Is the Appearance of the Dextranomer/Hyaluronic Acid Mound Predictive of Reflux Resolution?

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Abbreviations and Acronyms

Dx/HA = dextranomer/hyaluronic acid

HIT = hydrodistention implantation technique

PICC = positioned contrast instillation cystogram

VCUG = voiding cystourethrogram

VUR = vesicoureteral reflux

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Purpose: After endoscopic correction of vesicoureteral reflux, we correlated the appearance of the Deflux® mound with the outcome.

Material and Methods: We created an online survey based on 11 primary vesicoureteral reflux cases, including 6 failed and 9 successful procedures in a total of 15 renal units. Cases were selected randomly from our video library. All cases were performed by a single surgeon using the double hydrodistention implantation technique until a satisfactory mound was achieved and corrected. An online survey questionnaire was e-mailed to 234 members of the Society for Pediatric Urology. Each survey question contained a preoperative voiding cystourethrogram image as well as images of the ureteral orifice before and after injection. Respondents were asked to predict whether they thought that the appearance of the Deflux mound would be associated with successful reflux resolution on voiding cystourethrogram 3 months postoperatively. We analyzed the percent of correctly answered questions as well as the sensitivity, specificity and predictive value of the ability of experts to predict the outcome.

Results: A total of 104 pediatric urologists responded to the survey. Overall, 66.4% of respondents predicted reflux resolution based on mound appearance, including 66% and 67% who correctly predicted success and failure, respectively. Mean outcome predictability per respondent was 66% (range 26% to 86%).

Conclusions: The appearance of the Deflux mound and lack of hydrodistention at the completion of the procedure are not reliable predictors of outcome. Based on this experience, postoperative voiding cystourethrogram is still required to truly determine reflux resolution.

Key Words: ureter, vesico-ureteral reflux, deflux, prognosis, questionnaires

ENDOSCOPIC injection of Dx/HA is a widely accepted, minimally invasive surgical option for vesicoureteral reflux. Since Dx/HA is associated with low morbidity and it is a fairly effective form of VUR correction, it is considered the first line surgical intervention at many centers.[1] Published success rates of Dx/HA injection vary widely at between 50% and 100% in different series. In a systematic review of 47 series (7,303 ureters) Routh et al reported an overall 77% 3-month success rate.[2]

Factors predicting successful endoscopic management for primary VUR include clinical factors, such as VUR grade,[3,4] and bowel and bladder dysfunction,[5] as well as technical factors, such the double HIT technique,[6] the volume injected and surgeon experience.[3,6] Several groups have attempted to determine post-injection intraoperative predictors of successful injection,

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including ureteral orifice hydrodistention, intraoperative cystogram and mound morphology.[7,8] Based on those studies, some groups advocated abandoning postoperative VCUG based on the appearance of the mound and absent hydrodistention at the end of the procedure.

Since mound morphology correlates poorly with our ability to predict the outcome, we circulated a web based questionnaire among pediatric urologists to determine whether they could predict the success or failure of endoscopic intervention based on the appearance of the mound and the lack of hydrodistention.

METHODS

From our video library we randomly selected 11 patients (15 renal units) who underwent endoscopic injection of Dx/HA for primary VUR. Six of the procedures resulted in failure and 9 resulted in complete reflux resolution.

All procedures were performed by a single surgeon (AEK), who used the double HIT in all cases.[6] Satisfactory post-injection coaptation was confirmed visually by directing the irrigating stream toward the orifice and ensuring that the ureteral orifice was not distensible (hydrodistention grade 0). The mean Dx/HA volume injected was 0.8 ml per ureter.

From those cases we developed an online survey questionnaire consisting of 11 multiple choice questions. We used a web based survey tool (https://www.surveymonkey.com/s/defluxmound) and electronically distributed the survey with a letter of invitation to 234 pediatric urologists. Each multiple choice question presented patient age and gender, 1 or 2 representative preoperative VCUG images and ureteral orifice appearance just before and after injection (fig. 1). Respondents were asked to predict whether the injected mound appearance would be associated with successful VUR resolution on VCUG 3 months postoperatively. Individual respondent identity was unknown. The survey remained open for 4 weeks and a reminder e-mail was sent after 2 weeks. No financial incentive or reward was offered for survey participation. Correct answers were published after the survey was closed.

Statistical analysis was performed using 2 approaches. We first graded each participant on the ability to correctly deduce whether the mound successfully resolved VUR, expressed as the average percentage of correct answers per individual. The second approach to analyze the data was to document how each individual mound was correctly predicted by all participants as a group, expressed as the mean percent ± SD of the total correct answers. Results are also expressed separately for correctly predicted successful and failed mounds. Sensitivity, specificity, and positive and negative predictive outcomes were calculated.

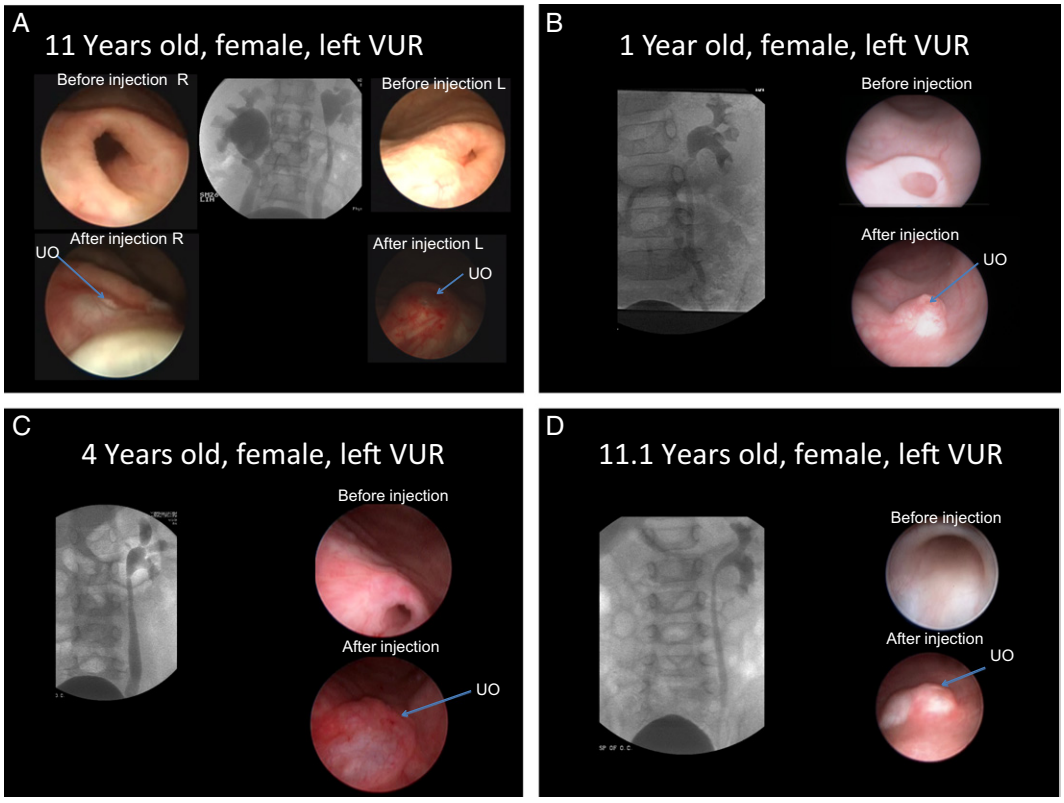

Figure 1. Failed endoscopic injection was correctly predicted by 94% (*A*) and only 33% (*B*) of participants, and successful endoscopic injection was correctly predicted by 89% (*C*) and only 46% (*D*). *R*, right. *UO*, ureteral obstruction. *L*, left.