

# Eruptive Multifocal Cutaneous Mucinous Cysts

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**Abstract:** Cutaneous cysts lined by mucinous epithelium are rare entities. We report an unusual case of a 60-year-old female patient who presented with a 2-month history of eruptive cystic papules on her right thigh. Histopathologic study showed multiple, multiloculated cysts located in the dermis lined by nonciliated mucinous epithelium. The cyst lining was positive for AE1/AE3, CK7, CK20, and GCDFP15. Patchy positivity was noted on the p53 stain. Attenuated Sox10 positive cells were identified, raising the possibility of sweat duct origin; however, no myoepithelial layer was identified by p63 staining. Mullerian markers, including ER, PR, WT1, and Pax8, were negative. We propose this as a unique case that may represent mucinous metaplasia of a cystic sweat duct lesion. Here, we review the literature of mucinous and other glandular cutaneous cysts.

**Key Words:** cyst, skin diseases, mucins, graft-versus-host disease

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## INTRODUCTION

Cutaneous cysts are a heterogeneous group of lesions that can be histologically defined on the basis of their purported structure of origin (ie, appendageal, developmental, or lymphatic cysts). Several cysts are difficult to categorize (miscellaneous cysts). Among all groups of cysts, mucin-lined cysts are exceedingly rare.<sup>1–3</sup> Mucinous cells are not normally found in human skin, and mucinous metaplasia usually takes the form of goblet-like cells admixed with apocrine or eccrine glandular epithelium.<sup>3</sup>

## CASE

A 60-year-old woman presented with a 2-month history of eruptive papules on her right thigh. Her medical history was notable for diffuse large B-cell lymphoma that had been treated with a matched sibling allogeneic bone marrow transplant and complicated by mucocutaneous graft-versus-host disease. Her lymphoma was in remission and her mucocutaneous graft-versus-host disease had been quiescent off treatment for 3 years before presentation. Clinical examination demonstrated clusters of homogenous firm pink cystic lesions ranging from 5 to 20 mm arrayed along the medial right thigh extending to the perineum. Excision biopsies of representative lesions were performed.

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The authors declare no conflicts of interest.

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Histologically, the lesions were multiple, multiloculated cysts located in the dermis (Fig. 1A). The cysts were lined by a predominantly single layer of bland columnar cells with apical periodic acid–Schiff–diastase-positive mucin (Figs. 1B, C). The alcian blue stain showed rare acid-containing goblet cells; however, most mucin cells were alcian blue negative (Fig. 1D). The lining was uniform throughout, and no convincing cilia were identified. The cyst lining was positive for cytokeratins AE1/AE3, CK7, and CK20 (not shown). Positive luminal staining was seen on the GCDFP15 stain (Fig. 1E), and patchy positivity was noted on the p53 stain (not shown). Rare basal cells were present on the Sox10 stain (Fig. 1F), but there was no continuous myoepithelial layer on the p63 stain (not shown). ER, PR, WT1, and Pax8 were negative (Figs. 1G, H). There were no features of endometriosis, such as hemosiderin or endometrial-type stroma, and no cytological atypia to suggest a primary or metastatic malignancy. The overall morphology eluded classification by current taxonomy.

## DISCUSSION

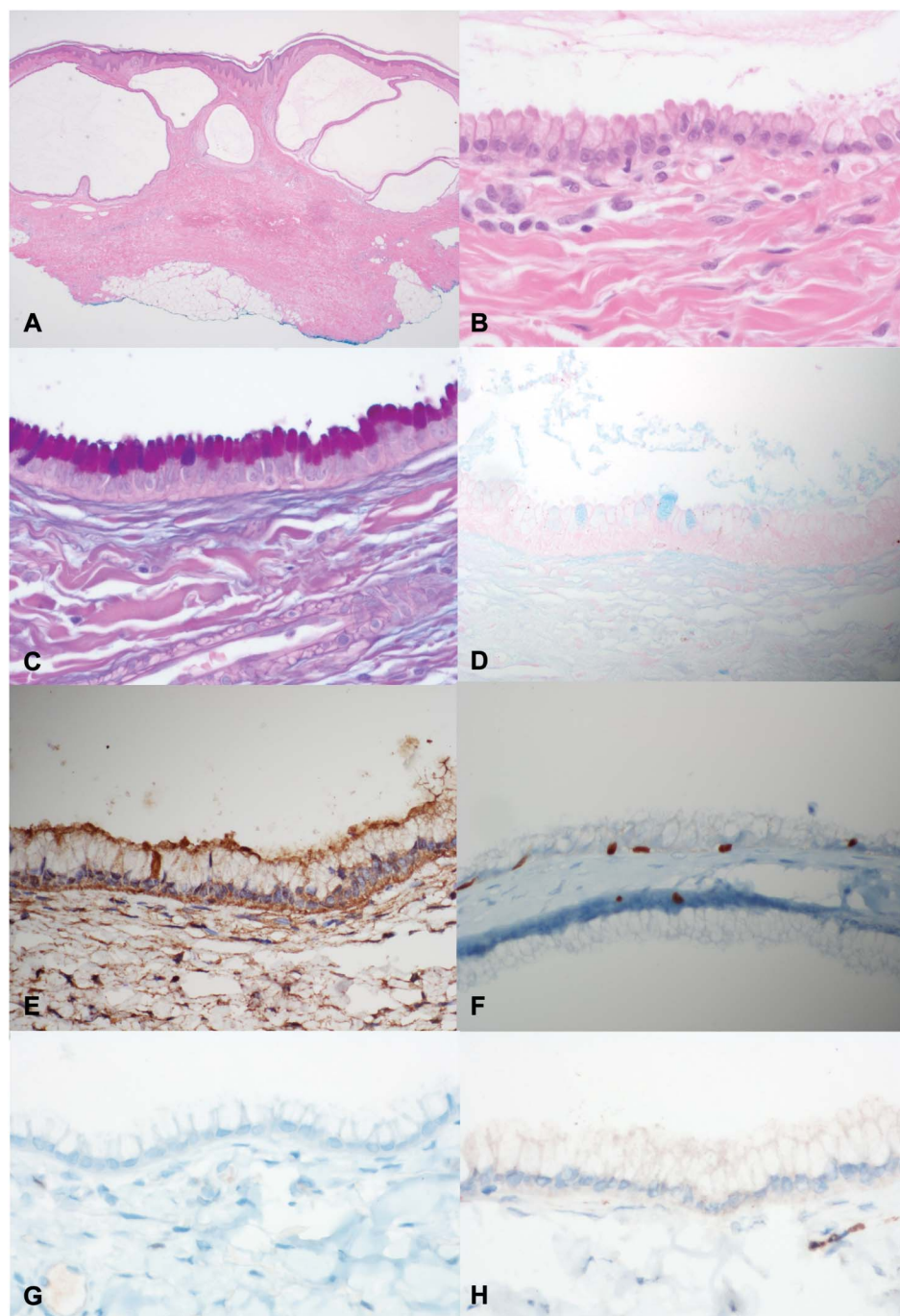
Appendageal cysts are the most important group of cutaneous cysts, of which the epidermoid cyst is by far the commonest. Appendageal cysts also include other squamous cysts (tricholemmal, hair matrix and vellous hair cysts, and steatocystoma multiplex) and sweat gland cysts (eccrine and apocrine hidrocystoma). Hidrocystomas and native sweat ducts may rarely be involved by metaplastic cystic processes such as mucinous syringometaplasia or adenomatous eccrine metaplasia; the latter typically occurs in the vicinity of a scar.<sup>1,4,5</sup>

Developmental cysts relate to migration of embryological structures and therefore have characteristic topography, such as the foregut-derived bronchogenic, branchial cleft, and thyroglossal duct cysts. These cysts have linings that resemble upper aerodigestive epithelia and therefore often contain mucin or cilia.

Another rare ciliated cyst of disputed origin is the cutaneous ciliated cyst of the lower limbs (CCCLL). It typically occurs in young women and has traditionally been considered of Mullerian origin.<sup>6,7</sup> However, several cases have been reported in men, and some authors have hypothesized an alternative derivation from eccrine ducts.<sup>8</sup>

Another developmental consideration is ectopic glands as an expression of the embryological milk line ridges, which can involve the upper thighs. Other developmental cysts include the median raphe cyst (from midline structures) and the dermoid cyst (which occurs around embryological lines of fusion). Both of these may contain scattered mucin cells. Finally, omphalomesenteric duct cysts are lined by any of the enteric-type epithelia.

Miscellaneous cysts can be considered to include a range of pseudocysts such as mucin extravasation cysts



**FIGURE 1.** A, Multiple multiloculated cysts [hematoxylin–eosin (H&E),  $\times 1.25$ ] (B) lined by a single layer of bland columnar cells [H&E  $\times 40$ ]. C, The cells contained apical mucin [DPAS  $\times 40$ ], and (D) the majority were alcian blue negative [alcian blue  $\times 40$ ]. E, Positive luminal staining was seen on GCDFP15 [GCDFP15  $\times 40$ ], and (F) rare basal cells were positive on the Sox10 stain [Sox10  $\times 40$ ]. Mullerian stains including (G) estrogen receptor [estrogen receptor  $\times 40$ ] and (H) WT1 [WT1  $\times 40$ ] were negative.

and digital mucous cysts; however, by definition, these lack mucinous epithelial cells. Other mucinous cysts in this group include secondary lesions such as endometriosis and rarely metastatic adenocarcinoma.

For our case, the site, multiloculation and female sex could be in keeping with CCCLL. There were, however, no convincing cilia microscopically, and our patient is older than is typical for this entity. As far as we are aware, an exclusively mucinous lining has not been previously reported in Mullerian cysts or CCCLL.<sup>7,8</sup> Furthermore, the lack of ER,

PR, WT1, and Pax8 staining in our case is against a cyst of Mullerian origin. As noted above, the Mullerian origin of CCCLL has been disputed and postulated as possibly eccrine.<sup>6,8</sup> Along these lines, we did note the presence of isolated Sox10 positive cells which resembled an attenuated layer of similar cells that are usually seen in native sweat ducts. Despite this finding, no myoepithelial layer was present on the p63 stain. Given the perineal involvement and lack of complete myoepithelial cell layers, the possibilities of ectopic apocrine and vestibular glands (Bartholin and minor

vestibular glands) were considered. Furthermore, the presence of GCDFP15 lends support to an apocrine origin. However, in this case, development from embryological apocrine or vestibular precursors was considered unlikely due to the clinical extent of glands along the right medial thigh.

As noted above, although the mammary milk line may involve the upper thighs, the extent of clinical involvement in this case seemed to spread beyond this embryological distribution to be a plausible mechanism.

Apocrine hidrocystoma with mucinous metaplasia also histologically resembles our case; however, these lesions typically readily demonstrate a myoepithelial layer and occur at head and neck sites.<sup>2</sup> These lesions are also usually unifocal and unilocular, except for cases associated with Schöpf–Schulz–Passarge syndrome.<sup>9</sup>

A final consideration is mucinous syringometaplasia, which typically affects acral sites and shows epidermal invaginations of glands from the surface that project down into the dermis.<sup>10</sup> In contrast to mucinous syringometaplasia, our case showed no connection to the surface, the cysts were rounded and dilated structures rather than invaginations, and the site was not acral.

## CONCLUSION

Ours is an unusual case of benign eruptive cutaneous mucinous cysts with mixed histological and immunohistochemical features that defy classification by the currently available literature. We offered a descriptive diagnosis as

multiple benign multiloculated cutaneous mucinous cysts of the lower limb. This case is unique in the literature and may represent mucinous metaplasia of a cystic sweat duct lesion. It is worthwhile to report this case, as it may represent a new or underrecognized entity.

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