing Interests:
The authors declare that they have no competing interests.

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