Randomized Comparative Study Between Buccal Mucosa and Bladder Submucosa Matrix Grafts in Patients with Complex Urethral Strictures

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Introduction

Urethral strictures have always been a reconstructive dilemma for surgeons over many decades. Although many techniques have been introduced to treat urethral stricture disease, the most widely accepted method remains the use of penile flap. In instances where penile skin is unavailable, a graft material, such as free skin grafts, bladder and buccal mucosa, has been used with various success. Of these, the buccal mucosal grafts have been favored over other materials due to its durability and excellent graft survival. Recently, collagen-based bladder submucosa graft has been proposed and used as an "off the shelf" biomaterial for bladder augmentation and urtheral repair. In this study we conducted a randomized comparative study to assess the outcome of the buccal mucosa and bladder submucosa matrix in patients with complex urethral strictures. We investigated the correlation between the length of the stricture and the quality of the urethral bed as measured by the number of prior surgeries.

Materials and Methods

Human bladder submucosa matrix was processed and prepared as previously described.[1] All patients were thoroughly assessed pre-operatively using a standard clinical examination methods.

The patients' ages ranged from 21-59 years (average 36.2) and the length of the strictures ranged from 2 to 18 cm (average 6.9 cm). 11 patients had bulbar, 7 had pendulous and 12 had combined bulbo-pendulous strictures. Of the 30 enrolled patients, 7 had no previous interventions, while the remaining 23 had 1-7 procedural interventions (average 1.9). The causes of the strictures were post traumatic in 9 patients, idiopathic in 1, previous catheterization in 8, iatrogenic in 5, infectious in 5 and failed hypospadias repair in 2.

Under general anesthesia, the urethra was exposed, opened longitudinally and the strictures were dissected from the surrounding fibrous tissues. A Russell's *(end to end anastomosis on the roof)* procedure was performed to minimize the length of the required graft and to remove severe fibrosis. In patients receiving the buccal mucosa grafts, a routine harvesting procedure was performed. The grafts were trimmed to size as needed, followed by urethral repair. A silicone urethral catheter was inserted and left in place for 3-4 weeks. Patients were assessed using standard clinical measures every 3 months for the first year and every 6 months for the second year.

Results and Discussion

In patients who had less than 2 prior operations, the success rate of buccal mucosa grafts was 100%, while the bladder submucosa matrix group had 8 successful results out of the 9 patients. In patients with 2 or more previous interventions, only 2 patients out of six had a successful outcome. The follow up of all patients ranged from 18-36 months with a mean of 25 months. Two patients were lost during the follow up. Post-operative uroflowmetry showed a significant improvement in voiding in both groups. Histological examination of the biopsy specimen showed normal urethral tissue characteristics.
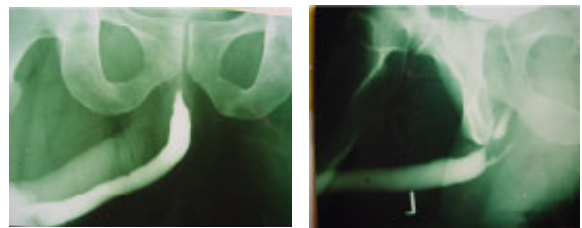

Figure 1. Pre- (right) and post-operative (left) urethrography.

Conclusion

These findings show that buccal mucosa and bladder submucosa matrices can serve as viable graft biomaterials for urethral repair. Although the buccal mucosa had a superior outcome, the graft harvest-related donor site morbidity remains a problem. The bladder submucosa matrix, being an off the shelf material, has definite advantages over the buccal mucosa. Therefore, a thorough consideration should be given when selecting the biomaterials for urethral repair, based on the patient's strictures conditions.

References

1. El-Kassaby AW, Retik AB, Yoo JJ, Atala A. Urethral Stricture Repair With An "Off The Shelf" Collagen Matrix. J Urol 2003; 169: 170-173.