Failed pediatric hypospadias repair: Flap or graft for reconstruction?

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Overview of urethroplasty trends

• Meeks et al 2009
  – Meta-analysis 2000 - 2008
    • 302 articles → 86 articles
      – 5617 patients
  – Overall stricture length 4.9cm
    • Stricture location
      – Bulbar (43%) penile (37%) posterior (19%)
  – Overall stricture recurrence rate was 15.6%
    • Range from 8.3% (2002) to 18.7% (2006)
      – Recurrence rate was highest for penile strictures (18.4%)
Overview of Urethroplasty Trends

• Meeks et al 2009
  – Substitution urethroplasty reported in 64% of manuscripts
    – Graft selection in these manuscripts
      – Buccal mucosa (44%)
      – Multiple tissue sources (16%)
      – Penile skin (27%)
      – SIS (4%)
      – Lingual (3%)

• Flap use described in only 3% of manuscripts
Graft or Flap?

• Why accelerated graft use over past ten years?
  – Outcomes of lichen sclerosis related stricture disease
    • Failure with one stage penile skin flap
      – Success with single or staged non-genital graft tissue (Venn et al, Kulkarni et al)
  – Abundance of non-genital skin available and ease of harvest
    • Oral mucosa
      – Lingual mucosa outcomes appear similar to buccal mucosa (Barbagli et al)
    • Post-auricular skin
Graft or Flap?

Abundance of non-genital skin available and ease of harvest

• Small intestine submucosa (SIS) (Palminteri et al 2007)
• Human cadaveric acellular matrix
• Human cadaveric demineralized bone (el-Kassaby, Atala 2008)
  • Acellular matrix
• Abdominal wall skin (Meeks et al 2009)
Graft preparation
Flap or Graft?

• Why deceleration of genital fasciocutaneous flap use?
  – Knowledge of lichen sclerosis and urethral stricture outcomes
    • Long term failure of genital skin
  – Surgeon’s familiarity with procedure
    • Trend of literature favoring grafts
    • Harvest technique
  – Amount of healthy, hairless genital skin available
Fossa Navicularis Stricture Disease

- Virasoro et al 2007
  - 83% success rate
    - 10 year follow-up
  - 23/23 in non-LS patients
    - 6/12 failures with LS

- Onol et al 2008
  - Post-prostatectomy fossa strictures
    - Short strictures < 1.5cm
      - Mean follow up 30 months
    - 25/26 recurrence free

- Morey et al 2007
Complex Anterior Urethral Stricture

- Whitson et al 2007
  - 124 patients with circular fasciocutaneous flap
  - Median follow up 7.3 years
    - Median stricture length was 8.2 cm
  - 1, 3, 5, and 10 years: estimated success was 95%, 89%, 84%, and 79%
  - Predictors of failure
    - Smoking
    - Stricture length 7-10 cm
    - History of previous hypospadias repair
Flap or Graft?

• Failed pediatric hypospadias repair patients
  – Presence of lichen sclerosis
  – Urethral plate compromised
    • Hair within previous repair
    • Presence of diverticulum or fistula
    • Size of the penile shaft compromised
  – Concealed penis
  – Deficiency of healthy genital skin
Flap or Graft for Stricture Disease?

• Prospective randomized study
  – Buccal mucosa (27) and genital skin flap (28)
    • Comparable rates of success at intermediate follow-up
      – Operative time, skin complications, post void dribbling, patient satisfaction less favorable with flap (Dubey et al 2007)

• Retrospective analysis
  – One stage penile urethroplasty (Barbagli et al 2008)
    • Graft (45 patients), Flap (18 patients)
      – Omitted hypospadias failures and lichen sclerosis
        » Mean follow up 55 months
  – Grafts with higher success rate (80% versus 67%)
    • No difference in success between oral versus skin grafts
Failed Hypospadias Repair in Adults?

- Barbagli et al 2006
  - One stage with graft technique superior
    - Buccal mucosa and penile skin grafts similar success
  - Buccal mucosa with better outcomes in staged repair
    - Penile skin flaps

  - Multi stage repair acceptable results
    - Buccal mucosa, penile skin, abdominal wall skin

- No direct comparisons of flap versus graft
Conclusions

• Proper patient selection is key

• Limited reports of fasciocutaneous flap use over past 10 years
  – Risk of recurrence may be higher in men with previous hypospadias repair

• Versatility and abundance of graft tissue provides distinct advantages
  – Hypospadias failure, Lichen sclerosis, single or staged procedure