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Risk factors for urinary tract infection after dextranomer/hyaluronic acid endoscopic injection

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Purpose: Endoscopic injection of dextranomer/hyaluronic acid is an option for primary vesicoureteral reflux. Few groups have assessed the rate of urinary tract infection after dextranomer/hyaluronic acid injection. We reviewed our experience with dextranomer/hyaluronic acid injection, and determined the incidence of and risk factors for postoperative urinary tract infection.

Materials and Methods: A retrospective cohort study was performed of all children with primary vesicoureteral reflux treated with dextranomer/hyaluronic acid from 2002 to 2007 at a single institution. Patient demographics and clinical outcomes were abstracted from the medical record. Risk factors for postoperative urinary tract infection, including female gender, preoperative vesicoureteral reflux grade, recurrent urinary tract infection, bladder dysfunction, nephropathy and persistent vesicoureteral reflux after surgery, were analyzed in a multivariate logistic regression model.

Results: We treated 311 children, of whom 87% were female and 13% were male (464 renal units), during the study period. Mode of presentation was urinary tract infection in 85% of cases. Mean followup was 2.6 years. Postoperatively urinary tract infection developed in 40 patients (13%) and febrile urinary tract infection developed in 11 (3.5%). Of patients with urinary tract infection 26 had initially negative postoperative voiding cystourethrogram, of whom 16 underwent repeat voiding cystourethrogram and 9 showed recurrent vesicoureteral reflux. Five of these 9 patients had clinical pyelonephritis. Of assessed risk factors only preoperative recurrent urinary tract infection (OR 2.2, $p = 0.03$) and bladder dysfunction (OR 3.3, $p = 0.001$) were independent predictors of post-injection urinary tract infection.

Conclusions: In our series urinary tract infection after dextranomer/hyaluronic acid injection was rare. Patients with recurrent urinary tract infections and bladder dysfunction preoperatively are at increased risk for urinary tract infection after treatment. Patients with febrile urinary tract infection after dextranomer/hyaluronic acid injection are at high risk for recurrent vesicoureteral reflux.

Editorial Comment

This manuscript studies 311 children over a five-year period that had Dx/HA. Secondary causes of reflux and poor follow-up patients were excluded. Bladder dysfunction included patients with enuresis, frequency/urgency, or urge incontinence and when discovered, standard treatment was instituted prior to surgery. This behavior and dietary modifications were continued after surgery if the bladder dysfunction persisted. Antibiotic prophylaxis was continued until a follow-up VCUg at 2-3 months showed no further reflux. The results showed 87% of their patients were female and 85% presented with a UTI and 60.5% were febrile. 90% of their patients had Grade III reflux or less. Preoperative nephropathy was present in 62 patients (20%) and bladder dysfunction was present in 64 patients (21%). The mean patient age was 5.7 years with mean follow-up of 2.6 years. The first time success rate for the sting procedure was 70%. With follow-up injections, the overall success rate by patient was 81% and renal unit 88% and these results correlated with preoperative grade of reflux. Postoperatively 40 patients (13%) developed UTI and 11 (3.5%) had febrile UTI's. Independent risk factors for postoperative UTI's by multivariate analysis were preoperative recurrent UTI's and bladder dysfunction. 4

of the 11 febrile UTI patients had a follow-up VCUG showing vesicoureteral reflux and subsequently 5 more of these patients had a VCUG positive for VUR. 10 patients of the afebrile UTI group were positive for VUR. Upon repeat, 11 more showed VUR later.

Vesicoureteral reflux and urinary tract infection are known risk factors for kidney scarring and modifications of both of these risk factors have been sought over the years to prevent permanent kidney damage. As noted in the discussion, the international reflux study group, a 28% incidence of afebrile UTI and 18% instance of febrile UTI in that population over 10 years. It is interesting to note that subureteric injection of Dx/HA seems to add some protective benefit for recurrent UTI's. In my mind, this may be the most important benefit. Recurrent UTI's correlate quite well with failed Deflux, although it is interesting to note that in a recent study by Lee et al. (1), it was showed the sting patients only had 46% of a durable reflux resolution after one year. During this 2.6 years of follow-up, that should mean that half of these patients had their reflux return, and yet the sting procedure seems to offer a UTI prevention benefit even in patients that did not have a long-term success. Readers should watch this data carefully and I think that these issues will become more clear over the next several years.

References

1. Lee EK, Gatti JM, Demarco RT, Murphy JP. Long-term followup of dextranomer/hyaluronic acid injection for vesicoureteral reflux: late failure warrants continued followup. J Urol. 2009; 181: 1869-74; discussion 1874-5.

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