

## **AUGMENTED KOYANAGI-NONOMURA 1-STAGE REPAIR FOR PERINEAL HYPOSPADIAS**

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**Introduction:** In 1983 Koyanagi described an elegant technique for 1-stage-proximal-hypospadias-repair. Glassberg named the procedure "Koyanagi-Nonomura 1-stage-bucket-repair" (KN) making a contribution in its reputation. We encountered KN-new-urethra occasionally short to reach the tip of glans penis. In order to achieve a longer tube, we augmented the flap utilizing extra dorsal preputial skin (augmented-KN). We applied an additional modification to facilitate flap blood-supply preservation, later described by Emir and Hayashi. Combination of augmented-KN and Emir-Hayashi modification made the procedure similar of "Yoke repair" described by Snow and Cartwright

**Patients and Methods:** Forty-five consecutive boys affected by perineal hypospadias were treated from December 1998 to December 2005 in 3 Institutions utilizing the same procedure and management. Patients' ages at operation varied from 4 months to 18 years (overage 22 months). The main technical detail is the urethral lengthening from 1 to 2.5 cm, obtained extending the skin incision dorsally over the prepuce

**Results:** At 3 months to 1 year outpatient-follow-up, the new-meatus was estimated adequate in aspect and position in 31 patients (69%). Of the remaining 14, 5 presented a coronal meatus, good urinary flow, acceptable glans appearance and no redo-distal-urethroplasty was performed; 9 (20%) needed redo-surgery. These 9 patients presented with meatal stenosis in 7 associated with urethral-fistula or multiple fistulas formation, sometimes associated with urethral stricture and/or urethral ballooning. We observed a fistula formation alone in 3 more cases. Untreatable, isolated, long urethral stricture was observed in 1 more patient. In 1 additional patient skin infection resulted in suture dehiscence, however the residual Koyanagi-Nonomura-skin-flap, attached to the corpora cavernosa, allowed urethral re-tabularization 6 months later. Total number of redo-operations was 14 (31%). Poor ventral skin appearance was uncommon and if isolated never needed surgical correction, however some cosmetic penile skin revisions might be anticipated at puberty

**Conclusions:** Treatment of proximal hypospadias is challenging. In comparison with other one-stage techniques, augmented-KN seems to be easier and less time consuming. The procedure favors the treatment of chordee and penoscrotal transposition and is not disturbed by the preputial skin amount. Rate and range of complications are acceptable. We believe this evolution of KN could extend the use of one-stage repair for the most severe form of hypospadias being a good alternative to the 2-stage-repair

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