Multicenter Analysis of Acquired Undescended Testis and Its Impact on the Timing of Orchidopexy

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Objective To assess whether late orchidopexy for undescended testis represents delayed treatment of primary undescended testis or later-occurring acquired undescended testis.

Study design We examined boys undergoing orchidopexy for cryptorchidism regarding age at surgery and entity of undescended testis. We characterized differences between primary undescended testis and acquired undescended testis and evaluated the knowledge regarding the diagnosis and management of acquired undescended testis among practicing physicians. We conducted an observational study using a mixed-method multicenter cross-sectional design. A total of 310 consecutive boys undergoing orchidopexy for undescended testis at 6 pediatric medical centers in Germany between April 2016 and June 2018 were investigated regarding testicular position at birth and age at surgery. In addition, a survey on acquired undescended testis management was carried out in 1017 multidisciplinary physicians and final-year medical students.

Results Only 13% of all patients were operated on in their first year of life. Among patients with known previous testicular position (67%), primary undescended testis (n = 103) and acquired undescended testis (n = 104) were equally frequent. More than one-half (56%) of orchidopexies performed after the first year of life were due to acquired undescended testis. Remarkably, only 15% of physicians considered acquired undescended testis as an indication for late surgery.

Conclusions Acquired undescended testis is more common than previously perceived and accounts for a significant proportion of "late" orchidopexies in patients with undescended testis. Acquired undescended testis needs to be better recognized in clinical practice and screening should continue in older children with previously descended testes. *(J Pediatr 2020;223:170-7)*.

Trial registration German Clinical Trials Registry: DRKS00015903

Undescended testis is encountered in approximately 1%-6% of full-term and up to 45% of premature male infants. It represents one of the most common clinical disorders in pediatric surgery.[1] Primary undescended testis may spontaneously descend, mainly within the first six months of life. The exact rate of postnatal spontaneous testicular descent is controversial, with reports ranging from 7% to 70%.[2] Spontaneous resolution becomes unlikely after age 1 year.[2] Untreated undescended testis is associated with a high risk for impaired spermatogenesis and malignant degeneration. Early orchidopexy, a surgical procedure to stably reposition the undescended testis within the scrotum, has been shown to reduce these risks significantly.[3]

Several (inter)national guidelines recommend orchidopexy for undescended testis at age 12-18 months[4] (**Table I**; available at www.jpeds.com). The recommended age for orchidopexy has been gradually lowered. In Germany, the AWMF guideline published in 1999 recommended orchidopexy before 2 years of age.[5] In 2009, this was amended to 1 year of age (AWMF register no. 006/022).[6]

Despite these guidelines, worldwide a high rate of orchidopexies for undescended testis is performed well after the age 1 year.[7-9] In an Australian study, two-thirds of 4980 patients with undescended testis were found to be operated on after the first year of life.[10] In the US and in Germany this figure even exceeded 80%.[7,8,11] Most of the delay is ascribes to late referral for orchidopexy associated with, for example, socioeconomic disadvantages.[10]

AWMF	Association of the Scientific Medical Societies
GP	General practioners
UTD	undescended testis

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Importantly, acquired undescended testis is also thought to contribute to the high prevalence of late orchidopexies.[12] Acquired undescended testis is defined as a testis that was previously present in the scrotum, but can no longer be manipulated into a stable scrotal position.[13] Although acquired undescended testis was first described in 1955, it is still poorly understood and neglected by a majority of studies on undescended testis.[14,15] Acerini et al have prospectively evaluated that acquired undescended testis is common in the Cambridge Baby Growth Study, but the assessment only covers the first patients' 2 years of life.[16] Moreover, the significance of acquired undescended testis for late orchidopexy is unclear and treatment recommendations for this entity are only scarcely represented in clinical guidelines (**Table I**; available at www.jpeds.com).

For this study we hypothesized that acquired undescended testis is more common than previously perceived and nevertheless underrecognized by physicians who treat children. To test these hypotheses, we aimed to characterize patients undergoing orchidopexy for undescended testis regarding the specific type of undescended testis (primary vs acquired). Second, we surveyed physicians and final-year medical students to assess their knowledge of acquired undescended testis diagnosis and management.

Methods

We prospectively enrolled 310 consecutive boys undergoing orchidopexy for unilateral or bilateral undescended testis between April 15, 2016, and June 1, 2018, at 6 hospitals in Germany. Inclusion criteria were male sex, age <18 years, elective surgical orchidopexy, and a verified diagnosis of undescended testis. Exclusion criteria were female sex, indications for orchidopexy other than undescended testis (eg, testicular torsion), or patient/parental decline to consent for participation in this study. All children had initially been diagnosed and referred by the treating primary care pediatrician. Patients were included in the study only after the diagnosis of undescended testis had been verified by a board-certified specialist pediatrician, pediatric surgeon, or urologist with a dedicated specialization in pediatric urology. The previous testicular position as assessed by board-certified primary care pediatricians as part of the legally required medical/developmental milestone examinations (6 examinations by age 1 year and 4 more examinations by age 7 years) was used to distinguish primary from acquired undescended testis. To guarantee a representative patient sample, all children referred to the participating centers for elective orchidopexy for undescended testis were invited to participate in this study, and no preselection other than the aforementioned inclusion and exclusion criteria was applied.

Parents and physicians provided information regarding medical history and socioeconomic factors. Time from diagnosis/indication of surgery by the primary care pediatrician (defined as therapeutically relevant diagnosis—ie, after 6 months of life) to surgical orchidopexy was analyzed to assess for potential referral delay. Ethics approval was obtained from the Witten/Herdecke University Ethics Committee (ID 162/2015). The study was registered at the German Clinical Trials Registry (DRKS00015903).

Biostatistical Analysis

To compare the acquired undescended testis and primary undescended testis populations with regard to specified characteristics, descriptive analyses (summary statistics, frequency tables, Student t test, and Pearson χ^2 test) were conducted. To further characterize acquired undescended testis and primary undescended testis, we performed univariate and multivariate logistic regression analyses. The multivariate regression model assessed the impact of different risk factors on the outcome acquired undescended testis (= 1) or primary undescended testis (= 0) and was based on a forward selection of variables using the Akaike information criterion. ORs with 95% CI and P values from Wald tests were calculated. Statistical analyses were conducted using R version 3.3.2 (R Foundation for Statistical Computing, Vienna, Austria).

National Survey among Physicians and Final-Year Medical Students

In parallel, we conducted a web-based questionnaire using the online survey tool SoGoSurvey. We contacted medical practitioners both via their resident doctor's associations and directly through www.kinderaerzte-im-netz.de. Furthermore, the student councils at Germany's largest medical faculties (11 of 38) were contacted.

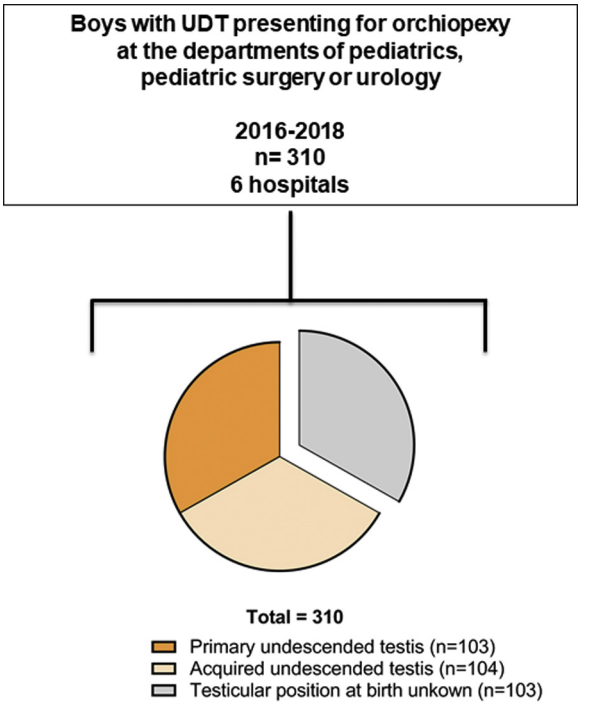

Figure 1. Overview of study centers, patient population, and information on testicular position at birth. *UDT*, Undescended testicle.

Table II. Biostatical analyses to investigate factors associated with acquired undescended testis: continuous variables

Characteristics	Total (n = 310)	Primary undescended testis (n = 103)	Acquired undescended testis (n = 104)	*P* value (*t* test)
Birth weight, g, mean	3238 (n = 290)	3166 (n = 102)	3463 (n = 94)	.003
Age at orchidopexy, y, mean	3.6	2.2	4.7	<.001

Results

Approximately 90% of the screened patients could be included in the study. Reasons for nonparticipation included lack of parental consent and language barriers. At the time of surgery, information regarding the previous testicular position (undescended testis present since birth vs secondarily ascended testis) was available in 207 of the 310 included patients (67%) (**Figure 1**). Among undescended testis cases with a known prior testicular position, 50% were primary and 50% were secondary in nature.

We analyzed factors previously associated with undescended testis in general, to investigate whether they occurred specifically with either form (**Tables II** and **III**). Patients with primary undescended testis had a lower mean birth weight (3166 g vs 3463 g; $P = .003$, *t* test) and were more likely to have been born prematurely (51% vs 34%; $P = .020$, χ^2 test). Primary undescended testis cases were more likely to have received hormonal treatment before the referral for surgery (28% vs 13%; $P = .009$, χ^2 test). Bilateral undescended testis occurred only in the primary undescended testis group and cases with an unknown history of previous testicular position.

Moreover, we observed a locally significant difference in mean age at orchidopexy between primary undescended testis and acquired undescended testis (2.21 years vs 4.71 years; $P < .001$, *t* test) (**Figure 2**). Only 13% of all patients were operated on before age 1 year. One-quarter (24%) of the patients with primary undescended testis were operated on before their first birthday, and the other 76% underwent surgery after their first year of life. This signifies true nonadherence to national guideline recommendations. Almost one-half (47%) of the patients with primary undescended testis were operated on in their second year of life, implying that still 29% were treated after their second birthday. In acquired undescended testis cases, only 4% (18%) of the patients were operated in their first (second) year of life, meaning that no less than 96% (78%) of patients underwent late orchidopexy after their first (second) birthday. At age 2 years and older, orchidopexy was performed more frequently to treat acquired undescended testis than to treat primary undescended testis (**Figure 3**; available at www.jpeds.com). In acquired undescended testis cases, we observed a second age peak for surgery at age 6-9 years.

To establish the presence of an associated inguinal hernia sac in children with acquired undescended testis, surgical procedure reports were reviewed. Seventeen of 96 children (18%) with acquired undescended testis and available specific documentation had an associated hernia sac at the time of orchidopexy. A countercheck in 14 patients from

Table III. Biostatical analyses to investigate factors associated with acquired undescended testis: categorical variables

Characteristics	Total (n = 310)	Primary undescended testis (n = 103)	Acquired undescended testis (n = 104)	OR, acquired vs primary	*P* value (χ^2 test)
Preexisting conditions, n (%)					
Yes	76 (25.2)	26 (25.5)	25 (24.8)	0.962	.904
No	226 (74.8)	76 (74.5)	76 (75.2)		
Regular medication, n (%)					
Yes	46 (15.2)	18 (17.6)	11 (10.9)	0.570	.169
No	257 (84.8)	84 (82.4)	90 (89.1)		
Birth, n (%)					
Preterm	129 (42.9)	51 (50.5)	35 (34.3)	0.512 (preterm vs other)	.020 (preterm vs other)
Late	52 (17.3)	14 (13.9)	20 (19.6)		
Scheduled	120 (39.9)	36 (35.6)	47 (46.1)		
Malformation, n (%)					
Yes	35 (11.7)	14 (14.4)	9 (8.7)	0.562	.198
No	264 (88.3)	83 (85.6)	95 (91.3)		
Conservative therapy (GnRH, HCG), n (%)					
No	246 (82.3)	72 (72.0)	87 (87.0)	2.603	.009
Yes	53 (17.7)	28 (28.0)	13 (13.0)		
Maternal smoking, n (%)					
Yes	47 (15.6)	15 (15.0)	18 (17.8)	1.229	.589
No	255 (84.4)	85 (85.0)	83 (82.2)		
Maternal diabetes, n (%)					
Yes	20 (7.2)	10 (5.4)	5 (11.1)	0.460	.164
No	257 (92.8)	80 (94.6)	87 (88.9)		

GnRH, gonadotropin-releasing hormone; *HCG*, human chorionic gonadotropin.

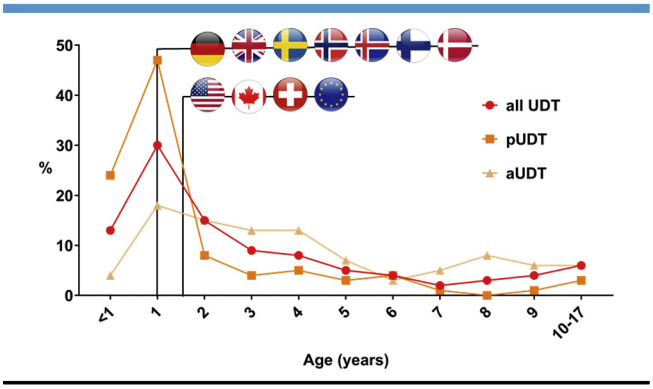

Figure 2. Proportional age distribution for the overall cohort, as well as for cases of primary undescended testis and acquired undescended testis. The timing of recommended definite treatment completion for children with primary undescended testis is plotted according to the respective (inter) national guideline recommendations of Germany/AWMF, Sweden, Norway, Denmark, Finland, Iceland/Nordic consensus, Great Britain/NICE and Switzerland (by age 12 months), and USA/AUA, Canada/CUA-PUC, and European Countries/EAU/ESPU. *aUDT*, Acquired undescended testicle; *AWMF*, Association of the Scientific Medical Societies in Germany; *AUA*, American Urological Association; *CUA-PUC*, Canadian Urological Association-Pediatric Urologists of Canada; *EAU/ESPU*, European Association of Urology/European Society for Paediatric Urology; *NICE*, National Institute for Health and Care Excellence; *BAPU/BAPS/APA/UKNHC*, British Association of Paediatric Urology/British Association for Paediatric Surgeons/Association of Paediatric Anaesthetists/United Kingdom National Screening Committee; *pUDT*, Primary undescended testicle.

the primary undescended testis group revealed 7 patients (50%) with an associated hernia sac.

We also analyzed the interval between the time of initial diagnosis/indication for surgery made by the primary care pediatrician and the performance of surgical orchidopexy (**Figure 4**; available at www.jpeds.com). Out of 251 patients with available data, 146 (58%) were operated on within 3 months of the indication for surgery (median interval between diagnosis and orchidopexy: 3 months for primary undescended testis vs 2 months for acquired undescended testis), and 11% had a delay of 1 year or longer.

In the univariate logistic regression model for evaluating the impact of the diagnosing physician's specialty at the referral center (reference: pediatrician) on the outcome acquired undescended testis vs primary undescended testis, it was found that urologists identified considerably more patients with acquired undescended testis than with primary undescended testis compared with pediatricians (OR, 11.0; P = .024, Wald test) (**Table IV**; available at www.jpeds.com). Multivariate logistic regression revealed that the occurrence of acquired undescended testis instead of primary undescended testis was mainly influenced by age at diagnosis, hospital location, birth weight, maternal smoking behavior during pregnancy, maternal diabetic disease, and presence of malformations (**Table V**; available at www.jpeds.com). Older age (OR, 1.036; $P < .001$, Wald test) and increased birth weight (OR, 1.001; $P = .001$, Wald test) were associated with a significantly increased occurrence of acquired undescended testis rather than primary undescended testis at the local 5% significance level. Acquired undescended testis was observed significantly less frequently in hospitals in which most of the patients were registered by the pediatric surgery unit (OR, 0.245; $P = .037$, Wald test) (**Table V**).

To investigate the common perception regarding the likely underlying etiology in "late orchidopexy," a questionnaire about the medical management of acquired undescended testis was completed by 1017 medical professionals (response rate, ~35%). The respondents comprised 392 pediatricians, 187 general surgeons, 131 general practitioners, 71 urologists, 59 pediatric surgeons, and 135 medical students in their final/internship year (**Figure 5**). Forty-two respondents did not disclose their medical discipline affiliation. Interestingly, when asked about the likelihood of the occurrence of acquired undescended testis was after a normal testicular position had been documented, 88% of all participants responded with "unlikely" (**Figure 5**, A).

In addition, the survey participants were asked what they considered to be the most likely etiology of undescended testis when diagnosed at school age. Strikingly, only 15% of all respondents considered acquired undescended testis as the cause. This share was slightly higher in pediatricians (24%) and pediatric surgeons (22%) than in other specialties. Thirty-nine percent reported failure to adequately diagnose primary undescended testis as the most likely cause, and 36% believed a delay caused by the physician to be the most relevant explanation of undescended testis diagnosis at school age (**Figure 5**, B). When asked about the most appropriate treatment for acquired undescended testis, 72% of all respondents (57% of the general practitioners) recommended surgery. Nine percent would treat acquired undescended testis medically, which is contrary to guideline recommendations, and 6% would treat only if symptoms occur (**Figure 5**, C). Analysis of all questionnaire responses excluding the 42 medical practitioners who did not disclose their medical specialty did not change the foregoing response distribution.

Discussion

Less than 10% of the 5547 analyzed patients with undescended testis underwent orchidopexy before age 1 year.[7] Here this number has increased to 13% (mean age, 3.6 years) (**Figure 2**). Other international studies have reported similar results.[17,18] This is particularly important considering that undescended testis is associated with long-term complications. In a population-based cohort study of all liveborn boys in Western Australia, 2.1% of whom had undescended testis, once more demonstrated an increased risk of testicular cancer, male infertility, and decreased

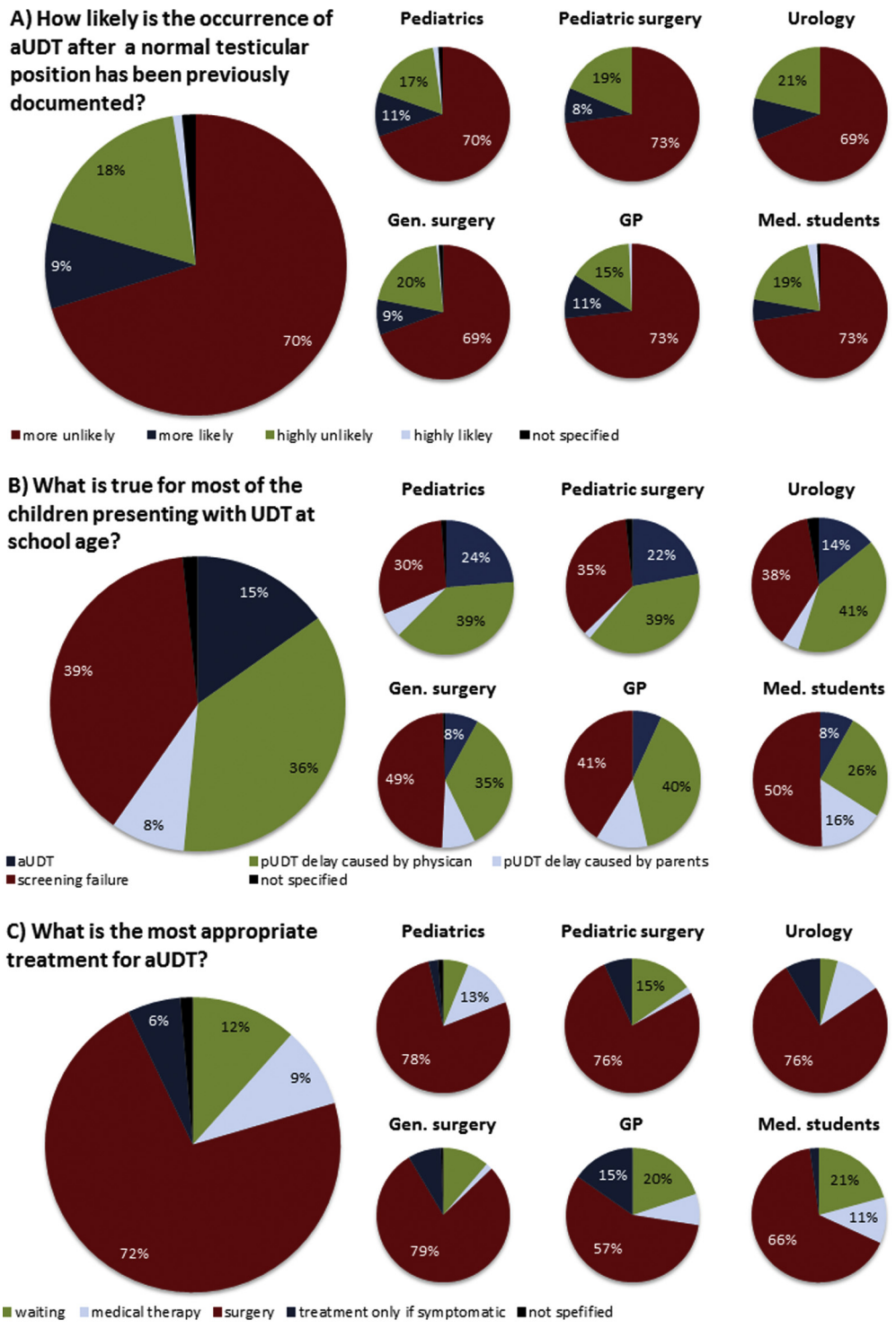

Figure 5. Results of the survey among children-treating physicians and final year medical students. A total of 1017 participants returned the questionnaire, including 392 pediatricians, 187 general surgeons, 135 medical students in the clinical internship year, 131 GPs, 71 urologists, and 59 pediatric surgeons. Forty-two respondents did not report their medical discipline affiliation. *UDT*, Undescended testicle.

paternity.[19] Specifically, for every 6 months' delay in orchidopexy, the authors reported a 6% increase in the risk of testicular cancer, a 5% increase in the risk of future use of assisted reproductive measures, and a 1% reduction in paternity. Whether surgery at 12 months vs surgery at 24 months makes a significant difference in the risk of testicular cancer remains to be established. Nevertheless, especially regarding fertility it has become clear that the younger the patient, the better the outcome. On the other hand, the fact that still only 1 in 8 patients with undescended testis undergoes surgery before age 1 year warrants further clarification.

We observed a locally significant difference in age at the time of orchidopexy between patients with primary undescended testis and those with acquired undescended testis (mean age, 2.2 vs 4.7 years). This is consistent with results from other German and international studies.[12,20,21] Only 24% of the patients with primary undescended testis were operated on before their first birthday. On a positive note, the majority of patients with primary undescended testis missed the target by a narrow margin. Nevertheless, almost 30% of patients with primary undescended testis miss the guideline recommendation by 1 year or more, and also do not meet also the more liberal recommendations like those of the American Urologic Association Guidelines recommending treatment completion by age 18 months (**Table I**). These children face an unjustified and avoidable increased health risk.[3,19] In contrast to previously published work, a delay from diagnosis/indication of surgery to surgical orchidopexy was found to be of minor importance in this study (**Figure 4**).[17] Thus, causative factors for delayed surgery in undescended testis are more likely screening failure and a lack of awareness for this indolent condition, as well as the naturally later occurring acquired undescended testis.

Primary undescended testis and acquired undescended testis were equally common. Strikingly, 2 of 3 children undergoing orchidopexy after the first year of life had acquired undescended testis. In contrast to this, international guidelines provide little or no specific recommendations on how to manage children with acquired undescended testis (**Table I**). Our survey of more than 1000 physicians and medical students revealed the participants' insufficient awareness of the significance of acquired undescended testis. In contrast to a previous survey demonstrating heterogeneous levels of knowledge about acquired undescended testis,[7] we found the awareness of acquired undescended testis to be generally poor among physicians and medical students (**Figure 5**). Nearly all respondents reported the occurrence of acquired undescended testis to be unlikely. Specifically, 70% of the urologists reported that acquired undescended testis was unlikely, even though acquired undescended testis accounted for 3 out of 4 cases of undescended testis treated by the urologists in this study. Most respondents attributed the occurrence of undescended testis at an older age to be a result of screening failure.

The underlying pathophysiological features of acquired undescended testis remain a matter of debate.[22] We found locally significant differences in birth weight and preterm birth between the 2 groups (**Table II**). Other studies also have identified low birth weight and preterm birth as risk factors for undescended testis.[23,24] This study reports associated risk factors, such as low birth weight and preterm birth, specifically differentiating between primary undescended testis and acquired undescended testis. Bilateral presentation occurred only in primary undescended testis, possibly pointing to a systemic underlying cause. Van Brakel et al reported that patients with unilateral primary undescended testis exhibited higher levels of anti-Müllerian hormone compared with patients with bilateral acquired undescended testis.[25] Moreover, the observation of nonorthotopic gubernacular insertion in most children with acquired undescended testis provides further evidence that primary undescended testis and acquired undescended testis feature distinct embryologic etiologies.[26] An associated hernia sac was more common in primary undescended testis than in acquired undescended testis but not specific to either entity, which is in keeping with a previous study reporting that an open processus vaginalis in 67% of children with undescended testis.[27] The importance of an associated hernia sac for the etiology of undescended testis and the possible distinction between primary undescended testis and acquired undescended testis requires further investigation.

We performed multivariate analyses and found important factors influencing the likelihood of acquired undescended testis compared with primary undescended testis, such as age at diagnosis, hospital location, birth weight, maternal smoking status during pregnancy, maternal glucose control, and the presence of malformations (**Table IV**). Overall in our cohort, compared with pediatricians, urologists identified considerably more patients with acquired undescended testis than with primary undescended testis (**Table III**). We speculate that this is probably because pediatric surgeons tend to see patients at an earlier age.

Even though secondary ascent of the testis was described long ago,[14] and several studies have specifically investigated acquired undescended testis,[12,21] there remains a lack of data on natural history (eg, the rate of spontaneous descent), long-term outcomes (eg, cancer risk, testicular growth and fertility) and optimal treatment strategies. We also observed a bimodal age distribution for undescended testis with peaks at age 1 and 8 years (**Figure 2**).[12,21,22] The second peak is mostly represented by cases of acquired undescended testis.[13] The prevalence of acquired undescended testis is believed to first increase and then decrease with age, and a relevant share of cases may resolve spontaneously.[28] Based on this, some authors have proposed a more conservative approach to acquired undescended testis.[29] Secondarily ascended testes tend to redescend spontaneously at puberty.[30] In contrast, fertility problems are similar in patients with previous acquired undescended testis and those with primary undescended testis.[25,31]

Another contributing factor to both the high rate of late orchidopexy and the confusion about the ideal management of acquired undescended testis is the phenomenon of "retractile testis." Retractile testes spontaneously leave the scrotum but return to the scrotum either spontaneously or under manipulation, and then remain there for a finite period. Retractile testis was traditionally considered a normal variant until a decade ago, when Agarwal et al demonstrated that 32% of retractile testis develop into acquired undescended testis.[32] Inan et al found a high prevalence of retractile testis and a potential negative effect on testicular volume development.[33] Retractile testis features abnormal cremaster muscle structural features, similar to those in cryptorchidism.[34] Overactive cremasteric muscles are believed to cause testicles to retract, which could be falsely interpreted as pathological ascent, indicating orchiopexy. Subsequently, increased circulating testosterone levels at puberty cause relaxation of the cremasteric reflex, which results in testicles to be more pendulous, the "natural redescend." Unfortunately, our study design did not facilitate confident identification of retractile testis cases in this population. Retractile testis merits further study.

A study limitation here is the retrospective assessment of the previous testicular position. Despite the fact that in Germany the obligatory well-child examinations performed regularly by board-certified pediatric specialists includes the assessment and documentation of a normal testicular position in all boys (ie, 6 examinations in the first year of life, 10 examinations by age 6 years), a prospective assessment would be superior, yet significantly more resource-intensive. Finally, there may be a gray area between pathological undescended testis and physiologically increased cremasteric activity (eg, anxiety-induced transiently high scrotal testicular position). This may have resulted in false-positive assessment of acquired undescended testis in some cases. Given the previously reported later-occurring peak of acquired undescended testis in children at school age, the higher incidence in acquired undescended testis in the first years of life reported here may be due to missed primary undescended testis or misdiagnosed overactive cremasteric activity. However, in keeping with the most important medical principle, primum non nocere ("first, do no harm"), we are convinced that primary care pediatricians and surgeons are doing their utmost to keep this number to minimum to provide the best imaginable care for their patients. ■

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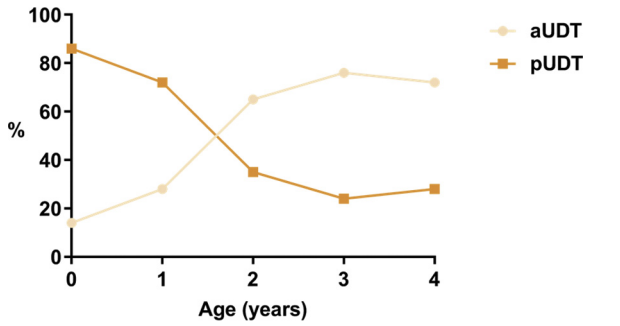

Figure 3. Proportions of acquired undescended testis and primary undescended testis cases in relation to patient age at orchidopexy. *aUDT*, Acquired undescended testicle; *pUDT*, Primary undescended testicle.

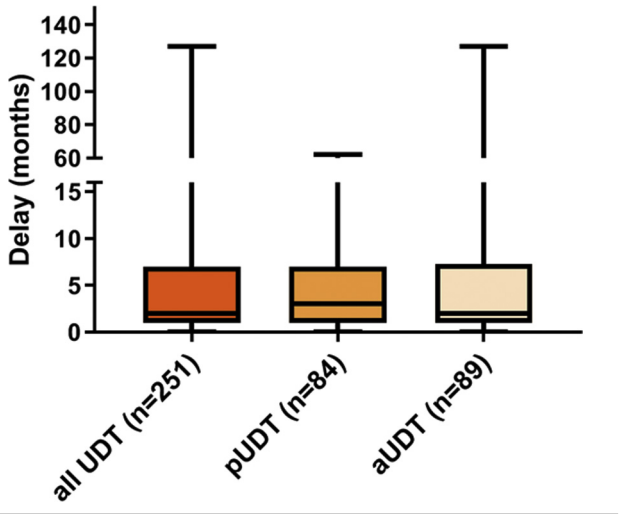

Figure 4. Boxplots showing the delay experienced by patients from establishing the diagnosis until orchidopexy for the overall cohort, as well as for the subsets of patients with acquired undescended testis and primary undescended testis. *aUDT*, Acquired undescended testicle; *pUDT*, Primary undescended testicle.

Table I. Synopsis of available clinical guidelines on therapeutic management of undescended testis

			Primary undescended testis		Acquired undescended testis		
Country	Society	Year	Hormonal therapy	Timing of recommended definite treatment	Mentioned	Diagnostic recommendation	Treatment recommendation
Germany	AWMF[6]	2016	Beyond 6th month of life: GnRH alone or in combination with hCG for retractile testis	<1 y	Yes	-	-
USA	AUA[35]	2014	Not advised	≤18 mo	Yes	Continued genital examinations, especially in boys with retractile testis	surgery
Canada	CUA-PUC[36]	2017	Hormone therapy has a limited role and should not be recommended as first-line therapy	6-18 mo	Yes	Serial physical examination to accurately determine testicular position and identify cases of acquired cryptorchidism with retractile testes.	-
Sweden, Norway, Denmark, Finland, Iceland	Nordic consensus[4]	2006	Not recommended	6-12 mo	Yes	-	-
European countries	EAU/ESPU[37]	2016	Not recommended	6-18 mo	Yes	-	-
Great Britain	NICE guidelines (BAPU/BAPS/APA/UKNHC)[38]	2015	May be considered on an individual basis	≤12 mo	Yes	-	surgery
Switzerland	[39]	2008	Not recommended	6-12 mo	No	-	-

AWMF, Association of the Scientific Medical Societies in Germany; *AUA*, American Urological Association; *CUA-PUC*, Canadian Urological Association-Pediatric Urologists of Canada; *EAU/ESPU*, European Association of Urology/European Society for Paediatric Urology; *GnRH*, Gonadotropin-releasing hormone; *hCG*, Human chorionic gonadotropin; *NICE*, National Institute for Health and Care Excellence; *BAPU/BAPS/APA/UKNHC*, British Association of Paediatric Urology/British Association for Paediatric Surgeons/Association of Paediatric Anaesthetists/United Kingdom National Screening Committee.

Table IV. Univariate logistic regression analysis for evaluating the impact of the diagnosing physician's specialty (reference: pediatrician) on the outcome acquired undescended testis (= 1) vs primary undescended testis (= 0)

Variable	OR (95% CI)	*P* value (Wald test)
Intercept	0.818 (0.599-1.117)	.207
GP	2.444 (0.435-13.729)	.310
Urologist	11 (1.362-88.859)	.024
Other	2.173 (0.907-5.207)	.082
Unknown	1.222 (0.239-6.240)	.809

GP, General practitioner.

Table V. Multivariate logistic regression analysis including forward selection to identify factors associated with an increased likelihood of acquired undescended testis compared with primary undescended testis

Variable	OR (95% CI)	*P* value (Wald test)
Intercept	0.013 (0.001-0.207)	.002
Age at diagnosis	1.036 (1.020-1.052)	<.001
Hospital 1	0.545 (0.062-4.791)	.584
Hospital 2	0.700 (0.070-7.006)	.761
Hospital 3	0.219 (0.050-0.956)	.043
Hospital 4	0.245 (0.065-0.920)	.037
Hospital 5	0.607 (0.107-3.432)	.572
Hospital 6	0.000 (0.000-Inf)	.989
Birth weight	1.001 (1.001-1.002)	.001
Maternal smoking status, yes	2.755 (0.699-10.862)	.148
Diabetes, yes	0.798 (0.154-4.124)	.787
Malformations, yes	0.802 (0.218-2.957)	.740