

# Pediatric Testicular Microlithiasis: To Refer or Not to Refer?

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## Introduction

Testicular microlithiasis (TM) has been defined as 5 or more echogenic petechial foci in a single view of a testicular ultrasound. TM usually presents bilaterally but may also present unilaterally. Most cases of TM are asymptomatic and are only found incidentally when testicular ultrasound is indicated for other conditions, such as this patient's testicular trauma and subsequent discovery of undescended testis. TM is generally discovered after the age of 2, and testicular tumors that present with TM often occur during adolescence.<sup>1</sup> It has been theorized that TM is prevalent in 1% to 5% of all boys.<sup>2,3</sup>

## Methods

Only English language literature articles within PubMed database were reviewed with the following key words in the search criteria: "TM + testicular tumors + recommendations." Only human studies were included. Journals without the aforementioned criteria were excluded. Literature search included case reports, review articles, clinical trials, and observational studies.

## Results

Seventy articles were reviewed in PubMed, and only 7 articles had positive association with testicular malignancy. The rest of the articles showed no association with testicular tumors within the pediatric age group. Eighteen articles discussed the possible association of TM and male fertility, and 36 articles had TM with associated risk factors such as testicular nondescent/mal-descent and testicular atrophy.

## Case Presentations

### Case 1

A 9-year-old African American, obese male was presented to pediatric clinic for a routine physical exam. His past medical history was significant for intermittent asthma, well controlled on short-acting beta agonists.

His last exacerbation was 2 years prior to the day of examination. He is otherwise active and healthy with no other significant medical or surgical history. On examination, the patient was noted to have left undescended testes, and on further inquiry, the mother of the patient mentioned that he had an accidental injury (hit by his friend while playing) to his private area 2 months prior to the day of examination, evaluated in the emergency department and discharged home. No investigations were needed at that time as the patient was completely normal. Due to his past history and absence of left testes, a testicular ultrasound was ordered that not only confirmed the diagnosis of left undescended testes (although cryptorchidism is a clinical diagnosis) but noted to have an incidental finding of multiple microcalcifications within the right testes consistent with TM.

### Case 2

A 13-year-old Hispanic male presented to the emergency department complaining of pain in his private area that started suddenly. His pain was bilateral, dull in nature, and rated to be between 5 and 6/10 on a pain scale. He denied any trauma, injury, back pain, or any penile discharge. He was sexually inactive and no positional change of pain. There were no other genitourinary complaints. Due to the sudden onset, the patient had testicular ultrasound done that showed multiple bilateral testicular microcalcifications suggestive of microlithiasis.

## Discussion: Testicular Microlithiasis and Testicular Tumors

The current understanding of the natural history of TM is unclear. The cause(s) of TM have not been defined.

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No statistically significant increase in number of calcifications or calcification density have been documented in longitudinal ultrasound follow-up studies of patients with TM.<sup>4</sup> A 2011 *Nature Review* by Tan and Eng theorized that TM is a condition belonging to a larger constellation of male fertility conditions grouped together as testicular dysgenesis syndrome. This syndrome also includes testicular germ cell tumors, undescended testis, and several other testicular pathologies.<sup>5</sup> While this may provide insight into the pathology of TM, it still does not provide evidence for clear clinical indications for management of TM.

Whether TM is a purely benign condition or a premalignant condition is also controversial. The association of TM with testicular tumors has been documented in the literature. Case reports have been published that demonstrate diagnosis of TM and a concurrent testicular malignancy<sup>6,7</sup> as well as a patient with diagnosed TM who subsequently later developed a testicular tumor.<sup>8</sup> Many retrospective studies,<sup>9,10</sup> longitudinal follow-up studies,<sup>11</sup> and cross-sectional studies<sup>12</sup> have found statistically significant associations with TM and concurrent or development of testicular malignancies compared to the general population.

Although a passive association between TM and testicular malignancy has been demonstrated in the literature extensively, it is significant to note that the rates of testicular malignancies in TM are still limited. They are only significant in comparison in patients without TM. For example, the cross-sectional study by Heller et al in the *Journal of Clinical Ultrasound* found primary testicular neoplasm in only 12% of patients with TM.<sup>12</sup> In addition, most of the data in the literature stem from ultrasound images from symptomatic patients or patients with indications for ultrasound. This may introduce a selection bias that overestimates rates of testicular malignancy in general population (which includes asymptomatic patients who will never get an ultrasound) with TM.

It is in light of the current understanding of TM and its association of testicular malignancy, clinicians are put in a bind. The question of whether TM is a risk factor and if so, how strong of a risk factor for testicular malignancy, has not been answered. What investigation and follow-up are required for TM? What is the appropriate management?

## Management of Testicular Microlithiasis

It can be argued that TM alone is not an actual risk factor for testicular malignancy because patients with asymptomatic TM have very low rates of concurrent malignancy and low probability of developing testicular

malignancy.<sup>13</sup> If this is the case, then the incidental finding of TM can be an indication for the assessment of testicular malignancy using tumor markers such as AFP and B-hCG in the presence of symptomology or discretion of the clinician.<sup>14</sup> But without indication, it would be unjustified to assess for testicular malignancy in the setting of truly asymptomatic TM. Patient and family reassurance with the recommendation and education about regular testicular self-examination is recommended for isolated TM.<sup>14-16</sup>

Clinicians should treat TM in the presence of other risk factors of malignancies differently than TM found incidentally. This is because the evidence shows that there is an association of TM and testicular malignancy in the presence of testicular ultrasound indications. Reviews and studies published in multiple disciplines such as radiology,<sup>17,18</sup> urology,<sup>2,13,19</sup> and pediatric surgery<sup>18</sup> suggest yearly ultrasound monitoring in addition to workup for testicular malignancy indicated by risk factors and symptomology.

The formal recommendations of the US Preventive Services Task Force recommends against testicular cancer screening in the presence of TM,<sup>20</sup> as well as the American Urological Association (AUA).<sup>11</sup> However, it is significant to note that these recommendations were based on studies that demonstrated no development of testicular malignancies on follow-up in patients with TM in adult men.<sup>11,21</sup> These articles also investigated ultrasound imaging and follow-up from patients with incidental findings of TM without risk factors (cryptorchidism, family history of testicular malignancy, personal history of testicular malignancy, history of testicular carcinoma in situ).<sup>22</sup>

## Conclusion

Testicular microlithiasis in pediatric age group does present as a clinical dilemma for the primary care providers. Due to the lack of specific guidelines and consolidated recommendations from various subspecialties, it is quite challenging for the primary physician to accurately make a clinical decision and communicate the results to the anxious patient and his family in a balanced way. Although the literature review shows a possible association with testicular tumors and infertility in young adults, no such association has been noted within the pediatric age group. For an isolated TM, the recommendations are to simply follow the patient annually with self-examination and reassurance. Imaging and urological referral is reserved for patients with associated risk factors such as mentioned above or family history of testicular cancer or age >55 years. For patients presenting with TM and testicular mass immediate referral is mandated to urology/oncology.

Case 1 was scheduled for routine testicular self-examination and annual testicular ultrasound with pediatric urology due to positive risk factors, and Case 2 was reassured to clinically follow-up with primary provider with testicular self-examinations. Both patients were evaluated by pediatric urologists and were given detailed education. No further evaluation for possible malignancy was done for either patient.

### Declaration of Conflicting Interests

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