HAYDARPAŞA NUMUNE MEDICAL JOURNAL

DOI: 10.14744/hnhj.2022.91297
Haydarpasa Numune Med J 2023;63(2):194–197

ORIGINAL ARTICLE

Management of Testicular Microlithiasis in Children: A Single-Center Experience

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Abstract

Introduction: Testicular microlithiasis (TM) is a rare condition characterized by asymptomatic calcification of seminiferous tubules. There is limited data on the natural history and risk of developing testicular malignancy in patients with pediatric TM. The aim of study was to review our experience in children with TM and to compare and evaluate the management of TM in light of literature.

Methods: The retrospective study included pediatric patients (aged below 18 years) that were diagnosed with TM by scrotal ultrasonography (US) in our center between May 2015 and May 2020. Demographic characteristics, physical and US examination findings, and follow-up records were reviewed for each patient.

Results: A total of 12 children diagnosed with TM were analyzed. The mean age at presentation was 6.6±3.5 years and the mean follow-up period (time between the first and last US examinations) was 31.2±16.2 (range, 8–56) months. The most common US indication was scrotal pain (n=4), followed by trauma (n=3), unilateral undescended testis (n=3), bilateral undescended testis (n=1), and Down syndrome with bilateral orchiopexy (n=1). Calcific density showed no significant change in US throughout the follow-up period. Serum α-fetoprotein and β-human chorionic gonadotropin levels were within normal limits in all patients and no testicular germ cell tumors or new abnormal symptoms were detected in any patient throughout the follow-up period.

Discussion and Conclusion: No testicular cancer or new abnormal findings were detected in patients with TM throughout the follow-up period. Further studies with larger patient series and longer follow-up periods are needed to develop a standard management algorithm.

Keywords: Child; lithiasis; testicular diseases; ultrasonography.

Testicular microlithiasis (TM) is a relatively rare condition detected incidentally during ultrasonography (US) examination of the scrotum. Typical US appearance of TM is characterized by multiple small, echogenic, nonshadowing foci of uniform size observed throughout the testicles[1].

Reported prevalence of TM in children ranges between 1.1 and 5.5%[2,3]. TM has been associated with a variety of diseases and chromosomal abnormalities, including cryptorchidism, Down syndrome, and Klinefelter syndrome[2]. In addition, an association of TM with testicular cancer has also been reported[4,5]. However, there is limited data on the natural history and risk of developing testicular malignancy in pediatric patients with TM[2,6,7].

The aim of this study was to review our experience in children with TM and to compare and evaluate the management of TM in light of literature.

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Submitted Date: 30.06.2022 **Revised Date:** 30.06.2022 **Accepted Date:** 01.08.2022

Materials and Methods

The retrospective study included pediatric patients (aged below 18 years) that were diagnosed with TM by scrotal US in our center between May 2015 and May 2020. US examinations were performed using two different US devices with 7.5–10 MHz linear transducers. In US examination, the number and distribution patterns of testicular calcifications seen in US were examined, and the echogenicities smaller than 1–3 mm with no acoustic shadows that were visible in a single plane were evaluated. Patients detected with microlithiasis in three or more sections were diagnosed as having diffuse TM (DTM) and patients detected with microlithiasis in fewer than three sections were diagnosed as having focal TM.[6] US images of two patients are shown in Figure 1.

After the detection of microlithiasis, a physical examination was performed by the same pediatric surgeon. Every 6 months, each patient underwent a clinical and US examination and also their serum tumor markers (α-fetoprotein [AFP] and β-human chorionic gonadotropin [β-hCG]) were measured to detect potential malignancies. No biopsy was performed in any patient. Age, indication for US, pathological features, US findings, clinical outcome, and follow-up records of patients were evaluated. An ethical approval was obtained from the local ethics committee (No: 2022/11409).

All the analyses were performed using SPSS for Windows version 22.0 (Armonk, NY: IBM Corp.). Continuous variables were expressed as median (range) and categorical variables were expressed as percentages (%).

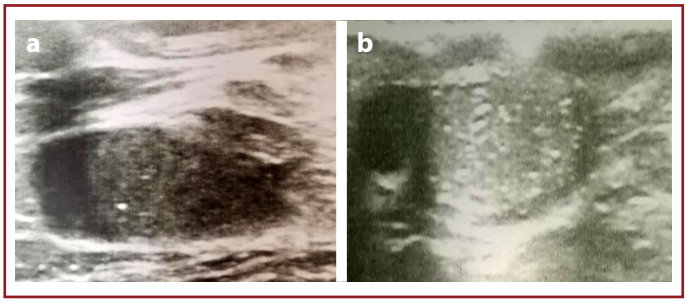

Figure 1. (a) Ultrasonographic image of focal testicular microlithiasis (A 5-year-old boy with unilateral undescended testis; Patient #12). **(b)** Ultrasonographic image of diffuse testicular microlithiasis (A 7-year-old boy who presented with testicular pain; Patient #9).

Results

A total of 12 children diagnosed with TM were analyzed. The mean age at presentation was 6.6±3.5 years and the mean follow-up period (time between the first and last US examinations) was 31.2±16.2 (range, 8–56) months. The most common US indication was scrotal pain (n=4), followed by trauma (n=3), unilateral undescended testis (n=3), bilateral undescended testis (n=1), and Down syndrome with bilateral orchiopexy (n=1). Calcific density showed no significant change in US throughout the follow-up period. Serum β-hCG (<2.5 mIU/mL) and AFP (<0.5 IU/mL) levels were within normal limits for all the patients, and no testicular germ cell tumors or new abnormal symptoms were detected in any patient throughout the follow-up period. Table 1 presents the demographic and clinical characteristics of the patients.

Table 1. Patient characteristics

No	Age at diagnosis (years)	TM localization	Ultrasonographic distribution pattern	US indications	Follow-up time (months)
1	4	Bilateral testes	Diffuse	Down syndrome with bilateral orchiopexy	33
2	8	Right testis	Focal	Scrotal pain	56
3	3	Bilateral testes	Diffuse	Bilateral undescended testes	48
4	9	Left testis	Focal	Trauma	24
5	14	Bilateral testes	Focal	Scrotal pain	32
6	8	Right testis	Focal	Trauma	9
7	3	Bilateral testes	Focal	Unilateral undescended testis	12
8	2	Right testis	Diffuse	Unilateral undescended testis	42
9	7	Bilateral testes	Diffuse	Scrotal pain	8
10	6	Right Testis	Focal	Trauma	36
11	11	Left testis	Focal	Scrotal pain	18
12	5	Bilateral testes	Focal	Unilateral undescended testis	44

TM: Testicular microlithiasis; US: Ultrasonography.

Discussion

The prevalence of TM varies among studies[2,6,7]. Several patient series reported that the prevalence of TM is higher in patients with Down syndrome, Klinefelter syndrome, and undescended testis[6,8,9]. Another study indicated that TM was associated with a substantially elevated risk of testicular neoplasia in the presence of risk factors. The authors also noted that high-risk population is described as those with disorders of sex development, history of testicular cancer, maldescended testes, Klinefelter syndrome, or infertility[10]. In our study, five patients had undescended testicles and one patient with Down syndrome had been operated on due to undescended testis.

Routine US examination is recommended for patients with TM who have a history of risk factors for testicular tumor, such as cryptorchidism[10]. In addition, Goede et al.[11] and Cebeci et al.[9] recommended annual US screening in boys with Down syndrome to detect malignancy. To date, however, no testicular cancer has been reported during the follow-up period in most pediatric patients[6,9,12]. On the other hand, two prospective US screening studies found that TM is a common finding in healthy men. In addition, the authors suggested that TM may not be related to testicular cancer[13,14]. In some other studies, self-examination has been recommended for healthy patients with TM[14]. In our study, each patient underwent routine US examination every 6 months and no testicular tumors were detected in the follow-up period. As is commonly known, self-examination is not appropriate for pediatric patients; therefore, we suggest that informing parents and instructing them on how to perform scrotal examination may help detect abnormal findings during the follow-up period.

Tumor markers have been used in numerous studies, in which the authors reported that tumor markers were normal in all participants with TM during the follow-up period[7,9,12]. In our study, we also found normal levels of AFP and β-hCG in all patients with TM. Silveri et al.[12] reported that asymptomatic TM is not an indication for biopsy in children. In our study, testicular biopsy was not performed in any patient. Although our series included a small number of patients, we consider that tumor markers, biopsies, or additional radiological examinations are not necessary during the follow-up period.

Our study was limited since it was a retrospective study, data were retrieved from hospital databases, and the study had a short follow-up period.

Conclusion

No testicular cancer or new abnormal findings were detected in patients with TM throughout the follow-up period. Based on our findings, we do not recommend screening for tumor markers or histopathological examination in the follow-up period. Further studies with larger patient series and longer follow-up periods are needed to develop a standard management algorithm.

Ethics Committee Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee (protocol no: 2022/11409 by Ethics Committee of University of Health Sciences, Kanuni Education and Research Hospital) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. There are no relevant financial or non-financial competing interests to report.

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: S.S., D.B.; Design: S.S., D.B.; Data Collection: S.S., D.B.; Analysis or Interpretation: S.S., D.B.; Literature Search: S.S., D.B.; Writing: S.S., D.B.

Conflict of Interest: None declared.

Financial Disclosure: The authors declared that this study received no financial support.

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