

ASSESSMENT OF TESTICULAR VOLUME BY ULTRASOUND IN CHILDREN & ADOLESCENTS WITH TYPE 1 DIABETES MELLITUS



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INTRODUCTION

- Poorly controlled T1DM have a negative impact on spermatogenesis and result in infertility (1).
- Also patients with T1DM are at a higher risk for tumor in future including testicular tumor (2).
- Delay in puberty is also known in T1DM being a chronic illness (3).

OBJECTIVES

- Ultrasound examination of the testis in boys with poorly controlled diabetes with disease duration of > 2 years.

METHODOLOGY

- Study design: Cross-sectional observational study.
- Study setting- Tertiary care pediatric endocrine unit.
- Study population- Underprivileged Boys with T1DM.
- Inclusion criteria- Boys with T1DM with disease duration of >2 years.
- Demography, age, disease duration, anthropometry, treatment history and associated illnesses were recorded.
- SMR was assessed as per Tanner pubertal staging.
- HbA1c was assessed and complications were screened.
- Complications screening included testing for retinopathy, neuropathy and nephropathy.
- USG scrotum was performed to assess testicular volume and additional findings were noted.
- Testicular Volume was calculated using formula (length x breadth x height)/2.
- USG dimensions were noted and they were converted into Z score as per available local normative data.
- Additional finding on USG was also noted .
- All data was entered in Microsoft excel 2010 and analysis was performed using SPSS 25.

RESULTS

- A total of 94 boys were studied with a mean age of 14.5±3.8 years.
- The mean disease duration was 5.8±2.1 years.
- Mean height and BMI Z scores were -0.75±1.1 and -0.71±1.3 respectively
- The mean testicular volume and their Z scores are shown in table 1.
- Last 5 years average HbA1c was 10.7±1.9%.
- Testicular Microlithiasis (TM) was observed in 11 patients (11.7%) and 17 (18%) had a prominent mediastinum.
- There was no statistical difference in average HbA1c, disease duration, anthropometry and complications in children with TM as compared to the children who were not having.

	Mean±SD	Tanner stage 1	Tanner stage 2	Tanner stage 3	Tanner stage 4	Tanner stage 5
N	94	14	15	17	13	35
Mean Age	14.5±3.8	8.7±1.1	11.8±0.8	13±1	15.4±1	17.2±1.3
Mean Disease Duration	5.8±1	3.6±1.9	6.1±4	4.3±2.5	5±3.6	7.1±4.5
Right Testicular Volume	6.3±4.7	0.9±0.3	1.4±0.6	3.7±1.7	9.3±2.6	10.7±2.8
Left Testicular Volume	6.3±4.8	0.8±0.2	1.5±0.7	3.7±1.7	9.1±3	10.8±2.9
Right testicular volume Z	-0.9±0.8	-0.6±0.4	-0.9±0.8	-1.6±0.6	-1.0±0.6	-0.5±0.7
Left Testicular volume Z	0.25±0.4	-0.1±0.4	-0.6±0.4	0±0.2	-0.4±0.2	0.6±0.2
Mean Testicular volume Z	-0.3±0.5	-0.4±0.4	-0.5±0.5	-0.8±0.3	-0.3±0.4	0.1±0.5
Microlithiasis Present	11	3	1	2	1	4

TABLE 1 MEAN TESTICULAR VOLUME & Z SCORE AS PER TANNER STAGING

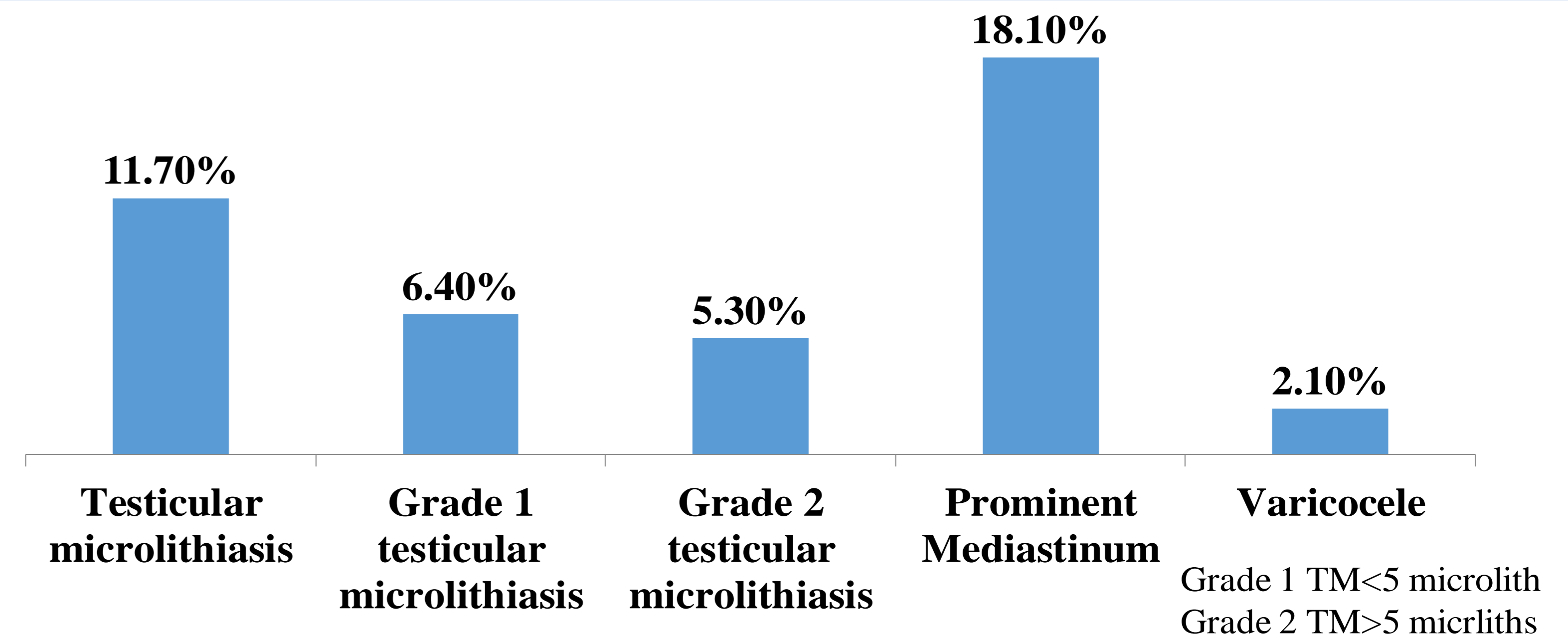


Fig 1. USG scrotum Findings

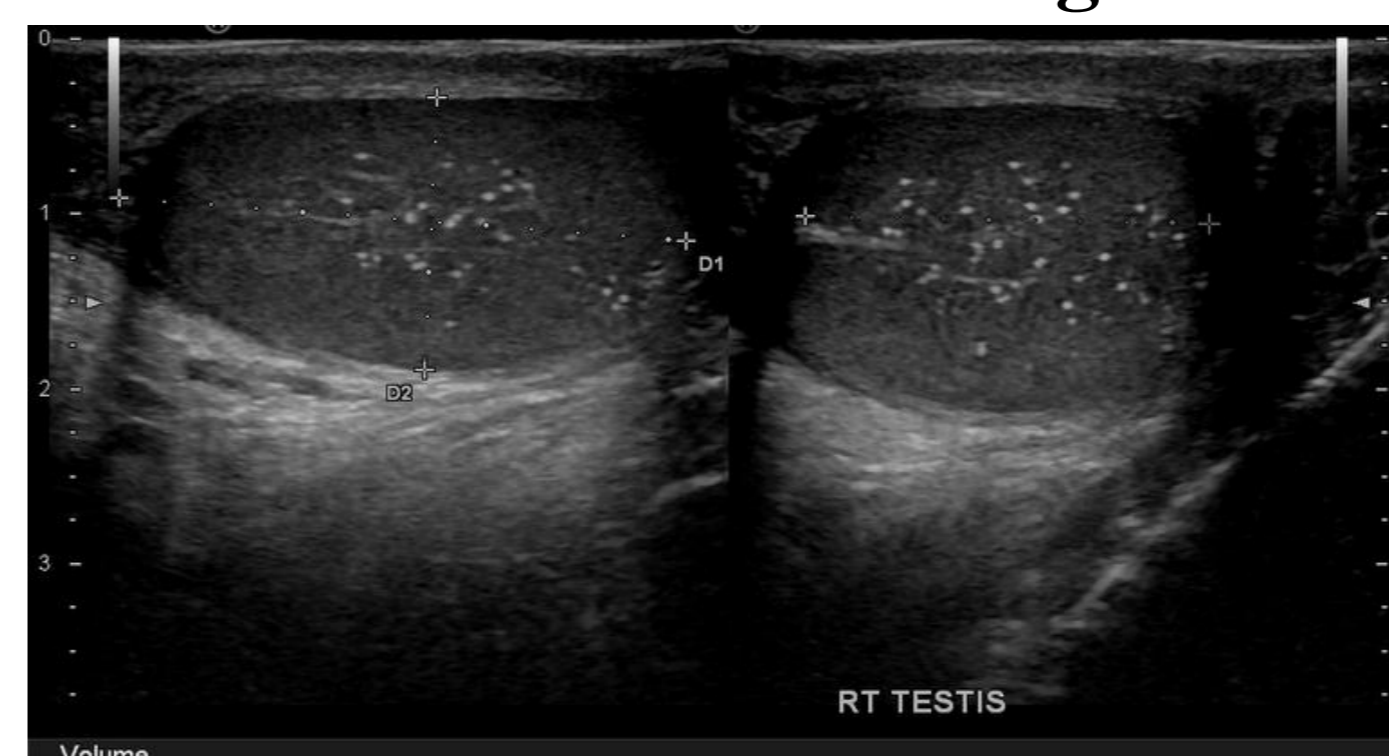


Fig 2 (a) USG 10 year old boy with bilateral grade 2 microlithiasis. His last HbA1c was 11.5% & normal calcium profile

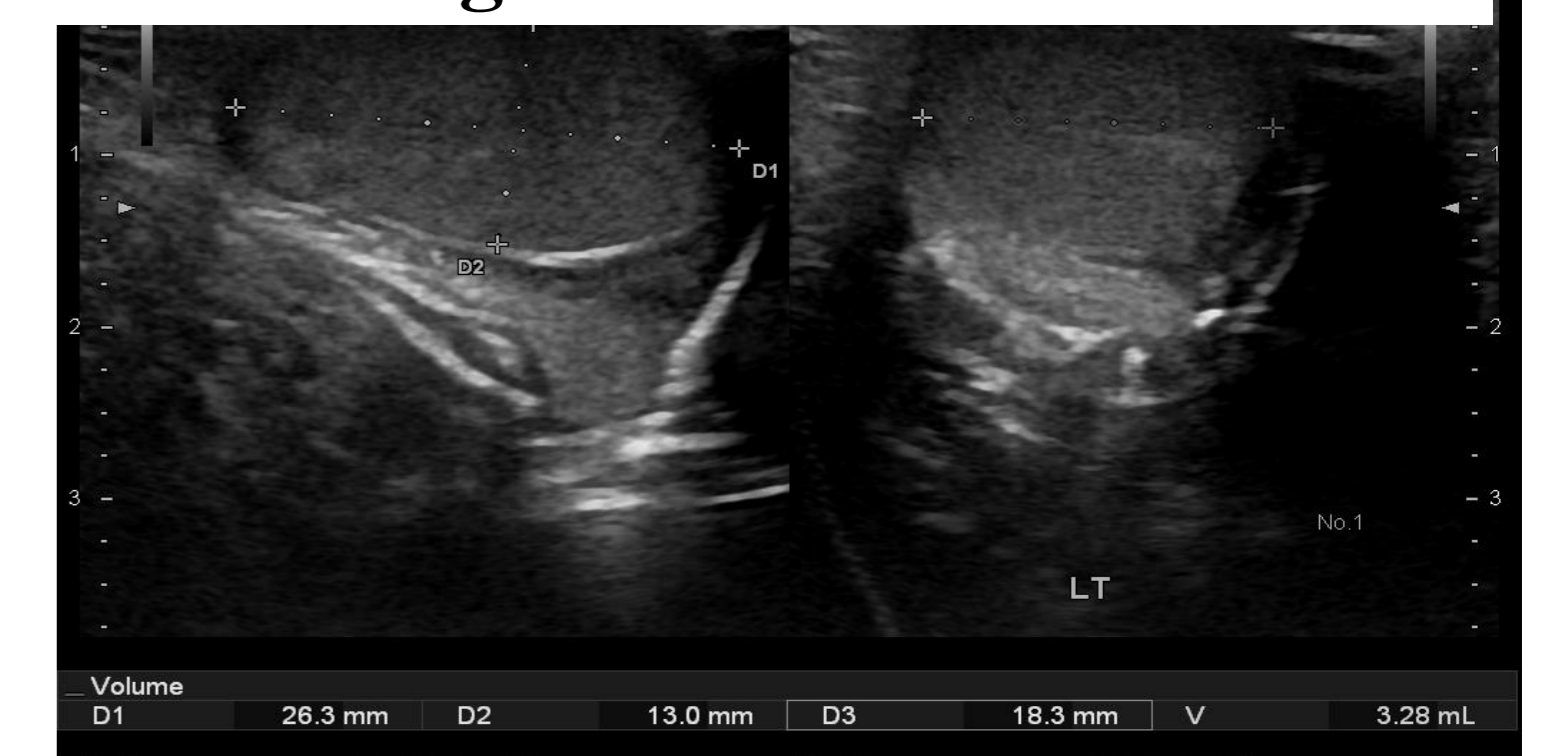


Fig 2 (b) 11 year old boy showing small testicular volume (Z=-3.1). His last HbA1c was 13.5%. His growth was normal for age.

Parameters	Mean
Age	14.1±5.6
Average HbA1c	9.7±2.9
Disease duration	4±2.7
Height Z score	-0.6±1.2
BMI Z score	-0.5±1
Right testicular volume Z score	-0.8±1
Left testicular volume Z score	0.2±0.5
Mean testicular volume Z score	-0.30.6
PTH (pg/ml)	27.2±12.2
Vitamin D (ng/ml)	18.7±11.9
Serum Calcium (mg/dl)	9.4±0.6
Serum Phosphorus (mg/dl)	4.1±0.6

TABLE 2. PROFILE OF CHILDREN WITH TESTICULAR MICROLITHIASIS

DISCUSSION

- We report TM in 11.4% of boys with type 1 DM.
- Also in our cohort the achievement of testicular volume though was delayed it caught up final stage of puberty.
- The prevalence of TM in pediatric population is between 2% to 5.5% (4)
- In adults many studies suggest association between TM and infertility and testicular malignancy (5)
- When testicular TM is detected it is advocated widely to keep a follow-up in adults (6).
- No pediatric consensus exist for management of TM.

CONCLUSION

- Testicular volume though small was within the reference range among poorly controlled patients with T1DM and shows delayed catch up.
- Testicular Microlithiasis was noted in 11% patients.
- Given the higher incidence of testicular tumors and impaired fertility, performing testicular USG might be needed in patients with T1DM as a chronic complication.

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