# *Hand, foot, and mouth disease presenting with a testicular mass in an adult*

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*The majority of solid testicular tumors are treated with orchiectomy given the high risk of malignancy. We present a case of a testicular mass in an adult patient in the setting of recent hand, foot, and mouth disease that was managed conservatively with serial ultrasounds. Even though cases of viral-associated testicular masses are rare, this differential diagnosis should be considered in patients with a new testicular mass in the setting of recent viral infection and negative tumor markers. For these patients, observation may be an option instead of immediate orchiectomy.*

**Key Words:** testis mass, viral infection, orchiectomy, ultrasound

## Introduction

We describe a case of hand, foot, and mouth disease associated orchitis with a testicular mass concerning for malignancy on scrotal ultrasound that was managed with observation. Viral associated testicular masses are rare, and when detected, frequently lead to the loss of a testicle due to the risk of malignancy in testicular tumors. Only two such cases have been previously described in the literature as being managed conservatively. We submit this case as example that under close supervision, viral associated testicular masses can be managed nonoperatively, sparing these patients unnecessary surgery.

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## Case report

The patient is a male in his 30s who presented to the Emergency Department with several days of intermittent testicular pain radiating to his lower abdomen. He was healthy at baseline and otherwise asymptomatic. He

had recently contracted hand, foot, and mouth disease from his toddler son. The patient's toddler son had been attending daycare where several other children were diagnosed with hand, foot, and mouth disease, which is commonly seen in young children across the United States. Approximately 10 days before our patient's scrotal pain began, his son began experiencing fatigue and fussiness. Several days later, the son developed an erythematous maculopapular rash. The rash covered the entirety of his body and was concentrated on his hands, feet, and the outside of his mouth. No lesions inside the mouth were identified. Four days later, our patient began to experience malaise and myalgias. Our patient developed a few maculopapular lesions on his hands the next day. Two days later, his initial symptoms had largely resolved but he began experiencing severe scrotal pain. His scrotum was tender to palpation and appeared mildly swollen but there were no other changes on exam including erythema, induration, or ecchymosis. At the time, his malaise and myalgias had resolved but the lesions on his hands remained. He presented to an urgent care, where he was referred to the emergency room.

On arrival to the emergency room, he was afebrile and his vitals were within normal ranges. An ultrasound was ordered and showed a left heterogeneous intratesticular lesion measuring 2.2 cm x 1.6 cm x 1.0 cm, Figure 1. The left testis was hyperemic without hyperemia of the left epididymis. The right testis was normal. With the exception of the lesion, the echotexture of the testes was symmetrical. The ultrasound read reported the following: "The findings are concerning for malignancy. An inflammatory process is difficult to completely exclude. Urologic/surgical consultation is recommended."

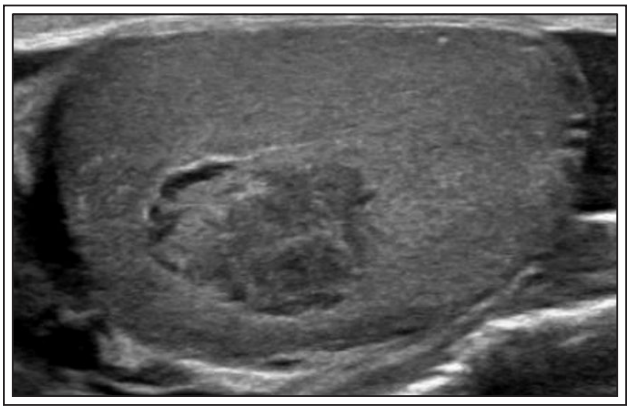

**Figure 1.** Initial ultrasound from the Emergency Department showing a heterogenous left testicular lesion.

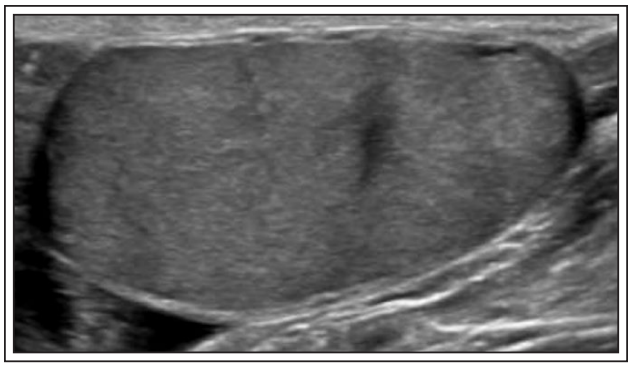

**Figure 2.** Ultrasound 4 months after presentation showing small ill-defined hypoechoic region in the area where the initial lesion was noted.

Alpha-fetoprotein (AFP), human chorionic gonadotropin (HCG), and lactate dehydrogenase (LDH) were ordered. AFP and HCG were normal. The sample sent for LDH had hemolyzed. He had no recent travel history and was in a monogamous relationship. An infectious work up (including complete blood count) was not sent. The patient was discharged and advised to follow closely with urology.

He was seen 3 days after discharge in urology clinic. Testicular exam was unable to be completed due to testicular tenderness. He was started on antibiotics and a urine culture and repeat ultrasound were ordered. A plan was made for radical orchiectomy unless the repeat ultrasound showed changes.

The urine culture was negative. The second ultrasound was completed 10 days after the first. It showed that the heterogenicity of the left testicle had increased from previous and that the mass now appeared to be a smaller (1.4 cm x 1.0 cm x 0.9 cm) complex cystic lesion. The change in the lesion from an isoechoic solid appearing lesion on the first ultrasound to mostly cystic on the second made abscess more likely than neoplasm.

Based on the improvement seen in the second ultrasound, the left orchiectomy was cancelled. On follow up 2 months after presentation, his pain had resolved. He was feeling well and had been able to resume regular activity and work. Ultrasounds 2 and 4 months after presentation showed an ill-defined hypoechoic region at the site of the previously noted lesion. This region was decreased in size at 4 months and thought to represent resolving inflammation perhaps with some fibrosis, Figure 2. His next ultrasound is scheduled for 6 months from the last.

## Discussion

The differential diagnosis for acute scrotal pain includes testicular torsion, testicular malignancy, torsion of the appendix testes, epididymoorchitis, strangulated inguinoscrotal hernia, and referred pain from a kidney stone. Scrotal ultrasound is the first line of imaging to diagnose testicular torsion, which is a surgical emergency, in addition to testicular malignancy and epididymoorchitis.[1] If an infectious cause is suspected, a midstream urine culture should be sent to assess for bacterial epididymoorchitis. Nucleic acid amplification testing for *N. gonorrhoeae* and *C. trachomatis* should be ordered for sexually active patients who are under age 35 or have a new sexual partner.[2,3]

A testicular mass is generally treated as neoplasm unless proven otherwise. Notably, in this case there was no flow to the mass on the initial ultrasound, and testicular neoplasms generally have increased blood flow. The differential also included infectious or inflammatory processes. There was hypervascularity of the left testicle without hyperemia of the left epididymis. This suggested isolated orchitis, which tends to be viral in nature, as opposed to epididymoorchitis. Another factor in this case that was indicative of orchitis as opposed to malignancy was the presence of acute pain. Malignant lesions are generally nontender and this patient's scrotum was tender to the point that it was difficult to perform a physical exam.

Orchitis has long been associated with viral infection, with a case of a patient with mumps and viral orchitis described by Hippocrates more than 400 years B.C.[4] While viral orchitis is most commonly associated with mumps, many other viruses have been reported to infect the testes including HIV, Epstein-Barr, HSV, dengue, chickenpox, COVID-19, and Coxsackie virus.[3,5,6] However, it is not common for orchitis to be associated with a discrete mass on physical exam or ultrasound.

Hand, foot, and mouth disease is a viral illness that commonly affects infants and children but can also occur in adults. It is caused by Enterovirus, most commonly Coxsackievirus A16. It classically presents with a rash on the hands and feet, sores in the mouth, fever, and flu-like symptoms. Treatment is usually supportive.[7] It is important to ascertain in the history if a patient has had a recent viral illness. This should be communicated to the radiologist to provide context for the ultrasound.

There are few reported cases of viral orchitis with a testicular mass. Many of these cases have resulted in surgical intervention due to concern for neoplasm. The largest series describing this is a retrospective analysis of 10 patients with clinical or radiological suspicion for a testicular tumor where testicular biopsy or orchiectomy was performed, and the pathology was diagnostic for orchitis.[5] In 2017, Hurtt et al also reported two cases of viral associated testicular masses. One patient had contracted hand, foot, and mouth disease from his toddler son 3 months prior to presentation. Both patients underwent orchiectomy due to patient anxiety for potential malignancy. Their pathology ultimately showed inflammation, fibrosis, and atrophy.[8]

There are two prior cases in the literature of viral associated testicular mass managed nonoperatively. Vilson et al chose observation with serial ultrasounds when presented with a patient with bilateral viral associated masses. Like our patient and one of the patients in the case report by Hurtt et al, he presented with testicular masses shortly after contracting hand, foot, and mouth disease from his toddler son. The patient's masses resolved without surgical intervention.[9] A similar case was reported in 2021 by Di Lelle et al where a 17-year-old boy was diagnosed with hand, foot, and mouth disease then developed testicular pain and was found to have a hypochechoic mass-like lesion in his testicle. Again, he was followed with serial ultrasounds and the lesion resolved.[10] In these cases, the authors were able to make the choice to observe instead of operate based on the presentation of a new mass in the setting of recent viral illness. Vilson et al specifically reviewed the cases reported by Hurtt et al with their patient as part of the shared decision not to operate.

Patients with a new diagnosis of testicular mass should also be evaluated for infectious diseases. Childhood-associated viral illnesses should be considered as part of the differential for the adults, if they have an exposure to a child. Urologists should be familiar with the presentation of hand, foot, and mouth disease. Additionally, the review of imaging needs to focus on the presence versus absence of blood flow to the testicular neoplasm, as hypervascular lesions are more likely to be malignant. Another clue to the inflammatory nature of the mass can be discerned from the presence of orchitis or epididymoorchitis based on the physical examination or radiological evaluation. Proper patient selection for observation is also important. Patients must be able to return for regular ultrasounds and follow up appointments. It is possible that for certain patients the anxiety about possible malignancy may cause them to choose orchiectomy preemptively. The knowledge of the current cases in the literature may help with shared decision making, which may help avoid unnecessary orchiectomies. □

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