Cryptorchidism: experience and reason

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Introduction: *To characterize our contemporary clinical experience with cryptorchidism.*
Materials and methods: *The records of boys referred for cryptorchidism were reviewed from 2001 to 2011. Data regarding the incidence of retractile testes, testicular ascent, surgical approach and outcomes were tabulated. Follow up was both early (< 12 weeks) and late (> 12 weeks).*
Results: *A total of 1885 patients, or 2593 testes, were identified. Eight hundred and forty-one children (45%) or 1204 testes (46%) were retractile on initial exam--57% bilateral; 187 testes (7%) later "ascended" on re-examination and underwent surgery--15% bilateral; 1340 (85%) testes were palpable in the inguinal canal and underwent inguinal orchidopexy--98% were successful; 69 (4%) of initially palpable testes were found to be atrophic and removed; 167 (11%) testes were non-palpable and underwent laparoscopy--46 were atrophic and removed; 31 were vanishing; 33 were brought down using an inguinal approach at the same sitting with 97% success; 47 underwent staged Fowler-Stephens orchidopexy (FSO) and 10 underwent non-staged FSO, with 82% and 78% success respectively. All second stages were performed open.*
Conclusions: *Almost half of children referred for cryptorchidism had retractile testes. Surgery for later ascent was required in 16% of testes judged to be retractile at a median age of 8 years, emphasizing the need for repeat examination. High success rates with inguinal orchidopexy were achieved, even in non-palpable testes. Testes requiring FSO were uncommonly encountered-approximately 5 testes/year or 4% of testes undergoing surgery-and success was achieved in approximately 80%.*

Key Words: cryptorchidism, orchidopexy, retractile testes, laparoscopy

Introduction

Cryptorchidism is a common reason for pediatric urologic consultation, affecting up to 6.9% of births and 1%-2% of males at 1 year of age.[1] Rates are higher in pre-term and low birth weight infants. Many boys referred for undescended testes are found to have retractile testes, an entity seen in up to 3.9%.[2] These children require follow up with no further correction; however, up to 50% have been reported to experience later ascent of a previously retractile testis.[3,4] Contralateral hypertrophy is said to reliably diagnose absence of a non-palpable testis.[5]

The rate of spontaneous testicular descent varies widely among several reports, ranging from 6.9%-76% by 1 year of age.[6-8] In children whose testes remain undescended, close follow up with eventual surgical correction is required to maintain fertility and abate the risk of testicular malignancy, which has been found to be up to three times higher compared to normal boys and highest in boys with intra-abdominal testes and some intersex conditions.[8-10] The mainstay of treatment for palpable, undescended testes is testicular fixation within the scrotum, or orchidopexy.[10,11] Up to 20% of undescended testes are non-palpable, and there is wide variability among diagnostic and surgical approaches in this subset of children.[12] Laparoscopy has proven to

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be an effective means of locating non-palpable testes and then determining subsequent surgery.[13] Imaging studies, consisting of ultrasound, CT scanning or MRI are less effective.[14] Fowler-Stephens orchidopexy (FSO), both staged and non-staged approaches, have been employed in circumstances where the testicular vessels are of inadequate length, with success ranging from 50% to 100%. We, therefore, characterize our recent 10 year experience with cryptorchidism.

Materials and methods

A retrospective study was performed and electronic medical records of all boys referred for cryptorchidism between January 2001 and December 2011 were reviewed. Institutional Board Review (IRB) approval was obtained. Data regarding age of presentation, testicular location, contralateral testicular size, surgical approach, and outcome were tabulated. Children were asked to return for postoperative visits several weeks after surgery and then later at least 12 weeks postoperatively. Some were discharged after the first early visit, if there was no inflammation and the testis was in good position. Success was defined as a non-atrophic testis in proper scrotal location.

Surgical approach for palpable or inguinal testes was standard inguinal orchidopexy. Diagnostic laparoscopy was employed for non-palpable testes. A staged FSO was most commonly performed for high intra-abdominal testes, although the non-staged approach was sometimes used. All second stages were performed using an open technique.

Results

A total of 1885 patients, or 2593 testes, were referred for the evaluation of cryptorchidism, Table 1. Seventy-one percent of patients were referred for unilateral cryptorchidism, while 29% were thought to have bilateral cryptorchidism by their primary physicians. Median age of presentation of the entire group was 36 months. Forty-five percent of patients had retractile testes on initial examination, at a median age of presentation of 48 months, Table 2. This represented 45% of all patients referred for cryptorchidism. Of those patients, 57% were unilateral and 43% were bilateral. Surgery for later testicular ascent was required in 19% of that group at a median age of 8 years. Most ascending testes requiring later surgery were unilateral (85%).

Overall, 1206 children, or 1576 testes, underwent surgery at a median age of 24 months, with a success rate of 98%, Table 3. At the time of inguinal exploration 4%

TABLE 1. **Clinical characteristics at time of referral**

Total patients	1885
Total testes	2593
Laterality (patients)	
Unilateral	1343 (71%)
Bilateral	542 (29%)
Median age at initial presentation (years)	3

TABLE 2. **Retractile testes**

Patients	841 (45%)
Testes	1204 (46%)
Laterality (patients)	
Unilateral	478 (57%)
Bilateral	363 (43%)
Median age at initial presentation (months)	48
Ascending testes	
Total testes	187
% of all testes	7
% of testes initially retractile	16
% of testes undergoing surgery	12
Median age at presentation (months)	84
Median age at surgery (months)	96
Laterality (patients)	
Unilateral	137 (85%)
Bilateral	25 (15%)

TABLE 3. **Surgical outcomes of all cryptorchid testes**

Patients	1206 (64%)
Testes	1576 (61%)
Median age at surgery (months)	24
Surgery successful	1277 (98%)
Surgery non-successful	32 (2%)
Testes lost to follow up	121 (8%)
Vanishing testes	31 (2%)
Testes found atrophic and removed	
Within inguinal canal	69 (4%)
Intra-abdominal	46 (3%)
Median length of follow up (weeks)	13

TABLE 4. **Surgical outcomes categorized by procedure**

	Inguinal orchidopexies	Laparoscopy: staged FSO	Laparoscopy: non-staged FSO	Laparoscopy: inguinal*
Patients	987	36	9	29
Laterality (patients)				
Unilateral	800	25	8	25
Bilateral	187	11	1	4
Testes	1340	47	10	33
Surgery successful (number and percentage)	1203 (98%)	37 (82%)	7 (78%)	30 (97%)
Surgery non-successful (number and percentage)	21 (2%)	8 (18%)	2 (22%)	2
Atrophied	4	8	2	2
High in scrotum	17	0	0	0
Testes lost to follow up	116	2	1	1
Median age at surgery (months)	48	16	66	16
Median length follow up (weeks)	12	21	22.5	14

*laparoscopy was followed by inguinal orchidopexy for intra-abdominal testes near or in the internal ring ("peeping")
FSO = Fowler-Stephens orchidopexy

of initially "palpable" testes were found to be atrophic in the inguinal canal and removed. Thirty-one patients had vanishing testes at laparoscopy (see below).

Surgical outcomes and follow up of each group is in Table 4. Standard inguinal orchidopexy for palpable testes was performed for 1340 testes or 85% of all testes undergoing surgery at a median age of 48 months. Ninety-eight percent were deemed successful, and 2% were unsuccessful. Forty percent of testes were not re-examined at a later date after the first postoperative visit, since they were dismissed from care with normal examinations.

A total of 167 testes in 151 patients were non-palpable and subject to diagnostic laparoscopy—89% unilateral, 11% bilateral. Thirty-three testes after laparoscopy were found to be either inguinal or close to the internal inguinal ring and then underwent standard inguinal orchidopexy at a median age of 16 months. Ninety-seven percent were successful; 2 underwent atrophy and 1 was lost to follow up. Twenty-eight percent underwent a staged FSO after diagnostic laparoscopy, at a median age of 16 months for the first stage. The second stage was performed an average of 6 months later. Eighty-two percent were successful, while 18% underwent atrophy. Six percent of testes were subject to a single stage FSO procedure at a median age of 66 months. Seventy-eight percent were successful, while 22% underwent atrophy. Forty-six testes were discovered to be atrophic and 31 testes were vanishing after laparoscopic evaluation. Sixty-five patients were noted to have contralateral hypertrophy subjectively noted by the examiner; of the 40 patients with non-palpable testes undergoing laparoscopy in which contralateral testicular hypertrophy was noted, 31 were found to be atrophic or vanishing (76%).

Discussion

Evaluation for undescended testes is a common reason for referral to pediatric urologists. In our experience nearly half of patients referred had retractile testes (45%). These boys tended to present when older, at a median age of 3 years and this does include older boys who may have had normal or equivocal infant examinations. The ideal age for orchidopexy is felt to be by 1 year of age or less. It is clear, however, that later referral still occurs, suggesting the need for improved efforts at education in the primary care community. It has been reported that up to 50% of retractile testes may eventually ascend, known as acquired cryptorchidism.[3] In our series this was seen in 16% of initially retractile testes in boys who returned for re-examination at a median age of 7 years age. One theory is that these testes are truly undescended at birth because many are located in the superficial inguinal pouch.[3] Others suggest that that these testes are truly cryptorchid and as a child grows, the gap between the testes and the

scrotum widens.[15] Ascent of the testis in our series was more common in those initially thought to have unilateral versus bilateral retractile testes; nonetheless, our results imply that patients with retractile testes should be examined on a regular basis until puberty.

In our series, 1206 patients (1576 testes) underwent surgical intervention with an overall success rate of 98%. A total of 1340 testes (85%) were palpable and underwent conventional inguinal orchidopexy with 98% success. This success rate is similar to other reported series.[14] Ten to twenty percent of undescended testes are testes located in the abdominal cavity.[16] Laparoscopy is a widely employed when the testis is non-palpable, facilitating both diagnosis and surgical treatment at the same sitting. Various imaging modalities have been utilized, with poor or fair results and, therefore, are not routine.[14] Of the patients in our series, 151 (167 testes) had non-palpable testes and subsequently underwent diagnostic laparoscopy. Forty-seven testes underwent staged FSO due to the presence of viable intra-abdominal testes with a success rate of 82%. First stage clipping of the vessels was performed laparoscopically, while all second stages were via an open approach approximately 6 months later.

First stage laparoscopic clipping of the gonadal vessels has been well accepted since Bloom et al first described it in 1991, and allows for increased collateral vasculature to develop from the deferential artery.[13] Data are conflicting in regards to whether an open or laparoscopic second stage offers more beneficial outcomes. In a study by Cassenova et al, long term testicular viability was greater after an open second stage, 79.6% of testes in their series managed by an open second stage were successful versus 50% success in those that were performed laparoscopically.[17] This is in contrast to previous reports of equal or greater success with laparoscopic second stage.[18,19] Operator experience as well as the challenge of laparoscopic management of a long looping vas entering the internal inguinal ring may account for the different reported rates of success.[20] Series with a higher success may include a larger number of testes located near the internal inguinal ring. The need for FSO for intra-abdominal testes is uncommon in our experience. Forty-seven patients over 10 years represent less than five children a year. This is due to the fact that many children with non-palpable testes either have non-viable testes or testes near the internal inguinal ring, which can be successfully brought down with a standard open inguinal approach, once identified at laparoscopy. Ninety-seven percent of so-called "peeping testes" were successfully brought down in this manner.

Of the 151 patients (167 testes) with non-palpable testes that underwent laparoscopy, 46 testes were discovered to be atrophic and 31 testes were vanishing. 40 of these patients were noted to have contralateral testicular hypertrophy on examination prior to the procedure, and of these 31 (76%) had vanishing or atrophic testes found at the time of laparoscopy. Prior studies have demonstrated a strong correlation between contralateral testicular hypertrophy and atrophy or absence of the non-palpable testicle during laparoscopy.[5,21] While there is a strong correlation between contralateral hypertrophy and an absent testis, it is a subjective assessment and, therefore, not absolute.

Limitations in our study include its retrospective nature. Of the 1340 testes that underwent standard inguinal orchidopexy, 692 (52%) had long term follow up at or after 12 weeks, but 116 (9%) were lost to follow up. Therefore, our success rate in this group may be less. We also occasionally discharged patients after a first early visit, if they had a viable testis in proper position without inflammation. In contrast, 54 of the 57 patients that underwent staged or non-staged FSO orchidopexy had follow up after 3 months.

Conclusion

Almost one-half of children referred for cryptorchidism had retractile testes. Surgery for ascent was required in almost 20% of that group at a median age of 8 years, emphasizing the need for repeat examination. One should expect a high success rate with standard inguinal orchidopexy, even when testicles were non-palpable on initial exam. Amongst those with non-palpable testes, the majority either had no salvageable testis or underwent standard inguinal orchidopexy, after laparoscopy. High testes requiring a FS approach were uncommonly encountered-approximately six testes/year or 4% of testes undergoing surgery-and success was achieved in 81%. Contralateral hypertrophy was a reliable, but not absolute, indicator of a non-viable testis. □

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