

# Lichen sclerosus on the penis associated with striking elastic fibers accumulation (nevus elasticus) and differentiated penile intraepithelial neoplasia progressing to invasive squamous cell carcinoma

Denisa Kacerovska, MD, PhD,<sup>a,b</sup> Michal Michal, MD,<sup>a,b</sup> Milan Hora, MD, PhD,<sup>c</sup>  
Ladislav Hadravsky, MD,<sup>a</sup> and Dmitry V. Kazakov, MD, PhD<sup>a,b</sup>  
*Pilsen, Czech Republic*

**Key words:** differentiated type; elastic fibers; increase; invasive squamous cell carcinoma; lichen sclerosus; penile intraepithelial neoplasia.

Lichen sclerosus (LS) is a chronic disorder with a predilection for the anogenital area. In this anatomic area, a subset of human papillomavirus–negative neoplasms arise on the background of chronic inflammation, of which LS is the most common condition. Of these neoplastic associations, squamous intraepithelial neoplasias, including the differentiated (simplex) type of vulvar intraepithelial neoplasia and penile intraepithelial neoplasia (PeIN), are salient lesions.<sup>1</sup> A rare and unusual feature in LS is a conspicuous accumulation of elastic fibers in the level of the mid to lower part of the reticular dermis, sometimes strikingly apparent on hematoxylin–eosin–stained slides. This condition was originally termed *nevus elasticus*,<sup>2</sup> but in a recent study the authors considered the process as hyperplastic.<sup>3</sup> To our knowledge, there are only 3 published clinicopathologic reports describing this phenomenon.<sup>2–4</sup> With respect to the anatomic site, all previously published examples occurred on the vulva (with exception of 5 extragenital cases). We report, a case of penile LS accompanied with conspicuous elastic fibers. Additionally, there were areas of differentiated PeIN progressing into invasive squamous cell carcinoma.

## Abbreviations used:

LS: lichen sclerosus  
PeIN: penile intraepithelial neoplasia

## CASE REPORT

A 70-year-old man presented with a flat, red-colored patch with irregular and poorly defined margins on the glans penis. The surrounding skin showed a whitish hue (Fig 1). The lesion was asymptomatic and had been present for 5 years. A biopsy found features of PeIN and invasive squamous cell carcinoma, and a simple glansectomy was performed. The case is too recent for a meaningful clinical follow-up.

The removed tissue was fixed in 4% formaldehyde and embedded in paraffin. The paraffin tissue blocks were cut into 5- $\mu$ m-thick sections and stained with hematoxylin–eosin. Histochemical staining for elastic fibers (Verhoeff–van Gieson, Elastic Stain [Sigma-Aldrich]) was performed. Immunohistochemical staining for p16 (clone E6H4, dilution RTU, Ventana, Mannheim, Germany) and p53 (clone DO-7, dilution 1:400, Dako, Glostrup, Denmark) was performed according to standard protocol.

From Siki's Department of Pathology<sup>a</sup> and the Department of Urology,<sup>c</sup> Charles University in Prague, Medical Faculty in Pilsen and Bioptical Laboratory, Pilsen.<sup>b</sup>

Funding sources: The study was supported in part by Ministry of Health of the Czech Republic - DRO (Faculty Hospital in Pilsen - FNPI, 00669806); by the Charles University Research Fund (project number P36); and by Czech government research project MSM 0021620819.

Conflicts of interest: None declared.

Correspondence to: Dmitry V. Kazakov, MD, PhD, Siki's Department of Pathology, Charles University, Medical Faculty

Hospital, Alej Svobody 80, 304 60 Pilsen, Czech Republic.  
E-mail: kazakov@medima.cz.

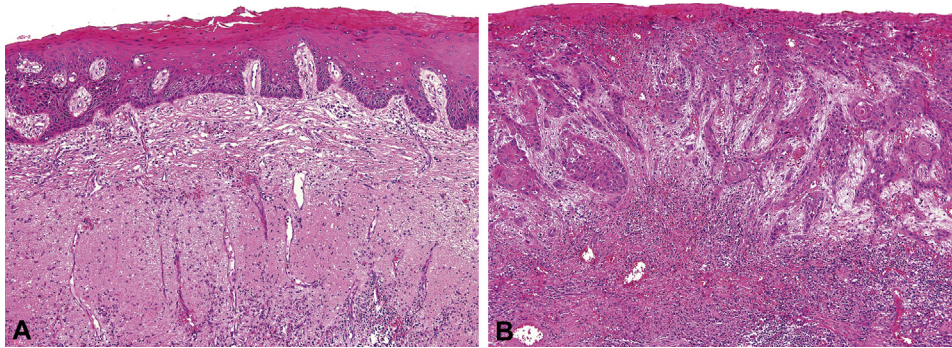
JAAD Case Reports 2015;1:163-5.  
2352-5126

© 2015 by the American Academy of Dermatology, Inc. Published by Elsevier, Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<http://dx.doi.org/10.1016/j.jdc.2015.03.004>



**Fig 1.** A flat, red-colored patch with irregular and poorly defined margins on the glans penis. The surrounding skin showed a whitish hue.



**Fig 2.** **A**, The epidermis showed focally mild hyperplastic areas with atypical keratinocytes in the basal cell layer compatible with differentiated PeIN. **B**, In several specimens, full-thickness atypia corresponding to carcinoma in situ and foci of invasive squamous cell carcinoma were found. (Hematoxylin-eosin stain.)

Microscopically, both the initial biopsy specimens and the specimens from glanssectomy found histologic features of lichen sclerosus (ie, both a bandlike infiltrate composed of predominantly lymphocytes and plasma cells with small foci of hemorrhage and sclerotic collagen bundles with their homogenization in the superficial dermis). The epidermis showed focally thinning; in other areas it was hyperplastic with atypical keratinocytes in the basal cell layer compatible with differentiated PeIN (Fig 2, A). In several specimens, full-thickness atypia corresponding to carcinoma in situ was present and foci of invasive squamous cell carcinoma were also revealed (Fig 2, B). The dysplastic areas stained positively for p53 and were immunonegative for p16.

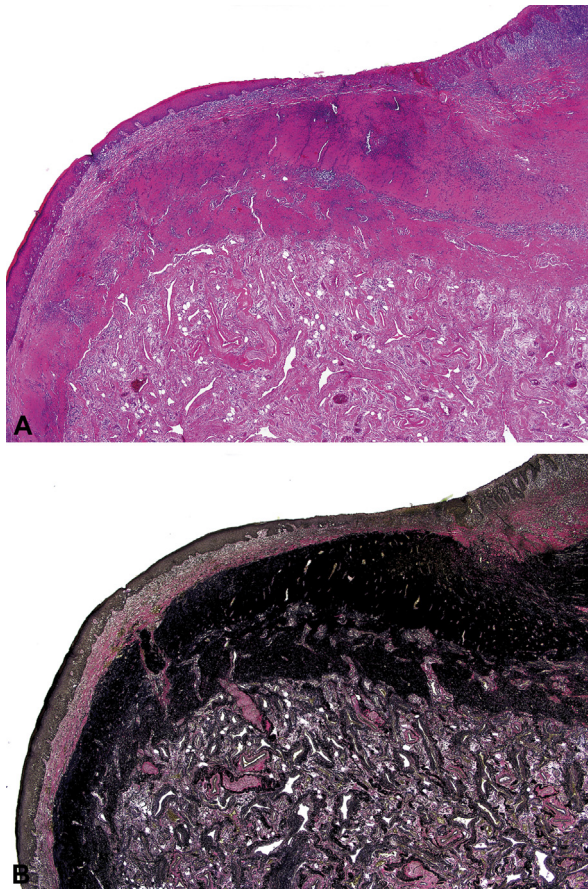
In the mid and reticular dermis there were striking areas of pink condensed finely fibrillary and wavy material, which histochemically stained deeply for Verhoeff-van Gieson and elastic stain confirming elastic etiology (Fig 3, A and B). This massive increase in elastic fibers in the mid and lower part of reticular dermis contrasted strikingly to their near absence in the superficial subepithelial tissues. Elastic stains also

found increased presence of elastic fibers around blood vessels in the deeper portion of the dermis.

## DISCUSSION

Apart from collagen, an elastic fiber network is an important extracellular matrix component extending throughout the dermis. In the normal skin, elastic fibers in the reticular dermis are composed of a central core of amorphous, hydrophobic, cross-linked elastin surrounded by connective tissue microfibrils, the principal structural component of which is the glycoprotein fibrillin. In the papillary dermis, finer fibers containing less elastin are found, which are termed *elaunin fibers*.<sup>5</sup> Although the precise nature of the alteration of an extracellular matrix in LS is still poorly understood, Rahbari<sup>6</sup> in 1989 found a decrease in elastic fibers in LS.

The article reporting a strikingly increased number of elastic fibers in a case of vulvar LS was published in 1990 by Sánchez Yus et al.<sup>2</sup> The authors interpreted this case as nevus elasticus and considered this unusual feature to be unrelated to LS. Recently, a series of 18 cases of LS of the vulva and 4 cases of



**Fig 3.** **A**, In the mid and reticular dermis, there were striking areas of pink condensed finely fibrillary and wavy elastic material. (Hematoxylin-eosin stain.) **B**, Histochemical staining for elastic stain showed a massive increase in elastic fibers in the mid and reticular dermis contrasted strikingly to their near absence in the superficial subepithelial tissues. Elastic stains also showed increased presence of elastic fibers around blood vessels in the reticular portion of the dermis.

extragenital LS associated with increased amount of elastic fibers in the mid to lower part of the reticular dermis has been published.<sup>3</sup> In contrast to Sánchez Yus et al,<sup>2</sup> Shiba et al<sup>3</sup> suggested that this phenomenon is different from an authentic nevus elasticus and may represent a repair process related to the loss of elastic fibers in the upper part of the lesion. There is also on record a case of extragenital LS in a surgical scar with an elastic fibers increase.<sup>4</sup>

The most common elastic fiber alteration in the skin is solar elastosis caused by chronic or long-standing sun exposure. Occasionally, areas of solar elastosis may be sharply circumscribed with an

apparent increase of collagen bundles resembling the phenomenon discussed here. The very anatomic site, namely, the vulva and penis, however, almost excludes the possibility of sun exposure to play a role in the pathogenesis of the disease. Along this line, we are aware of cases of increased elastic fibers in the vagina (A. Selim, personal communication, October 2013). A case of unusual stromal elastosis associated with mammary-type tubulolobular carcinoma of the vulva has been reported.<sup>7</sup> Elastic changes in that case were analogous to those seen in the mammary parenchyma adjacent to a carcinoma.

In neither the original cases of Sánchez Yus et al<sup>2</sup> or in the series of Shiba et al<sup>3</sup> was there any case of epithelial dysplasia. Apart from the current case of differentiated PeIN, we have in our files 4 cases of vulvar lesions displaying a combination of LS, differentiated vulvar intraepithelial neoplasia, and increased elastic numbers. In other words, all our cases of LS associated with strikingly increased elastic fibers manifested dysplastic changes.

We describe a case of penile LS associated with conspicuous increase of elastic fibers and epithelial dysplasia. The histologic picture is distinctive, with a sandwich-like structure composed of the epithelium (normal or dysplastic), subepithelial homogenized and sclerotic area, and sharply demarcated deeper elastosis. The mechanism of alterations of elastic fibers is not currently known.

#### REFERENCES

1. Kokka F, Singh N, Faruqi A, et al. Is differentiated vulvar intraepithelial neoplasia the precursor lesion of human papillomavirus-negative vulvar squamous cell carcinoma? *Int J Gynecol Cancer*. 2011;21:1297-1305.
2. Sánchez Yus E, Aguilar A, Requena L, et al. Nevus elasticus and lichen sclerosus et atrophicus on the vulva. *Cutis*. 1990;45:252-255.
3. Shiba Y, Ono K, Akiyama M, et al. Increase of elastic fibers in lichen sclerosus et atrophicus. *J Cutan Pathol*. 2014;41(8):646-649.
4. Allan A, Andersen W, Rosenbaum M, et al. Histologic features of lichen sclerosus et atrophicus in a surgical scar. *Am J Dermatopathol*. 1999;21:387-391.
5. Farrell AM, Dean D, Millard PR, et al. Alterations in fibrillin as well as collagens I and III and elastin occur in vulval lichen sclerosus. *J Eur Acad Dermatol Venereol*. 2001;15:212-217.
6. Rahbari H. Histochemical differentiation of localized morphea-scleroderma and lichen sclerosus et atrophicus. *J Cutan Pathol*. 1989;16:342-347.
7. Fernandez-Figueras MT, Michal M, Kazakov DV. Mammary-type tubulolobular carcinoma of anogenital mammary-like glands with prominent stromal elastosis. *Am J Surg Pathol*. 2010;34:1224-1226.