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Long-term testicular position and growth of acquired undescended testis after prepubertal orchidopexy

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Abstract

Purpose: The aim of the study was to determine long-term testicular position and growth of acquired undescended testis (UDT) after prepubertal orchidopexy.

Methods: Patients who had undergone prepubertal orchidopexy for acquired UDT at our hospital between 1986 and 1999 were recruited to assess long-term testicular position and volume. Testis position was assessed by physical examination. Testis volume was measured with Prader orchidometry and ultrasound and was compared with normative values reported in the literature.

Results: A total of 105 patients (aged 14.0-31.6 years) were included with 137 acquired UDT (32 bilateral, 33 left sided, and 40 right sided). All but 1 of the orchidopexied testes (99.3%) were in low scrotal position. The mean volume of the orchidopexied testes in unilateral UDT (n = 73, 10.57 ± 3.74 mL) differed significantly from the size of the testes at the contralateral side (14.11 ± 4.23 mL) ($P = .000$). The operated testes (10.28 ± 3.45 mL) were smaller than the mean adult testis volume reported in the literature (13.4-13.6 mL; cutoff, 13.2 mL).

Conclusion: Testis position after prepubertal orchidopexy for acquired UDT was nearly always low scrotal. The volume of the orchidopexied testes was smaller than both the volume of the contralateral testes and the normative values reported in the literature.

Undescended testis (UDT) is a common genital abnormality in boys that is categorized into congenital and acquired forms [1,2]. For congenital UDT, orchidopexy is advised between 6 and 12 months old [3]. By contrast, it is still debatable as to what is the best management of acquired UDT. Some authors recommend orchidopexy at diagnosis because this would reduce the risk of subsequent infertility [2,4]. Still, no long-term follow-up data regarding acquired UDT after prepubertal orchidopexy have yet been published. Acquired UDT may also be managed with a conservative attitude; recently, long-term follow-up data regarding this policy have become available [5-8].

In this study, we assessed long-term testicular position and growth for acquired UDT after prepubertal orchidopexy. These data may be helpful in determining the best treatment for a boy with acquired UDT.

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1. Methods

1.1. Population

In this study, 335 boys were included who had undergone orchidopexy for acquired UDT at our hospital (1986-1999) as detailed in an earlier publication [9]. Each patient was requested by mail to participate in the long-term evaluation. If no reaction followed, a second letter was sent, and if there was still no response, the patient was contacted by telephone. Written, informed consent was obtained from the patient and/or his parents.

Patients were included if they had undergone an orchidopexy for acquired UDT in the Medical Centre Alkmaar between 1986 and 1999 before the age of 15 years and if written, informed consent had been obtained for participation in this study. Therefore, practically all included boys underwent a prepubertal orchidopexy.

Patients were excluded if one or more of the following criteria were present in their medical history: epididymitis, chromosomal or hormonal abnormalities, hormonal medication, earlier orchidopexy or other inguinal surgery, congenital UDT, and presence of a testicular germ cell tumor.

1.2. Definitions

1.2.1. Undescended testis

A *UDT* was defined as a testis that could not be manipulated into a stable scrotal position in its most caudal position, and further traction on cord structures was painful. It included high scrotal, inguinal, or impalpable forms.

1.2.2. Acquired UDT

An *acquired UDT* was defined as a UDT for which a previous scrotal position had been documented at least twice.

1.2.3. Orchidopexy

All orchidopexies were performed in boys under general anesthesia as an outpatient procedure. Orchidopexy was started with an inguinal incision. Subsequently, exploration of the groin took place, and if present, the open processus vaginalis was separated from the cord structures and ligated. Retroperitoneal funiculolysis and separation of the cremaster muscle were performed to mobilize the cord. Finally, the testis was fixed in the scrotum via a scrotal incision in a created dartos pouch. Surgical findings in these boys have been published previously [10].

1.3. Design of the study and follow-up data

All patients were seen at the outpatient clinic. Their medical history was obtained, and physical and ultrasound examinations were performed. All patients were examined by the same physician (JG).

1.3.1. History

A special questionnaire was used to determine the patients' medical history, including previous groin surgery and use of medication. Furthermore, the questionnaire included questions regarding fatherhood or the desire to father a child as well as how long it took to conceive a child.

1.3.2. Physical examination

Physical examination included assessment of testis position and volume. Testis position was classified as low scrotal, high scrotal, inguinal, or nonpalpable.

Testicular volume was measured with a Prader orchidometer. The orchidometer consists of a chain of 13 numbered beads of increasing size from 1 to 30 mL (1-6, 8, 10, 12, 15, 20, 25, and 30 mL). The beads are compared with the testicles of the patient, and the volume is read off the bead that matches most closely in size. If testes were larger than 30 mL, 35 mL was noted as testicular size.

1.3.3. Testicular ultrasound

After the physical examination, testicular volume was measured ultrasonography. All ultrasound examinations were performed with the same equipment (Falco Auto Image; Falco Software Co, Tomsk, Russia) with a 12-MHz linear array transducer. To measure the testicular volume, the scanner was placed on the scrotum while exerting light pressure to avoid distorting the testicular shape. Gray scale images of the testes were obtained in the transverse and longitudinal planes. Three separate transverse and longitudinal images were recorded for each testis. The epididymis was not included in the images. After maximum length, width and height were obtained in the ultrasonogram; these were measured, and the volume was calculated with the formula for an ellipsoid = $\pi/6 \times$ length $\times$ width $\times$ height. For each testis, the highest value of the 3 testicular volumes was taken as volume measurement. Additional findings, such as hydrocele, varicocele, and microlithiasis, were recorded. If necessary, the patient was referred for further follow-up.

1.4. Statistical analysis

All data were collected and analyzed with SPSS, version 14.0 (SPSS Inc, Chicago, IL). The independent t test was used to calculate the differences in age and volume. $P < .05$ was considered statistically significant.

1.5. Comparison with normal values of testicular volume in adult men

To enable comparison of our testicular volume measurements with normal values of adult testicular volume known in the literature, we performed a PubMed search. The terms we used were *normal testicular volume*, with limitations for *humans* and *adults*. We scored the abstracts