Guido Barbagli

Center for Urethral and Genitalia Reconstructive Surgery

Arezzo

E-mail: guido@rdn.it  Website: www.urethralcenter.org
Dedicated to John Quartey, respected colleague and friend. His passing is a great personal as well as professional loss

Professor John Quartey, FRCS

Center for Urethral and Genitalia Reconstructive Surgery
Reconstruction of urethral strictures due to lichen sclerosus
The discussion I have prepared for today is on a difficult topic as it is not easy to provide definitive guidelines of treatment for urethral stricture due to lichen sclerosus.

In any case, I sincerely hope to provide you with useful information on the problems involved in the treatment of this complex type of stricture and disease.
Lichen sclerosus and urethral stricture

Terminology
Epidemiology
Pathogenesis
Treatment
Lichen sclerosus and urethral stricture

Terminology
- Balanitis xerotica obliterans
- Lichen sclerosus
- Lichen sclerosus et atrophicus
- Kraurosis vulvae
Balanitis xerotica obliterans (post operationem) und ihre Beziehungen zur „Kraurosis glandis et praeputii penis“.

Von
A. Stühmer.
Mit 4 Textabbildungen.

(Eingegangen am 14. Mai 1928.)
In 1995, the American Academy of Dermatology recommended that the term *lichen sclerosus* be used in future reports to define the true incidence and the malignant potential of *lichen sclerosus*.
Lichen sclerosus is a complex immunological disorder of the genitalia involving:

- glans, meatus, coronal sulcus and penile skin
- navicularis, penile and bulbar urethra
Lichen sclerosus is a chronic, evolving disease
Lichen sclerosus

Sexual activity

Urinary function

Aesthetic appearance of the genitalia

Association with penile cancer

Poor quality of life
Lichen Sclerosus is a pre-cancerous condition for at least some types of penile cancers, especially those not related to HPV.

Penile Carcinoma in Patients With Genital Lichen Sclerosus: A Multicenter Survey

G. Barbagli, E. Palminteri, F. Mirri, G. Guazzoni, D. Turini and M. Lazzeri*
From the Center for Urethral and Genitalia Reconstructive Surgery (GB, EP), Arezzo, Sezione di Anatomia Patologica, Ospedale S. Maria alla Gruccia (FM), Montevarchi, San Raffaele-Vita Salute Hospital and University (GG), Milano and Department of Urology, Santa Chiara Firenze (DT, ML), Florence, Italy

The incidence of neoplastic changes in patients with lichen sclerosus ranges from 2.3% to 8.4%

J Urol, 2006
Histopathological findings for diagnosis of lichen sclerosus

- Hyperkeratosis and vacuolar degeneration of the basal layer
- Edema and homogenisation of collagen in the upper dermis
- Band-like inflammatory infiltrate

- Slight
- Moderate
- Severe
The name “Balanitis xerotica obliterans” given this disease by Stühmer in 1928 is no longer adequate to describe this very serious immunological disorder.
Lichen sclerosus and urethral stricture

Epidemiology
<table>
<thead>
<tr>
<th>authors</th>
<th>journal, year</th>
<th>patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barbagli et al.</td>
<td>Lancet, 1999</td>
<td>31</td>
</tr>
<tr>
<td>Depasquale et al.</td>
<td>Br J Urol, 2000</td>
<td>128</td>
</tr>
<tr>
<td>Andrich et al.</td>
<td>J Urol, 2001</td>
<td>33</td>
</tr>
<tr>
<td>Barbagli et al.</td>
<td>Urol Int, 2004</td>
<td>102</td>
</tr>
</tbody>
</table>
Lichen sclerosus and urethral stricture

- **Lichen sclerosus** is increasing in all Centres specialized in treatment of urethral and genitalia diseases
  
  A.U.A. Annual Meeting 2001, Anaheim - USA

- Involvement of the urethra in genital **lichen sclerosus** appears to be much more common than previously reported

- Prior to diagnosis, many patients had symptoms for years, thus encouraging the disease’s progression over time

- In our experience, when the urethra is involved in the disease, 41% of patients showed panurethral stricture
  
  Barbagli et al., Urol Int, 2004
Lichen sclerosus and urethral stricture

Pathogenesis
The embryology of the glans may explain the involvement of the external urinary meatus and navicularis tract in **lichen sclerosus**

The developing glanural urethra involves the preputial folds that fuse to genital folds
Venn and Mundy suggested that panurethral stricture in patients with lichen sclerosus may be caused by the trauma of repeated dilation or instrumentation.  

Barbagli et al. showed that lichen sclerosus caused urinary retention or difficulties in 60% of patients who had not undergone previous urethral dilation, instrumentation or surgery.
1 foreskin
2 glans
3 meatus
4 penile urethra

? bulbar urethra
Lichen sclerosus and urethral stricture

The penile urethra shows the typical histological features of *lichen sclerosus* disease.
Lichen sclerosus and urethral stricture

The bulbar urethra shows no histological features of lichen sclerosus disease

Squamous metaplasia
Lichen sclerosus and urethral stricture

Squamous metaplasia involves the ductus of the periurethral glands, which becomes rigid and wide open. Thus the retrograde urethrography is able to depict the periurethral glands.
Questions to resolve

- Is squamous metaplasia in the bulbar urethra caused by distal obstruction or is it related to histological changes caused by lichen sclerosus?

- What is the role of squamous metaplasia in causing urethral obstruction over time?

- Is squamous metaplasia in the bulbar urethra a typical lesion in patients with lichen sclerosus or is it a typical lesion in any patient with bulbar urethral stricture?
My pathologist and I are currently working on resolving these questions, involving a large series of patients in our study.

Doctor Francesco Mirri

Center for Urethral and Genitalia Reconstructive Surgery
Patients with urethral stricture disease due to *lichen sclerosus* are treated with so many various surgical approaches that it is really impossible to evaluate and standardize the long-term outcome of all these techniques.

The literature dealing with this argument is still terribly confused and does not furnish a reliable interpretation of the available data.
One-stage repair

- Penile dartos fascial flap with skin island techniques
- Dorsal inlay buccal mucosal graft urethroplasty
- S. Kulkarni urethroplasty
Penile dartos fascial flap with skin island techniques

Jordan
McAninch
Graft + flap
## Penile skin flaps: results

<table>
<thead>
<tr>
<th>authors</th>
<th>patients</th>
<th>follow-up</th>
<th>success</th>
<th>failure</th>
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</thead>
<tbody>
<tr>
<td>Venn et al. 2000</td>
<td>12</td>
<td>36</td>
<td>0%</td>
<td>100%</td>
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<tr>
<td>De Pasquale et al. 2000</td>
<td>42</td>
<td></td>
<td>10%</td>
<td>90%</td>
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<tr>
<td>Alsikafi et al. 2004</td>
<td>20</td>
<td>89</td>
<td>55%</td>
<td>45%</td>
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<tr>
<td>Virasoro et al. 2006</td>
<td>12</td>
<td>48</td>
<td>6%</td>
<td></td>
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<tr>
<td>Garcia et al. 2006</td>
<td>22</td>
<td>19</td>
<td>70%</td>
<td>30%</td>
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</tbody>
</table>

## Graft + flap: results

<table>
<thead>
<tr>
<th>authors</th>
<th>patients</th>
<th>follow-up</th>
<th>success</th>
<th>failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brady et al. 1999</td>
<td>10</td>
<td>27</td>
<td>87%</td>
<td>13%</td>
</tr>
<tr>
<td>Berglund et al. 2004</td>
<td>18</td>
<td></td>
<td>95%</td>
<td>5%</td>
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</table>
Caution must be exercised in recommending fasciocutaneous penile skin flaps for long-term treatment of *lichen sclerosus* strictures

Alsikafi et al., J Urol, 2004

Better understanding of the physiopathology of *lichen sclerosus* has changed our way of treating fossa navicularis strictures

Virasoro et al., J Urol, 2006

There is a relatively low success rate even when the skin used for the flap appears to be free of *lichen sclerosus*

Garcia et al., J Urol, 2006
Dorsal inlay buccal mucosal graft urethroplasty
Results

- Small number of patients
- Satisfactory short-term results
- Long-term follow-up not available
- Meatal stenosis is a frequent complication

Barbagli 2006, unpublished data
The glans is always deeply involved in the disease
S. Kulkarni urethroplasty

Pune - India

Center for Urethral and Genitalia Reconstructive Surgery
Kulkarni urethroplasty

Full length dorsal buccal mucosal onlay graft urethroplasty
# Results

<table>
<thead>
<tr>
<th>authors</th>
<th>patients</th>
<th>follow-up</th>
<th>success</th>
<th>failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kulkarni et al. 2000</td>
<td>36</td>
<td>12</td>
<td>89%</td>
<td>11%</td>
</tr>
<tr>
<td>Dubey et al. 2006</td>
<td>25</td>
<td>33</td>
<td>88%</td>
<td>12%</td>
</tr>
</tbody>
</table>
Multi-stage repair

- Wide meatotomy
- First stage - Johanson procedure
- A. Bracka combined technique
- Multi-stage buccal mucosal graft urethroplasty
- Perineal urethrostomy
Wide meatotomy

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First stage - Johanson procedure
Wide meatotomy or first stage - Johanson procedure are selected particularly for patients in which the disease has caused urinary retention due to edema and acute inflammatory changes in the involved tissues.

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A. Bracka combined urethroplasty

Stourbridge, United Kingdom
Bracka combined urethroplasty

First stage
buccal mucosa graft

Second stage
bladder mucosa tube
Results

- Patient requires periodic dilation over a long period
- Unpublished results
- A. Bracka reported a satisfactory final outcome
  (personal communication)
Multi-stage buccal mucosal graft urethroplasty
Results

28% to 50% of patients require repeated surgical revision of the grafted area before the final urethral closure

Dubey et al., J Urol, 2006
18% to 30% of patients showed complications following the second stage of urethroplasty, requiring new surgical revision.
Definitive perineal urethrostomy
Patient, 68 years old, who underwent 12 previous urethral attempts to repair urethral stricture due to lichen sclerosus
Surgical technique
Webster’s technique
Center for Urethral and Genitalia Reconstructive Surgery
Center for Urethral and Genitalia Reconstructive Surgery
Heroic measures may not always be justified in extensive urethral stricture due to lichen sclerosus

A C. Peterson, E. Palminteri, M. Lazzeri, G. Guazzoni, G. Barbagli and G. D. Webster

A.U.A. Annual Meeting 2003, Chicago - USA

Urology, 2004
Definitive perineal urethrostomy is a reasonable alternative in selected populations.

- Low morbidity
- Quick recovery
- Satisfies quality of life
- Acceptance of seated voiding
- Diverts urine from diseased tissue

Peterson et al., A.U.A. Meeting 2003, Chicago - USA
Perineal urethrostomy diverts urine from diseased tissues
# One-stage or multi-stage repair?

<table>
<thead>
<tr>
<th></th>
<th>Patients</th>
<th>Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One-stage</strong></td>
<td>22</td>
<td>88%</td>
</tr>
<tr>
<td><strong>Multi-stage</strong></td>
<td>14</td>
<td>72%</td>
</tr>
</tbody>
</table>

Dubey et al., J Urol, 2005
One-stage or multi-stage repair?

When?
<table>
<thead>
<tr>
<th></th>
<th>one-stage</th>
<th>multi-stage repair</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>age</strong></td>
<td>young</td>
<td>old</td>
</tr>
<tr>
<td><strong>clinical history</strong></td>
<td>primary repair</td>
<td>previous failed repair</td>
</tr>
<tr>
<td>clinical status</td>
<td>decreased urinary flow</td>
<td>• urinary retention</td>
</tr>
<tr>
<td>histology</td>
<td>• slight or moderate disease</td>
<td>• severe disease</td>
</tr>
<tr>
<td></td>
<td>• no pre-cancerous lesions</td>
<td>• pre-cancerous changes</td>
</tr>
<tr>
<td>disease extension</td>
<td>focal involvement of the glans, meatus, penile skin</td>
<td>full involvement of the glans, meatus, penile skin</td>
</tr>
<tr>
<td>urethral plate</td>
<td>viable or salvageable</td>
<td>scarred with focally dense segment</td>
</tr>
</tbody>
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Conclusions

**Lichen sclerosus** is a devastating disease and the patient must be informed on the likely causes, the course of the disease and the possible association with cancer. Moreover, the patient must be informed that complex and multiple surgical procedures will be necessary to restore urinary function, sexual activity and aesthetic appearance of the genitalia.
I showed you what lichen sclerosus is and what stenosis is in a patient affected with genital lichen sclerosus and the current surgical techniques suggested for repair.

What approach to take will be decided by you, your experience, your surgical background and your patient’s expectation.

There is nothing more I can tell you! Thank you.
Madonna del Parto - Piero della Francesca
Monterchi - Arezzo

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