Testicular Microlithiasis in Boys and Young Men With Congenital or Acquired Undescended (Ascending) Testis

Joery Goede,* Wilfried W. M. Hack, L. M. van der Voort-Doedens, Frank H. Pierik, Leendert H. J. Looijenga and Karlijn Sijstermans

From the Department of Pediatrics, Medical Center Alkmaar, Alkmaar (JG, WWMH, LMvdV-D, KS), Netherlands Organization for Applied Scientific Research TNO, Delft (FHP) and Department of Pathology, Josephine Nefkens Institute, Erasmus MC, Rotterdam (LHJL), The Netherlands

Purpose: We assessed the prevalence of testicular microlithiasis by ultrasound in boys and young men with congenital or acquired undescended (ascending) testis.

Materials and Methods: During followup for testicular growth patients with congenital or acquired undescended (ascending) testis were also screened by ultrasound for testicular microlithiasis, which was defined as echogenic foci without shadowing within the testis parenchyma. Classic microlithiasis was defined as 5 or more echogenic foci in either or both testes and limited microlithiasis as fewer than 5 foci.

Results: We performed 181 ultrasounds in 181 patients (199 congenital undescended testes) with a mean age of 12.6 years (range 2.6 to 28.6) and 636 ultrasounds in 320 patients (350 acquired undescended/ascending testes) with a mean age of 12.4 years (4.1 to 24.1). Age in both patient groups was equivalent. Median followup was 1.34 years (range 0 to 3.2). Testicular microlithiasis was found in 14 patients (2.8%), of whom 11 (2.2%) displayed classic testicular microlithiasis and 3 (0.6%) exhibited limited testicular microlithiasis. Among these 14 patients 5 had congenital undescended testes, which demonstrated classic microlithiasis. Of these 5 patients 4 had chromosomal deformities. The remaining 9 patients had acquired undescended (ascending) testis, which exhibited classic microlithiasis in 6 instances and limited microlithiasis in 3.

Conclusions: The prevalence of testicular microlithiasis in patients with undescended testis is 2.8%. There is no difference in the prevalence of testicular microlithiasis between congenital and acquired undescended (ascending) testes.

Key Words: cryptorchidism, lithiasis, orchiopexy, testicular diseases

Abbreviations and Acronyms

CTM = classic testicular microlithiasis

LTM = limited testicular microlithiasis

TGCT = testicular germ cell tumor

TM = testicular microlithiasis

UDT = undescended testis

US = ultrasound

Submitted for publication August 7, 2009.

* Correspondence: Department of Pediatrics, Medical Center Alkmaar, Wilhelminalaan 12, 1815 JD Alkmaar, The Netherlands (telephone: 31-72-5-48-44-44; FAX: 31-72-5-48-21-90; e-mail: j.goede@mca.nl).

UNDESCENDED testis is categorized as either congenital or acquired (ascending).[1] Patients with undescended testis have a 4 to 7-fold increased risk of malignant testicular germ cell tumor.[2] No definite factor triggering this tumor in later life has been identified to date. Testicular germ cell tumor is seen more frequently in boys with abnormal external genitalia, an intra-abdominal testis or an abnormal karyotype.[3] Furthermore, boys treated for undescended testis at age 13 years or older are at increased risk for this tumor.[4]

Testicular microlithiasis is considered to be an additional predisposing factor for TGCT. Testicular microlithiasis is characterized by multiple echogenic foci less than 3 mm without shadowing within the testis parenchyma. There are some indications that testicular microlithiasis is more frequently

0022-5347/10/1834-1539/0
THE JOURNAL OF UROLOGY®

Vol. 183, 1539-1544, April 2010
Printed in U.S.A.
DOI:10.1016/j.juro.2009.12.045

seen in UDT.[5] Ultrasound following orchiopexy revealed a 10% microlithiasis rate in the operated testis. Moreover, approximately 10% of these patients had TGCT during followup.[6] Hence, testicular microlithiasis may be an additional risk factor for TGCT in patients with UDT, necessitating tighter surveillance of these patients. The aim of this prospective study was to determine by ultrasound the prevalence of testicular microlithiasis in boys and young men with congenital or acquired undescended (ascending) testis.

MATERIALS AND METHODS

Patients With Congenital Undescended Testis

We recently analyzed 181 boys and young men with 199 congenital UDTs for long-term testicular growth after orchiopexy. US assessment of both testes was performed for testicular growth. During this examination the presence of TM was also considered. All patients underwent 1 scrotal US.

Patients With Acquired Undescended (Ascending) Testis

Since the mid 1990s we have annually assessed patients with acquired undescended (ascending) testis. In accordance with the Dutch Consensus spontaneous descent at puberty is awaited and orchiopexy is performed during puberty only in cases of nondescent.[7] Preliminary results of these assessments have already been published.[8] To date, 636 ultrasounds have been performed in 320 patients with 350 acquired undescended (ascending) testes.

Definitions

A retractile testis was defined as a normally developed testis that could be manipulated into a low scrotal position, where it remained until the cremasteric reflex was elicited. There was no shortening of cord structures. UDT was defined as a testis that could not be manipulated into a stable scrotal position and further tension on cord structures was not possible due to shortening. UDT can be high scrotal, inguinal or nonpalpable. Congenital UDT was defined as a testis that had not been documented in a scrotal position since birth, whereas an acquired undescended (ascending) testis had previously been descended.

TM involves multiple hyperechogenic, nonshadowing small foci within the testis parenchyma. Classic TM was considered present if 5 or more echogenic foci 1 to 3 mm in diameter were present in either or both testes, while limited TM was defined as fewer than 5 foci. TM was differentiated as diffusely scattered throughout the parenchyma or segmented.

Study Protocol

A questionnaire was used that included the items medical problems, medication, major surgery, previous groin surgery (other than orchiopexy), gestational age and birth weight. Because it is possible that the rate of TM varies in different ethnic groups, we also assessed patient ethnicity. Adenotonsillectomy and/or middle ear drainage was not considered.

Physical examination of the left testis was performed first, followed by the right testis with the patient in the supine and cross-legged position. Testes were categorized as descended, retractile or undescended.

Scrotal US was performed by 1 physician (KS) in the 181 patients with 199 congenital UDTs and by 1 physician (WH) in the 320 patients with 350 acquired undescended (ascending) testes. All ultrasounds were performed with the same equipment (12 MHz linear array transducer and Falco Auto Image, Falco Software Co., Tomsk, Russia). To assess the presence or absence of TM, we placed the scanner on the scrotum while recording transverse and longitudinal images of both testes. We performed US on both testes (undescended and normally descended), documenting the testicle involved and the number of microliths detected. Color Doppler ultrasound of the testis was not performed.

Followup After TM Diagnosis

If TM was diagnosed, a full physical examination was performed. Additionally US was repeated to confirm the diagnosis. Brothers of boys diagnosed with TM were also requested for scrotal ultrasound because TM has been reported in relatives of patients with TGCT.[9]

Statistics

Chi-square tests were conducted to compare birth weight, gestational age, groin surgery, chromosomal abnormalities, medication use and ethnicity between patients with and without TM. Chi-square tests were also used to compare the frequency of TM in congenital and acquired undescended (ascending) testes. Fisher's exact test was used to compare the frequency in different age groups. A p value of less than 0.05 was considered significant.

RESULTS

Number of Patients and Ultrasounds

A total of 501 patients were included in this study. Mean patient age was 12.5 years (range 2.6 to 28.6). Mean age of the 181 patients with 199 congenital UDTs was 12.6 years (range 2.6 to 28.6) and mean age of the 320 patients with 350 acquired undescended (ascending) testes was 12.4 years (4.1 to 24.1). We analyzed patient age in both groups and found no difference between the groups ($p = 0.78$).

In patients with congenital UDT scrotal US was performed once. By comparison, 636 USs were performed in the 320 patients with acquired undescended (ascending) testis, with all patients undergoing US at least once, 204 at least twice, 87 at least 3 times and 25 more than 3 times. Median followup was 1.34 years (range 0 to 3.2). Figure 1 shows a Kaplan-Meier plot of the prevalence of TM related to length of followup.

Testicular Microlithiasis

TM was present in 14 boys (2.8%, mean age 11.4 years, range 4.2 to 18.4), with CTM manifesting in 11 (2.2%, 11.7 years, 4.2 to 18.4) and LTM in 3 (0.6%, 10.4 years, 8.4 to 11.9). Five of the boys with TM were diagnosed with congenital UDT (all CTM) and 9 were diagnosed with acquired undescended (as-