Multiple Hereditary Infundibulocystic Basal Cell Carcinomas

A Genodermatosis Different From Nevoid Basal Cell Carcinoma Syndrome

Luis Requena, MD; Maria del Carmen Faríña, MD; Mercedes Robledo, MD; Omar P. Sangueza, MD; Evaristo Sanchez Yus, MD; Aurora Villanueva, MD; Amparo Marquina, MD; Roser Tamarit, MD

Background: Infundibulocystic basal cell carcinoma is a recently described distinctive clinicopathologic variant of basal cell carcinoma. Histopathologic differential diagnosis among infundibulocystic basal cell carcinoma, trichoepithelioma, and basaloid follicular hamartoma has generated controversy in the literature.

Observations: Members of 2 families with multiple infundibulocystic basal cell carcinomas are described. Each patient showed multiple papular lesions, mostly located on the face. No patient showed palmar pits or jaw cysts. Forty-two cutaneous lesions from 5 patients were studied histopathologically. Thirty-nine lesions were infundibulocystic basal cell carcinomas. This clinicopathologic variant of basal cell carcinoma consists of a relatively well-circumscribed basaloid neoplasm composed of buds and cords of neoplastic cells arranged in anastomosing fashion and with scant stroma. Some of the neoplastic cords contain tiny infundibular cysts filled by cornified cells with abundant melanin. Linkage analysis in family members shared the same haplotype. Loss of heterozygosity (LOH) for D9S196, D9S280, D9S287, and D9S180, and the affected members shared the same haplotype. Loss of heterozygosity analysis was performed in 2 affected members of this family from whom tumoral DNA was available, and although these individuals were constitutively heterozygous for D9S196, they did not show loss of heterozygosity for this marker in their neoplasms.

Conclusions: Multiple hereditary infundibulocystic basal cell carcinomas represent a distinctive genodermatosis different from multiple hereditary trichoepitheliomas and nevoid basal cell carcinoma syndrome. We propose clinical and histopathologic criteria to distinguish infundibulocystic basal cell carcinoma from trichoepithelioma, basaloid follicular hamartoma, and folliculocentric basaloid proliferation.

Arch Dermatol. 1999;135:1227-1235

In 1987, Tozawa and Ackerman1 described a new clinicopathologic variant of basal cell carcinoma that they named basal cell carcinoma with follicular differentiation. Their report generated considerable controversy in the literature, mainly concerning the difference between this basal cell carcinoma with follicular differentiation and trichoepithelioma.2-9 Later, in 1990, Walsh and Ackerman10 proposed a new name for this variant of basal cell carcinoma, ie, infundibulocystic basal cell carcinoma, on the basis of the main histopathologic characteristics of the neoplasm. These authors stated that infundibulocystic basal cell carcinoma was found frequently in patients with nevoid basal cell carcinoma syndrome (Gorlin syndrome). More recently, debate has ensued again as to whether this infundibulocystic basal cell carcinoma and basaloid follicular hamartoma are the same or different entities.11-13

We herein describe 2 families in which several members have multiple infundibulocystic basal cell carcinomas. None of the patients had palmar pits or jaw cysts. Furthermore, results of linkage analysis demonstrated that the affected members shared the same haplotype, but loss of heterozygosity (LOH) for D9S196 could not be demonstrated in 2 patients from whom tumoral DNA was available. Therefore, a diagnosis of nevoid basal cell carcinoma syndrome could be eliminated. We believe that multiple hereditary infundibulocystic basal cell carcinomas represent a distinctive genodermatosis different from nevoid basal cell carcinoma syndrome. We discuss the histopathologic differential diagnosis with that of lesions that look like infundibulocystic basal cell carcinoma, namely folliculocentric basaloid proliferation, basaloid follicular hamartoma, and trichoepithelioma. We review the literature about the subject, giving our interpretation for each...
of the previously described cases on the basis of the histopathologic illustrations provided in the reports and the histopathologic criteria that we propose herein.

REPORT OF CASES

FAMILY 1

Patient 1

A 50-year-old woman presented with multiple pearly, small papules involving the face (Figure 1), scalp, neck, chest, and vulva (Figure 2) that had been present for several years, but had increased in number and size during the last few years. During physical examination, more than 100 lesions were counted. Clinical diagnosis was multiple trichoepitheliomas, and 28 lesions were excised from the face and neck, mostly for cosmetic reasons. All lesions showed histopathologic features of infundibulocystic basal cell carcinoma.

Figure 1. Multiple pearly, small papules involving the face, mostly the nasolabial folds.

Patient 2

A 45-year-old sister of patient 1 was seen with multiple small papules scattered over the back and the anterior aspect of the legs (Figure 3) that had been present for many years. A larger lesion with pedunculated shape and eroded surface was present on the left shoulder (Figure 4). There were no facial lesions. The eroded lesion on the left shoulder was excised, and it showed histopathologic features of nodular basal cell carcinoma with areas of infundibulocystic basal cell carcinoma. Three small papules excised from the back were stereotypical examples of infundibulocystic basal cell carcinoma.

Figure 2. Papules involving the labia majora of the vulva.

Figure 3. Pearly papules on the anterior aspect of the legs.

Figure 4. A pedunculated lesion with eroded surface on the left shoulder.
Other Family Members

In accord with these siblings, a younger sister showed the same facial lesions as patient 1, but this third patient could not be examined by us because she lives in another country. The parents of the 3 siblings had died of unrelated causes, but according to both patients, they had no cutaneous lesions.

FAMILY 2

Patient 1

A 51-year-old woman presented with multiple pearly papules scattered over the face, mostly located on the upper lip, nasolabial folds, and chin (Figure 5). Some of the lesions showed an annular shape, with delled centers and raised borders. A papular lesion with identical shape was present in the left external auditory canal (Figure 6), and another lesion had been excised previously (in another center) from the tip of the nose and interpreted as trichoepithelioma. Four lesions from the face and the lesion from the left external auditory canal were excised for histopathologic study. One lesion showed features of nodular basal cell carcinoma; the other 4 lesions exhibited characteristic findings of infundibulocystic basal cell carcinoma.

Patient 2

A 54-year-old sister of patient 1 was seen with multiple translucent papules on the face and back. The lesions were predominantly located on the upper lip, nasolabial folds, and chin (Figure 5). The scar of the nose tip resulted from a lesion previously excised in another center. Two lesions on the back were eroded and covered by crusts. Two facial lesions and both eroded lesions on the back were excised for histopathologic study. The facial lesions were infundibulocystic basal cell carcinomas, whereas the back lesions were superficial basal cell carcinomas.

Patient 3

A 22-year-old daughter of patient 1 was seen with several pearly papules on the nasolabial folds. An excised lesion from the right nasolabial fold showed histopathologic features of infundibulocystic basal cell carcinoma.

Other Family Members

Patient 1’s father had died of unrelated causes, but according to both siblings seen by us, their father had multiple pearly small papules scattered over the face. Two brothers and 2 sons of patient 1 were examined in our department, and they showed no cutaneous lesions.

In the 5 patients examined by us, no palmar or plantar pits were seen, and results of the radiographic survey demonstrated that jaw cysts or other bone anomalies were not present.

RESULTS

HISTOPATHOLOGIC CHARACTERISTICS OF INFUNDIBULOCYSTIC BASAL CELL CARCINOMAS

Forty-two specimens from the 5 patients were studied histopathologically. Except for a nodular basal cell carcinoma in patient 1, family 2, and 2 superficial basal cell carcinomas in patient 2, family 2, the remaining 39 specimens showed essentially the same histopathologic features, ie, relatively well-circumscribed basaloid neoplasms. Some neoplasms were superficial with no involvement of the deep reticular dermis, whereas in other specimens, neoplastic aggregations of basaloid cells extended throughout the full thickness of the dermis and involved the skeletal muscle to the base of the specimen (Figure 7). Neoplastic aggregations consisted of buds and cords of basaloid and squamoid cells arranged in radial and anastomosing fashion. Some neoplastic aggregations showed peripheral palisading, and others, areas of necrosis en masse. Tiny infundibular cysts containing cornified cells with abundant melanin were seen within some aggregations of neoplastic cells. The stroma of the neoplasms was scant and consisted of wiry bundles of collagen in lamellated or compact arrangement. In some specimens, clefts separated neoplastic stroma from adjacent dermis (Figure 8),
whereas in others, no clefts were seen. In a specimen of patient 2, family 1, features of nodular basal cell carcinoma and infundibulocystic basal cell carcinoma were combined, with gradual transition between the 2 patterns (Figure 9).

GENETIC STUDIES

We obtained DNA using standard procedures from peripheral blood samples of all available members of family 2, and tumoral DNA was obtained from paraffin-embedded tissue of infundibulocystic basal carcinomas from patients 1 and 3 of this family.

Linkage analysis was performed using 4 polymorphic markers, D9S196, D9S280, D9S287, and D9S180, that map to chromosome 9q22.3 flanking the PATCHED (PTC) gene. Polymerase chain reaction (PCR) analysis was performed in 20-µL volumes containing 100 ng of template DNA; 200-µmol/L deoxyadenosine triphosphate, deoxyguanosine triphosphate, and deoxythymidine triphosphate each; 10-µmol/L deoxycytidine triphosphate; 15 pmol of each primer; 0.037 MBq α-phosphorus 32–labeled deoxycytidine triphosphate (Amersham Life Science Ltd, Buckinghamshire, England); 1 U Taq polymerase (Boehringer, Mannheim, Germany); and 1 × PCR buffer (Boehringer) (50-mmol/L calcium chloride; 10-mmol/L Tris [pH, 8.3] (Serva Electrophoresis, Heidelberg, Germany); and 1.5-mmol/L magnesium chloride). The PCR analysis was performed in a 2400 thermocycler (Perkin-Elmer Applied Biosystem Division, Foster City, Calif) with the following conditions for 30 cycles: 94°C for 45 seconds, 55°C for 40 seconds, and a final extension of 5 minutes at 72°C.

The PCR products were analyzed on denaturing 8% polyacrylamide gels and exposed at −70°C with commercially available film (Kodak X-OMATIC S film; Eastman Kodak, Rochester, NY). The primer sequences are available from Genome Database (available at http://gdbwww.gdb.org). The order of the polymorphic markers was derived from genetic linkage data.14,15 For LOH analysis, tumoral DNA from patients 1 and 3 of family 2 was obtained. The PCR conditions were the same described above, except the number of cycles was reduced to 23.

To determine whether the infundibulocystic basal cell carcinomas in family 2 could be attributable to a nevoid basal cell carcinoma syndrome, linkage and LOH studies were performed using 4 polymorphic markers (D9S196, D9S280, D9S287, and D9S180) flanking the PTC gene. The linkage analysis showed that the affected members I.1, II.2, II.3, and III.1, and the healthy 23-year-old male III.2 shared the same haplotype (Figure 10). Studies of LOH were performed in patients 1 and 3 of this family. Both patients were constitutively heterozygous for D9S196, but they did not show LOH for this marker in their cutaneous neoplasms.

COMMENT

We herein describe 2 families with several members affected by multiple infundibulocystic basal cell carcinomas. In our opinion, these patients have a genodermat-
tosis different from multiple hereditary trichoepitheliomas and nevoid basal cell carcinoma syndrome. Clinically, the cutaneous lesions were similar to those of multiple hereditary trichoepitheliomas, because the patients showed multiple small pearly papules scattered over the face, with lesions predominantly located on nasolabial folds. However, they also showed additional lesions on the scalp, neck, back, chest, and extremities. In contrast to nevoid basal cell carcinoma syndrome, our patients with multiple hereditary infundibulocystic basal cell carcinomas had no palmar pits, jaw cysts, or other bone anomalies, which are necessary to establish the diagnosis of Gorlin syndrome. Furthermore, genetic studies of linkage analysis and LOH using polymorphic markers demonstrated that the affected members shared the same haplotype. Two members of family 2 were constitutively heterozygous for D9S196, but they did not show LOH for this marker in their neoplasms. Although LOH has not been reported in 100% of patients with nevoid basal cell carcinoma syndrome,17-19 the haplotype and LOH data suggested that this family did not have nevoid basal cell carcinoma syndrome. Hereditary transmission of multiple infundibulocystic basal cell carcinoma seems to be autosomal dominant, although a striking feature in our 2 families was that all patients examined by us were female.

The biological behavior of infundibulocystic basal cell carcinoma, however, seems to be less aggressive than that of other clinicopathologic variants of basal cell carcinoma, because most of the lesions remain small for a long time and show little tendency to ulcerate the epidermis. In our experience, this biological behavior is similar to that of most of the facial lesions in patients with nevoid basal cell carcinoma syndrome, which remain small in size, without ulceration for a long time. In this syndrome, only a few lesions become large and ulcerated basal cell carcinomas. Nevertheless, some indubitable examples of infundibulocystic basal cell carcinomas of our series ulcerated the epidermis and involved subcutaneous fat and skeletal muscle at the base of the specimens, and neoplastic aggregations destroyed preexisting adnexal structures of the dermis, all architectural features of malignant neoplasms. Furthermore,1 specimen from patient 2, family 1, showed combined features of a large nodular basal cell carcinoma, which ulcerated the epidermis, and infundibulocystic basal cell carcinoma. The main controversial point of infundibulocystic basal cell carcinoma is its differential diagnosis with trichoepithelioma.2-9 Ackerman4,6,8 and Walsh and Ackerman10 have established clear-cut histopathologic criteria for differential diagnosis between infundibulocystic basal cell carcinoma and trichoepithelioma. Briefly, trichoepithelioma is a benign neoplasm with follicular differentiation that appears as a relatively symmetric and well-circumscribed neoplasm in which stroma predominates over the epithelial component. This abundant stroma is highly fibrocytic, closely resembling follicular papillae and the perifollicular connective tissue sheath. In neoplastic aggregations of trichoepithelioma follicular papillae and the perifollicular connective tissue sheath are readily recognizable. Usually, at scanning magnification, a histopathologic differential diagnosis between trichoepithelioma and infundibulocystic basal cell carcinoma may be established with confidence on the basis of the abundant and highly fibrocytic stroma in trichoepithelioma and the scant stroma with a paucity of fibrocytes in infundibulocystic basal cell carcinoma. Infundibulocystic basal cell carcinoma also should be differentiated from basaloid follicular hamartoma.
Table 1. Literature Review of the Reported Cases of Basaloid Follicular Hamartoma, Multiple Trichoepitheliomas With Alopecia and Myasthenia Gravis, and Infundibulocystic Basal Cell Carcinoma

<table>
<thead>
<tr>
<th>Source, y</th>
<th>Age of Patient/Sex</th>
<th>Clinical Appearance</th>
<th>Associated Anomalies</th>
<th>Published Diagnosis</th>
<th>Our Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown et al,22 1969</td>
<td>32 y/F</td>
<td>Multiple papules on the face and axilla</td>
<td>Alopecia, aminocacuriduria, myasthenia gravis</td>
<td>Hair follicle hamartoma</td>
<td>Basaloid follicular hamartoma</td>
</tr>
<tr>
<td>Mehregan and Hardin,42 1973</td>
<td>23 y/F</td>
<td>Multiple papules on the face, palms, and soles</td>
<td>Scarring alopecia, palmar pits</td>
<td>Folicular hamartoma</td>
<td>Trichilemmal cysts</td>
</tr>
<tr>
<td>Keough et al,23 1977</td>
<td>26 y/F</td>
<td>Solitary plaque on the abdomen</td>
<td>ND</td>
<td>Basaloid follicular hamartoma</td>
<td>Basaloid follicular hamartoma</td>
</tr>
<tr>
<td>Delacretaz and Balsiger,24 1979</td>
<td>40 y/F</td>
<td>Small cystic lesions on the face and vulva</td>
<td>ND</td>
<td>Folicular hamartoma</td>
<td>Basaloid follicular hamartoma</td>
</tr>
<tr>
<td>Ridley and Smith,25 1981</td>
<td>32 y/F</td>
<td>Multiple papules on the face</td>
<td>Alopecia, myasthenia gravis</td>
<td>Hair follicle hamartoma</td>
<td>Basaloid follicular hamartoma and trichoepitheliomas</td>
</tr>
<tr>
<td>Mehregan and Baker,27 1985</td>
<td>53 y/F</td>
<td>Multiple papules on the arm, back, chest, and abdomen</td>
<td>Graves disease</td>
<td>Basaloid follicular hamartoma</td>
<td>Basaloid follicular hamartoma</td>
</tr>
<tr>
<td></td>
<td>32 y/F</td>
<td>Solitary plaque on the scalp</td>
<td>ND</td>
<td>Basaloid follicular hamartoma</td>
<td>Basaloid follicular hamartoma</td>
</tr>
<tr>
<td></td>
<td>47 y/M</td>
<td>Solitary plaque on the scalp</td>
<td>ND</td>
<td>Basaloid follicular hamartoma</td>
<td>Infundibulocystic basal cell carcinoma</td>
</tr>
<tr>
<td>Starink et al,43 1986</td>
<td>51 y/F</td>
<td>Multiple papules on the face</td>
<td>Alopecia, myasthenia gravis</td>
<td>Trichoepitheliomas</td>
<td>Trichoepitheliomas</td>
</tr>
<tr>
<td>Gartmann et al,39 1988</td>
<td>14 y/F</td>
<td>Multiple papules on the face and upper back</td>
<td>Nevobal basal cell carcinoma syndrome</td>
<td>Basaloid follicular hamartoma</td>
<td>Infundibulocystic basal cell carcinoma</td>
</tr>
<tr>
<td></td>
<td>20 y/M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walsh and Ackerman,10 1990</td>
<td>ND</td>
<td>Localized and generalized lesions</td>
<td>Nevobal basal cell carcinoma</td>
<td>Infundibulocystic basal cell carcinoma</td>
<td>Infundibulocystic basal cell carcinoma</td>
</tr>
<tr>
<td>Mayou et al,26 1991</td>
<td>33 y/F</td>
<td>Multiple papules on the face</td>
<td>Alopecia, anti-acetylcholine receptor antibodies</td>
<td>Hair follicle hamartoma</td>
<td>Trichoepitheliomas</td>
</tr>
<tr>
<td>Kato et al,28 1992</td>
<td>39 y/F</td>
<td>Multiple papules on the retroauricular fold</td>
<td>ND</td>
<td>Basaloid follicular hamartoma</td>
<td>Basal cell carcinoma, Pinkus fibroepithelioma type</td>
</tr>
<tr>
<td>Brownstein,11 1992†</td>
<td>57 y/F</td>
<td>Multiple papules on the face</td>
<td>Basaloid follicular hamartoma</td>
<td>Infundibulocystic basal cell carcinoma</td>
<td></td>
</tr>
<tr>
<td></td>
<td>55 y/M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>55 y/F</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>27 y/M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22-88 y</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60% F, 40% M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broberg and Gisslen,24 1992</td>
<td>18 y/F</td>
<td>Multiple papules on the face</td>
<td>ND</td>
<td>Basaloid follicular hamartoma</td>
<td>Trichoepitheliomas</td>
</tr>
<tr>
<td>Jimenez-Acosta et al,26 1992</td>
<td>36 y/F</td>
<td>Linear plaque on shoulder and arm</td>
<td>ND</td>
<td>Basaloid follicular hamartoma</td>
<td>Basaloid follicular hamartoma</td>
</tr>
<tr>
<td></td>
<td>4 y/M</td>
<td>Plaque on the face</td>
<td>ND</td>
<td>Hair follicle hamartoma</td>
<td>Basaloid follicular hamartoma</td>
</tr>
<tr>
<td>Kato and Ueno,44 1993</td>
<td>56 y/F</td>
<td>Papule on the nose</td>
<td>ND</td>
<td>Infundibulocystic basal cell carcinoma</td>
<td>Infundibulocystic basal cell carcinoma</td>
</tr>
<tr>
<td>Nelson et al,29 1993</td>
<td>34 y/M</td>
<td>Multiple papules on the neck</td>
<td>ND</td>
<td>Basaloid follicular hamartoma</td>
<td>Basaloid follicular hamartoma</td>
</tr>
<tr>
<td></td>
<td>60 y/F</td>
<td>Multiple papules on the face</td>
<td>ND</td>
<td>Basaloid follicular hamartoma</td>
<td>Basaloid follicular hamartoma</td>
</tr>
<tr>
<td>Mascaro et al,25 1995</td>
<td>2 y/M</td>
<td>Atrophic follicular macules on subaxillary areas</td>
<td>Cystic fibrosis, hypotrichosis, hypohidrosis</td>
<td>Folicular hamartoma</td>
<td>Basaloid follicular hamartoma</td>
</tr>
<tr>
<td></td>
<td>6 y/M</td>
<td>Milia-like papules on the face</td>
<td>Cystic fibrosis, hypotrichosis, hypohidrosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 mo/F</td>
<td>No cutaneous lesions</td>
<td>Cystic fibrosis, hypotrichosis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

©1999 American Medical Association. All rights reserved.

Downloaded From: http://archderm.jamanetwork.com/pdfaccess.ashx?url=/data/journals/derm/11691/ on 06/18/2017
Basaloid follicular hamartoma is a rare follicular malformation with distinctive histopathologic features. It was originally described by Brown et al in 1969 as multiple papules in nasolabial folds associated with myasthenia gravis and diffuse alopecia. Since then, several cases have been reported, and now it is evident that basaloid follicular hamartoma may assume the following 5 different clinical forms: (1) an acquired generalized type, associated with myasthenia gravis and diffuse alopecia; (2) a congenital generalized type, associated with diffuse alopecia and cystic fibrosis; (3) a generalized familial type, without any apparent associated disease; (4) a localized linear and unilateral type; and (5) a localized and solitary type that mimics a plaque of alopecia on the scalp or appears as an indurated papular plaque. In our opinion, some of the cases reported as basaloid follicular hamartoma are better interpreted as trichoepitheliomas, basal cell carcinoma of fibroepithelioma (Pinkus) type, or infundibulocystic basal cell carcinomas. Conversely, some cases reported as trichoepitheliomas are in our opinion examples of basaloid follicular hamartomas, supporting the notion that multiple follicular neoplasms and hamartomas may be cutaneous markers of a more complex familial syndrome. Table 1 summarizes the literature review and our interpretation of the reported cases of basaloid follicular hamartoma, multiple trichoepitheliomas associated with alopecia and myasthenia gravis, and infundibulocystic basal carcinoma. From the histopathologic point of view, basaloid follicular hamartoma is characteristic, and the lesion consists of malformed and distorted hair follicles composed of cords and strands of basaloid cells arranged in radial and anastomosing fashion (Figure 12). In contrast to trichoepithelioma, the stroma of basaloid follicular hamartoma is scant or absent, and when present it consists of eosinophilic compact collagen bundles with no fibrocytes. No follicular bulbs and papillae are seen in basaloid follicular hamartoma. Unlike infundibulocystic basal cell carcinoma, basaloid follicular hamartoma is a superficial malformation of hair follicles, and basaloid cords and strands are seen only at the sites where normal follicles should be present, with no proliferations of basaloid neoplastic aggregations in interfollicular dermis and no involvement of deeper reticular dermis. In brief, basaloid follicular hamartoma consists of malformed hair follicles, whereas infundibulocystic basal cell carcinoma is a malignant neoplasm composed of aggregations of neoplastic cells that involve and destroy preexisting hair follicles and interfollicular dermis, and sometimes infiltrate deeper dermis, subcutaneous fat, and skeletal muscle. Finally, infundibulocystic basal cell carcinoma should also be differentiated from the so-called folliculocentric ba-
Table 2. Differential Diagnosis Among Basaloid Follicular Hamartoma, Folliculocentric Basaloid Proliferation, Trichoepithelioma, and Infundibulocystic Basal Cell Carcinoma

<table>
<thead>
<tr>
<th>Nature</th>
<th>Basaloid Follicular Hamartoma</th>
<th>Folliculocentric Basaloid Proliferation</th>
<th>Trichoepithelioma</th>
<th>Infundibulocystic Basal Cell Carcinoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical variants</td>
<td>Malformation</td>
<td>Reactive, probably hyperplastic</td>
<td>Benign neoplasm</td>
<td>Malignant neoplasm</td>
</tr>
<tr>
<td>Inheritance</td>
<td>Autosomal dominant</td>
<td>None, histopathologic finding only</td>
<td>Solitary variant; multiple variant</td>
<td>Solitary variant; multiple variant</td>
</tr>
<tr>
<td>Associated anomalies</td>
<td>Alopecia; myasthenia gravis; cystic fibrosis</td>
<td>ND</td>
<td>Autosomal dominant</td>
<td>Autosomal dominant</td>
</tr>
<tr>
<td>Histopathologic features</td>
<td>Malformed follicles composed of basaloid cords and strands</td>
<td>Folliculocentric proliferation with vertical and axial arrangement; prominent basement membrane surrounding basaloid aggregations</td>
<td>Architecture of benign neoplasm of germinative follicular cells</td>
<td>Basaloid cords and strands involving preexisting follicles and interfollicular dermis</td>
</tr>
<tr>
<td>Epithelial component</td>
<td>Scant or none</td>
<td>None</td>
<td>Abundant and highly fibrocytic</td>
<td>Scant</td>
</tr>
<tr>
<td>Folicular bulbs and papillae</td>
<td>None</td>
<td>None</td>
<td>Frequent</td>
<td>None</td>
</tr>
<tr>
<td>Deeper dermis and subcutaneous fat</td>
<td>No involvement; no involvement of interfollicular dermis</td>
<td>No involvement</td>
<td>In classic trichoepithelioma, only superficial dermis involved; in trichoblastoma, deeper dermis and subcutaneous fat may be also involved</td>
<td>Neoplastic basaloid aggregations sometimes involve subcutaneous fat and skeletal muscle</td>
</tr>
</tbody>
</table>

Accepted for publication June 14, 1999.

Reprints: Luis Requena, MD, C/Leopoldo Alas Clarín 4-3D, 28035-Madrid, Spain (e-mail: Irequena@ffj.es).

REFERENCES


©1999 American Medical Association. All rights reserved.