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Kohler disease: A rare under diagnosed cause of pediatric foot arch pain and limping

Ankit Jaiswal[1*], **Ratnakar Ambade**[2], **Rameez Bukhari**[3], **Prateek Upadhyay**[4], **Dhruva Halani**[5]

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Authors' Affiliation:
[1]Post Graduate Resident, Department of Orthopaedics, Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education and Research (Deemed to be University), Wardha, Maharashtra, India
[2]Professor and Head, Department of Orthopaedics, Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education and Research (Deemed to be University), Wardha, Maharashtra, India
[3]Assistant Professor, Department of Orthopaedics, Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education and Research (Deemed to be University), Wardha, Maharashtra, India
[4]Senior Resident, Department of Orthopaedics, Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education and Research (Deemed to be University), Wardha, Maharashtra, India
[5]Post Graduate Resident, Department of Obstetrics and Gynaecology, Datta Meghe Institute of Higher Education and Research (Deemed to be University), Wardha, Maharashtra, India

[*]**Corresponding author**
Post Graduate Resident, Department of Orthopaedics, Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education and Research (Deemed to be University), Wardha, Maharashtra, India
Email: jaiswalankit414@gmail.com

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ABSTRACT

Kohler disease is an uncommon etiologic of gait disturbance in children which is related with decrease circulation of navicular bone by the compression of talus and cuneiform. The clinical presentation is arch pain & diffuses swelling in the mid-foot and limping gait with typical weight bearing on the affected foot. As it is a scarce entity for orthopaedics, the lack of clinical suspicion leads to under and delayed diagnosis leading to mis-management. Here we are presenting a case of Kohler disease in an 8 years-old male with right foot arch pain and limping gait (worsened due to improper management) which was managed later conservatively with medication and immobilization. Patient later on follow up after 4 weeks of immobilization, got symptomatically relieved. We concluded from this case report that the prompt diagnosis and management, improves quality of life of the patient in such a rare kind of disease.

Keywords: Osteochondrosis, limping, navicular bone, radiograph, pediatric

1. INTRODUCTION

Children with Kohler's disease have a rare bone abnormality of the foot that may be brought on by compression or stress during a crucial stage of growth. It is characterized by a limping gait, foot pain and swelling. Males are affected five times more frequently than females and it most frequently affects pediatric age group between the ages of 3 and 7 years. On an average, less than 2% children are estimated to have this disorder (Vargas, 2021).

Navicular bone, located at mid foot on medial aspect between navicular and cuneiform. According to X-rays, this bone is initially crushed and then it fractures, heals and then hardens back into bone. Swelling, redness and/or pain of the afflicted foot are signs and symptoms of the illness, which can cause a limp or irregular stride (style of walking). Although the precise underlying aetiology of Kohler disease is not known yet, researchers believe that it may be brought on by excessive pressure placed on the tarsal navicular bone and its related blood vessels before the bone is fully matured (Atanda et al., 2011).

Kohler disease is an unusual cause of children's foot arch pain and walking with pain. Abnormalities of disease is easily distinguished by proper

thorough local examination and confirmed on radiography. Therefore, in an effort to emphasise the clinical and radiological signs of the disorder, we present a case of Kohler disease in a pediatric male child who was under-diagnosed and mis-managed for over 3 months, hence correctly demonstrating the use of early diagnosis and proper health care management in the pathophysiology of such scarce disease.

2. CASE REPORT

Patient information

A 8-year-old male, belonging to low socio economic class, informant being the father presented with intermittent right foot arch pain for over 12 weeks in the emergency department of our hospital. Informant gives alleged history of patient having trauma by slip and fall while playing in outdoors 12 weeks back which lead to sustained injury to right foot. He was mobilized with full weight bear for 4 weeks but associated with pain. But since last 8 weeks patient had experienced limping while walking and sometimes denying putting weight on right foot. Informant also suggested taking prior treatment and medications for the same for 4 weeks at a nearby hospital but pain was not relieved and gradually increased up to an extent that the child had limping gait and was sometimes unable to put weight.

Clinical Examination

On local examination of right foot, he had no local inflammatory signs at present, but tenderness over his right dorsal aspect of mid foot was present. There was mild, diffuse swelling over the mid foot which increased in size on walking and prolonged standing and was relieved on overnight rest (Figure 1). Patient had antalgic gait. There was no discharging sinus, redness, ecchymosis and overlaying skin was normal. There was no history of fever or weight loss. There was no abnormal neurological clinical finding. Local examination of hip, knee and ankle was normal and non-tender.

Figure 1 Showing right foot swelling with normal overlying skin

Diagnostic assessment

An X-ray was done to confirm the diagnosis. X-ray of right ankle and foot showed a small, sclerosis and flattening navicular bone, which confirms the Kohler disease (Figure 2).

Figure 2 X-ray of the right ankle and foot. Avascular necrosis on the navicular bone is indicated by blue arrows

Table 1 Showing laboratory investigations of the patient

Lab investigations	Values	Normal range
CBC	Hb: 12.2 gm% TLC: 7000/cumm Platelet count: 2,00,000/cumm	Hb: 11-14gm % TLC: 4000-11000 Platlet count: 1,50,000-4,00,000/cumm
Sr. Calcium	8.2 mg/d	8.3-10.5 mg/dl
Sr. Vitamin D	60 nmol/l	50-120 nmol/l
Alkaline phosphate	220 U/L	130-260 U/L

Therapeutic intervention

Patient was under-diagnosed and mis-managed earlier before coming to our hospital. Due to the delay in the diagnosis the patient's clinical symptoms got worsened which were treated by pharmacological and preventive methods. The patient was started on Inj. Brufen 8 mg/kg intravenous 12 hourly for 3 days then short course of tablet Brufen 200 mg twice a day was given. Then short-leg walking cast was applied on the right leg for 4 weeks and patient was discharged on day 5 of admission and follow up was advised in out-patient department after 4 weeks for removal of cast.

Follow up and outcomes

Patient was discharged and was advised cast care. He was reviewed in outpatient department after 4 weeks of discharge. The cast was removed. Patient was reassessed clinically which was suggestive of no tenderness or swelling over mid foot. The patient was able to walk pain-free.

3. DISCUSSION

Osteochondrosis is the degeneration of growing bones related with the interruption of the blood circulation by unknown etiology. The clinical presentation is pain and disability on the affected part of extremity which are usually hip, knee or foot (Atanda et al., 2011). First reported in 1908, Kohler disease is an unusual, self-recovering, Osteochondrosis of the navicular bones. Pediatric males are typically affected and it is typically unilateral. Although it can appear in as early in 2 years old, its typical onset is between the ages of 4 and 5 years. Pediatric females with this syndrome tend to be much younger than males, perhaps because ossification begins sooner in females (Borges et al., 1995). The best explanation for the pathophysiology of this disease involves a mechanical origin linked to a delayed ossification (Figure 3).

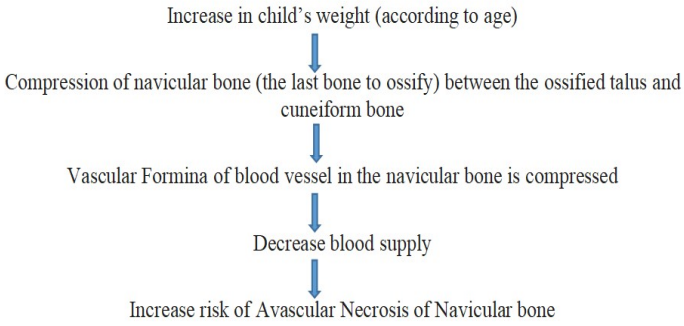

Figure 3 Pathophysiology of Kohler disease

The navicular bone is supplied by dual blood supply from branch of dorsalis pedis artery and posterior tibial artery. Due to this dual blood supply system, the prognosis is still favorable (Ippolito et al., 1984). The diagnosis of Kohler disease lies in the lack of the typical trabecular pattern seen in radiological imaging which results as patches of navicular bone with sclerosis and rarefaction. The navicular bone can occasionally seem collapsed or typical in shape with consistent rise in density and little fragmentation. Pain management techniques include applying of medial heel wedges or soft arch supports. For symptoms more than 4 to 6 weeks, patients with more severe symptoms may relieve from wearing a below knee cast. Untreated patients' symptoms endure longer than people who have received treatment (Borges et al., 1995; Ippolito et al., 1984).

Patients with chronic pain should be checked for talar coalition and other disorders. Six to Eighteen months after the episode of trauma, radiographic results might appear normal and nearly all patients eventually might regain outstanding outcome but the duration and delay affect quality of life of the patient. The medication has little impact on the disease's radiological course or outcome but our patient gets relieved of symptoms within the given short time period even after it was diagnosed lately. Although the duration of symptoms is related with the therapy, the long-term prognosis is independently favorable (Chan and Young, 2019).

Hence in our case report, quality of life of the patient and symptoms worsened due to under-diagnosis or mis-management or delayed diagnosis. Being the upfront warriors in medical fraternity assessing the mishaps occurring in the pediatric age group, we as orthopedics should be able to give correct diagnosis and provide proper clinical care and treatment. Thus, when the patient reported to our tertiary care hospital, after immediate clinical and radiograph diagnosis and other differential diagnosis such as infectious cause, fractures, metabolic conditions, sickle cell disease were ruled out. Our patient improved after adequate medical treatment and cast application in 4 weeks. Ultimately, our case report shows the on-time diagnosis and management, improving quality of life of the patient in such a rare kind of disease.

4. CONCLUSION

When there is a clinical suspicion of Kohler disease, an uncommon cause of pediatric foot arch pain, swelling and pain during walking, radio-graphs of the foot might be used to reach the diagnosis. However, a clinician's lack of understanding might lead to an incorrect diagnosis and the unnecessary use of time-consuming diagnostic procedures such as Magnetic resonance imaging and Computer tomography scan, delayed management and ultimately costing adverse on quality of life.

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Informed Consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Author's contribution

All the authors contributed equally to the case report.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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