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Results of distal hypospadias repair after pediatric urology fellowship training: A comparison of junior surgeons with their mentor

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Summary

Background
Teaching and learning hypospadias repair is a major component of pediatric urology fellowship training. Educators must transfer skills to fellows, without increasing patient complications. Nevertheless, few studies report results of surgeons during their first years of independent practice.

Purpose
To review outcomes of distal hypospadias repairs performed during the same 2-year period by consecutive, recently matriculated, surgeons in independent practice, and to compare them to results by their mentor (with >20 years of experience).

Materials
Exposure to hypospadias surgery during fellowship was determined from case logs of five consecutive fellows completing training from 2007-2011. TIP was the only technique used to repair distal hypospadias. No fellow operated independently or performed complete repairs under supervision. Instead, the first 3 months were spent assisting their mentor, observing surgical methodology and decision-making. Then, each performed selected portions under direct supervision, including: degloving, penile straightening, developing glans wings, incising and tubularizing the urethral plate, creating a barrier layer, sewing the glansplasty, and skin closure. Overall fellow participation in each case was <50%. In 2011-2012, urethroplasty complications (fistula, glans dehiscence, meatal stenosis, urethral stricture, diverticulum) were recorded for consecutive patients undergoing primary distal repair by these recent graduates in their independent practices. The fellow graduating in 2011 provided 1 year of data. All patients undergoing repair during the study period were included in the analysis, except those lost to follow-up after catheter removal. Composite urethroplasty complications were compared between junior surgeons, and between junior surgeons and their mentor, with Fisher's exact contingency test.

Results
Training logs indicated fellow participation ranged from 76–134 hypospadias repairs, including distal, proximal and reoperative surgeries. Post-graduation case volumes ranged from 25–68 by junior surgeons versus 136 by the mentor. With similar mean follow-up, urethroplasty complication rates were statistically the same between the former fellows, and between them versus the mentor, ranging from 5–13%. Nearly all were fistulas or glans dehiscence. Junior surgeons reported they performed TIP as learned during fellowship, with one exception who used 7-0 polydioxanone rather than polyglactin for urethroplasty.

Discussion
This is the first study directly comparing hypospadias surgical outcomes by recently graduated fellows in independent practice with those of their mentor. We found junior surgeons achieved similar results for distal TIP hypospadias repair. Although their participation during training largely comprised observation and surgical assistance, with discrete performance of key steps, skills sufficient to duplicate the mentor's results were transferred. These data suggest there should be no learning curve for distal hypospadias after training.

This report raises several considerations for surgical educators. First, mentors should review their own results, to be certain that they are correctly performing and teaching procedures. Second, programs need to determine key steps for procedures they teach, and then emphasize their optimal performance. Finally, mentors should expect former fellows to report back their initial results of hypospadias repair to be certain lessons taught were learned. Otherwise, preventable complications resulting from technical errors will be multiplied in the children operated by their trainees as they enter independent practice.

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Introduction

The teaching and learning of hypospadias repair is a major goal of pediatric urology fellowship training. Despite this, few reports have addressed the results obtained by young surgeons during their first years of independent practice, and have reported contradictory findings. Both Horowitz and Salzheuer [1] and Rompe et al. [2] noted learning curves, with complications diminishing after 50—90 cases. In contrast, Frimberger et al. [3] stated that two surgeons achieved similar results during their first 3 years of practice as those of their mentors, but provided no comparison data from their training institutions. Outcome data after distal hypospadias repair by consecutive fellows during the same 2-year period shortly after the end of their fellowships were reviewed and directly compared with the results of distal repairs performed during the same time by their mentor.

Materials

Exposure to hypospadias surgery during fellowship was determined from case logs of five consecutive fellows who completed their fellowship training between 2007 and 2011. In the USA, fellowship training in pediatric urology consists of 1 year of supervised clinical training in addition to at least 1 year of research in pediatric urology after a 5- or 6-year residency training program, with graduating fellows typically going directly into unsupervised private or academic practice thereafter.

The present study found that during the year of clinical training, no fellow operated independently or performed complete hypospadias repairs under supervision of their mentor. Instead, the first 3 months were spent assisting their mentor (WS), observing the surgical methodology, and decision-making. Then, each performed selected portions of cases under direct supervision, including: degloving, straightening penile curvature, developing glans wings, incising and tubularizing the urethral plate, creating a barrier layer, sewing the glansplasty, and skin closure. While fellows were trained in and participated with each key component of the surgery in different cases, overall participation in each case was $<$50%, with none performing complete repair until after graduation.

In 2011 and 2012, these recent graduates in their independent practices recorded outcomes for consecutive patients undergoing primary distal repair, with data representing all distal hypospadias repairs performed during these 2 years of unsupervised practice for all but the last graduate, who contributed 1 year of data. The mentor (WS), and three of the five former fellows prospectively collected this data. All cases were repaired by tubularized incised plate (TIP), and all patients undergoing primary distal hypospadias repair during the study period were included in the analysis, except those lost to follow-up after catheter removal. Results were reviewed with Internal Review Board (IRB) approval, and submitted to NCB for analysis, which was then shared in anonymous fashion with the mentor.

Briefly, distal TIP was performed as previously described [4]. The urethral plate was incised from within the meatus to its distal end, extending deeply to near the underlying corpora, and then two-layer urethroplasty was performed using continuous subepithelial 7-0 polyglactin. Only Surgeon E varied, using 7-0 polydioxanone instead of polyglactin for the urethroplasty. Next, the neourethra was covered with a dartos flap. Glansplasty was performed in a single layer, with the goal of placing three interrupted subepithelial 6-0 polyglactin sutures by all surgeons. Postoperative urinary diversion with a 6-Fr Kendall™ catheter was performed for 5—7 days.

Distal hypospadias was defined as a meatus located on the distal shaft or glans after degloving, at the beginning of urethroplasty. The definitions of urethroplasty complications were standardized as follows. Fistulas were urethral leaks below the neomeatus. Glans dehiscence was complete separation of the glans wings resulting in a coronal or subcoronal meatus. Fistulas beneath a bridge of skin holding dehisced glans wings were also classified as glans dehiscence. Meatal stenosis was diagnosed by obstructive voiding symptoms and calibration $<$8 Fr. Urethral strictures presented with symptoms (obstructive voiding symptoms, urinary retention, and/or UTI) and had visual near closure of the neourethra by urethroscopy. Diverticulum was visual sacculation of the neourethra during urination.

Composite urethroplasty complications were compared between junior surgeons, and between junior surgeons and the mentor, with Fisher's exact contingency test (SAS version 9.2, Cary, NC).

Results

Training logs indicated fellow participation ranging from 76 to 134 hypospadias repairs, which included distal, proximal and reoperative surgeries. Post-graduation case volumes and results (in random order) are shown in Table 1, with the number of repairs ranging from 25 to 68 by the Table 1 the junior surgeons versus 136 by the mentor. With mean follow-up for all surgeries $<$1 year, urethroplasty complication rates were statistically the same between the former fellows, and between them versus the mentor, ranging from 5 to 13%. Nearly all complications were fistulas or glans dehiscence.

Junior surgeons reported that they performed the key steps of urethral plate incision and tubularization, barrier flap coverage of the neourethra, and glansplasty, using the same methodology and sutures, as learned during fellowship training with the exception of one, who used 7-0 polydioxanone rather than polyglactin for urethroplasty.

Discussion

This was the first study comparing hypospadias surgical outcomes by former fellows in their initial years of independent practice with those of their mentor. It was found that junior surgeons in their first 5 years of experience achieved similar outcomes performing distal TIP hypospadias repair. Even though their participation during training largely comprised observation and surgical assistance with discrete performance of key steps, technical skills sufficient to duplicate the results of the mentor were successfully transferred.