

A Clinical and Histopathologic Study of Epidermal Cysts

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Background: Epidermal cysts are the most common of all cysts.

Objective: The purpose of this paper is to report the clinical and histopathologic features of epidermal cysts.

Methods: We reviewed the clinical and histopathologic features of 205 cases that were diagnosed with epidermal cysts at the department of dermatology in Anam Hospital of Korea University for 11 years, from January 1983 to December 1993.

Results: 1. Of the 3,400 cases of skin biopsy specimens, 205 cases were epidermal cysts (6%). There were 141 male cases (68.8%) and 64 female cases (32.2%). The ratio of male to female was 1:0.45.

2. Most patients with epidermal cysts belonged to age ranging from 20 to 59 with the highest incidence in the 3rd decade.

3. The site of predilection of the epidermal cysts were face 94(45.9%), trunk 37(18.0%), neck 23(11.2%), leg 21(10.2%), arm 19(9.3%), scalp 7(3.4%), scrotum 2(1.0%), and vagina 2(1.0%).

4. Histopathologically, 61 cases (29.3%) were ruptured. The most common cystic wall change was acanthosis followed by atrophy, hyperplasia, hypergranulosis, parakeratosis, basalioma-like change, squamous eddies, dyskeratosis. The most common cystic content was keratinous material followed by parakeratotic cells, pigment, bacterial colony, RBC, inflammatory cells, hair shaft, calcification, trichilemmal keratinization, pilomatricoma-like change. The most common stromal change was giant cells followed by fibrosis, granulation tissue formation, vessel proliferation, pigment.

Conclusion: According to our results, which agree with those of Chung, the epidermal cysts occur as a disease particular to young men, especially on the face. Histopathologically, when an epidermal cyst ruptures and the contents of the cyst are released into the dermis, a considerable foreign body reaction with numerous multinucleated giant cells results.

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Key Words: Epidermal Cysts

Epidermal cysts are slowly growing, elevated, round, firm, intradermal or subcutaneous tumors that cease growing after having reached 1 to 5 cm in diameter. They occur most commonly on the face, scalp, neck, and trunk¹. Although most epidermal

cysts arise spontaneously in hair-bearing areas, occasionally they occur on the palms or soles as the result of trauma^{2,3}. Usually, a patient has only one or a few epidermal cysts, rarely many. In Gardner's syndrome, however, numerous epidermal cysts occur, especially on the scalp and face¹.

A typical histopathologic appearance of a wall composed of true epidermis and horny material arranged in laminated layers is seen in almost all lesions, and the histologic diagnosis is seldom in doubt. When an epidermal cyst ruptures and the

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Fig. 1. Cross-sectioned hair shaft is seen in the cystic contents(H&E, $\times 200$).

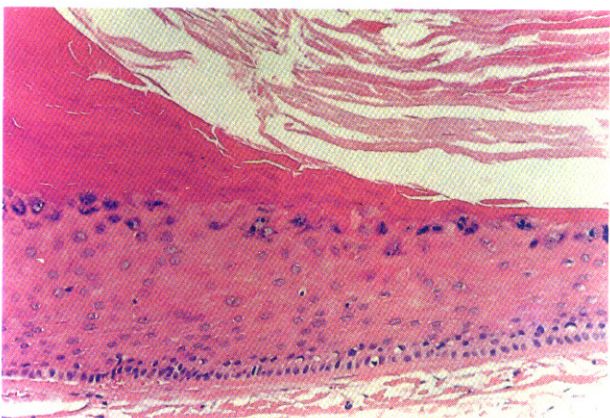


Fig. 2. Both trichilemmal and epidermal keratinization are present in the cystic contents(H&E, $\times 200$),

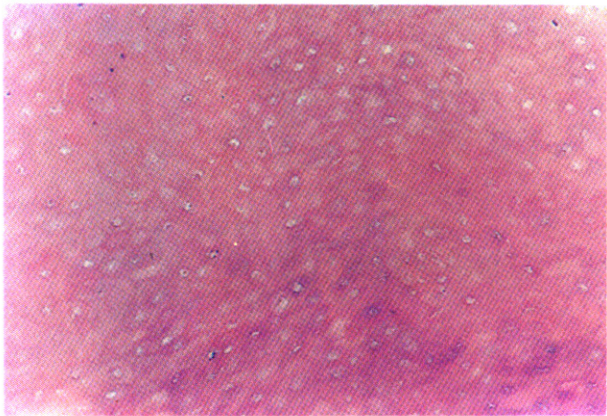


Fig. 3. Shadow cell-like changes are seen in the cystic contents(H&E, 200).

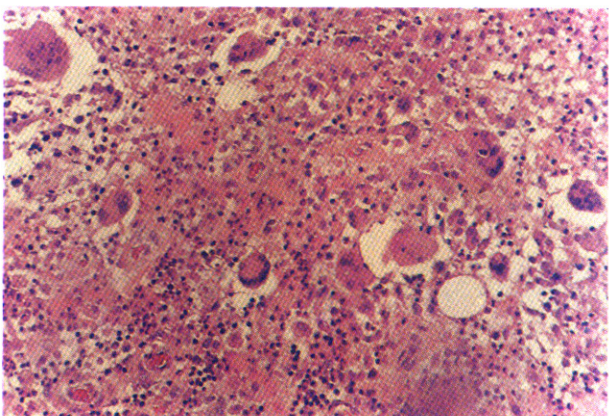


Fig. 4. Numerous multinucleated giant cells are present in the stroma(H&E, $\times 200$).

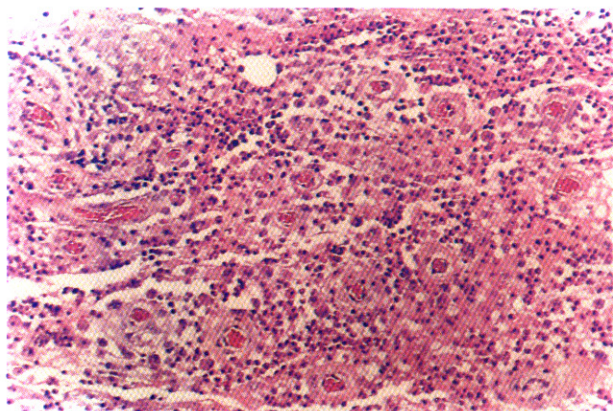


Fig. 5. Numerous small blood vessels are present in the stroma(H&E, $\times 200$).

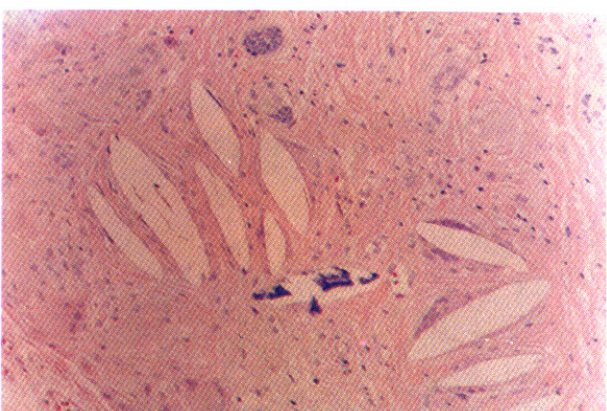


Fig. 6. Multi-lobulated cholesterol clefts are seen in the stroma(H&E, $\times 200$).

contents of the cyst are released into the dermis, a considerable foreign-body reaction with numerous multinucleated giant cells results¹.

There are few reports of the clinical and histopathologic features of epidermal cysts so we have tried to investigate the clinical and histopathologic features of epidermal cysts.

MATERIALS AND METHODS

We reviewed retrospectively the files of the pathologic reports at the Department of Dermatology in Anam Hospital of Korea University for 132 months (January 1983 to December 1993), and found a total of 205 epidermal cysts, all confirmed by biopsy. In the same period, 3,400 skin biopsies were taken. The material available was from routine histopathologic blocks. The cases were grouped by year, sex, age, anatomical region affected and histopathologic data.

RESULTS

Incidence: In our own entire dermatohistopathologic material of 3,400 cases, one epidermal cyst for every 17 specimens was found (Table 1).

Sex and age distribution: Table 2. shows the incidence of epidermal cysts in both sexes. The ratio of the occurrence for male patients compared with female patients in the total material is nearly 1:0.45. Table 2. shows the age distribution of epidermal cysts. More than 80% of the tumors arise between the age of 20 and the age of 59. The highest incidence is found between 20 and 29 years of age.

Localization: Table 3. gives the localization of the epidermal cysts. Face, trunk, neck, leg, arm, scalp, scrotum, and vagina are affected with decreasing frequency. No cases of epidermal cysts were observed on palms or soles. Table 4. shows the anatomic site of epidermal cysts in the face. The cheek, periauricular, forehead, eyebrow, nose, chin, and lip are affected with decreasing frequency.

Histopathologic data: The main histopathologic elements are summarized in Table 5. About seventy percent of the cysts in this study have intact epidermal cystic wall and 61 cases (29.3%) were ruptured. Most common cystic wall change was acanthosis followed by atrophy, hyperplasia, hypergranulosis, parakeratosis, basalioma-like change,

squamous eddies, dyskeratosis. The most common cystic content was keratinous material followed by parakeratotic cells, pigment, bacterial colony, RBC, inflammatory cells, hair shaft (Fig. 1). calcification, trichilemmal keratinization (Fig. 2), pilomatricoma-like change (Fig. 3). The most common stromal changes was giant cells (Fig. 4) followed by fibrosis, granulation tissue formation, vessel proliferation (Fig. 5), pigment, calcification, cholesterol cleft (Fig. 6).

DISCUSSION

Epidermal cysts are slowly growing, elevated, round, firm, intradermal or subcutaneous tumors that cease growing after having reached 1 to 5 cm in diameter¹. On palpation, they are spherical in shape and are freely mobile over underlying structures. They may become inflamed and tender from time to time. Suppuration may occur⁵. Epidermal cysts are common, most frequently affecting young and middle-aged adults. They are rare in childhood. Both sexes are affected equally^{6,7}. Usually, a patient has only one or a few epidermal cysts but patients with Gardner's syndrome and nevoid basal cell carcinoma syndrome may have many lesions⁴. Epidermal cysts are most commonly found on the face, neck, chest, and upper trunk, where the sebaceous glands are most numerous and active. Cysts secondary to traumatic implantation usually occur on the palms or soles or on the buttocks^{2,3}. Judging from the our cases, epidermal cysts are tumors seen most frequently in young and middle-aged men. Male patients outweigh female patients significantly. Concerning the sex distribution it is striking that in our material the preponderance of male patients compared with female patients is as accentuated as that seen by Chung et al⁸. Its most frequent location is the face, followed by trunk, neck, leg, arm, scalp, scrotum, and vagina. It is the same result as that reported by Chung et al⁸. Chung et al⁸ reported that the most frequent anatomic site of epidermal cysts in the face is periauricular, but in our cases the most frequent site is the cheek.

An epidermal cyst is the result of the proliferation of surface epidermal cell within the derm. Production of keratin within a circumscribed space results in a cyst. Epidermal cysts may arise from occlusion of pilosebaceous follicles, from implanta-

Table 1. Incidence of epidermal cysts in the skin biopsies

Year	Total No of biopsies	Sex		Total(%)
		M	F	
1983	249	10	5	15(6.0)
1984	357	12	7	19(5.3)
1985	308	12	6	18(5.8)
1986	266	5	3	8(3.0)
1987	308	17	8	25(8.1)
1988	320	10	5	15(4.7)
1989	302	9	3	12(4.0)
1990	288	8	7	15(5.2)
1991	308	18	6	24(7.8)
1992	336	16	9	25(7.4)
1993	358	24	5	29(8.1)
Total	3,400	141	64	205(6.0)

Table 3. Anatomic site of epidermal cysts

Location	No of cases(%)
face	94(45.9)
trunk	37(18.0)
neck	23(11.2)
leg	21(10.2)
arm	19(9.3)
scalp	7(3.4)
scrotum	2(1.0)
vagina	2(1.0)
palm&sole	0
Total	205(100.0)

tion of epidermal cells into the dermis following penetration injury, and from the trapping of epidermal cells along embryonal fusion planes. The first mechanism is the most common, and it is widely believed that the epidermal lining of the cyst is derived from the follicular infundibulum⁴.

Table 2. Age and sex distribution of epidermal cysts

Age	Sex		Total(%)
	male	female	
1-9	1	3	4(2.0)
10-19	10	1	11(5.4)
20-29	60	16	76(37.1)
30-39	30	15	45(22.0)
40-49	12	8	20(9.8)
50-59	17	12	29(14.1)
60-69	8	2	10(4.9)
70-	3	7	10(4.9)
Total	141	64	205(100.0)

Table 4. Anatomic site of epidermal cysts in the face.

Location	No of cases(%)
cheek	43(45.7)
periauricular	27(28.7)
forehead	8(8.5)
eyebrow	7(7.4)
nose	4(4.3)
chin	3(3.2)
lip	2(2.1)
Total	94(99.9)

Table 5. Histopathologic finding

Wall change	Cystic contents	Stromal change
acanthosis(49)	keratinous material(144)	fibrosis(21)
atrophy(33)	parakeratotic cells(9)	granulation tissue formation(21)
hypergranulosis(11)	calcification(4)	cholesterol cleft(1)
parakeratosis(6)	pigment(9)	calcification(2)
basalioma-like changes(4)	pilomatricoma-like changes(2)	pigment(6)
dyskeratosis(1)	RBC(8)	vessel proliferation(14)
squamous eddies(1)	inflammatory cells(7)	
	trichilemmal keratinization(2)	

Recently, several reports have shown the presence of human papilloma virus antigen in plantar epidermal cysts⁹⁻¹⁰, but the exact relation between the virus and epidermal cyst remains unclear.

The cyst is lined by stratified squamous epithelium, as seen on the skin surface and in the infundibulum of hair follicles. A granular layer is present. Within the cyst is keratinous material arranged in laminated layers, sometimes containing melanin and sometimes calcified as a result of dystrophic calcification. Foreign-body type reaction with multinucleated giant cells may be found in the dermis surrounding the cyst in response to a spillage of the cysts contents. In a study of the microbiology of infected epidermal cysts, Brook¹¹ found 192 of 231 clinically infected epidermal cysts yielded bacterial growth, of which 44 percent had aerobic organisms (*Staphylococcus aureus*, group A *Streptococcus*), 30 percent had anaerobic organisms (*Peptostreptococcus species*, *Bacteroides species*), and 26 percent had mixed growth. This study highlights the polymicrobial nature and the predominance of anaerobes in cyst abscesses. Development of a basal cell epithelioma¹², a lesion of Bowen's disease¹³, a Merkel cell carcinoma¹⁴, or a squamous cell carcinoma¹⁵⁻¹⁶ in epidermal cysts is a rare event. It is likely that some cases that were regarded in the past as malignant degeneration of epidermal cysts now are interpreted either as pseudocarcinomatous hyperplasia in a ruptured epidermal cyst or as proliferating trichilemmal tumor 1. Table 5. shows the cystic wall changes, cystic contents, and stromal changes of the epidermal cysts. Cystic wall changes were usually present in intact epidermal cysts and stromal changes were usually present in ruptured cases. The most common histopathologic finding was acanthosis followed by atrophy, giant cells, granulation tissue formation, fibrosis, and hyperplasia.

An inflamed noninfected cyst can be treated by intralesional triamcinolone 5 mg/ml⁴. A fluctuant, probably infected cyst should be incised, drained, and cultured; if there is no improvement, antibiotic treatment should be started. The initial antibiotic therapy should cover against *Staphylococcus aureus* as this is the most common pathogen. Removal of the cyst is usually best deferred until the inflammation and infection have subsided. To prevent recurrence, the entire epidermal lining should be removed or destroyed¹⁷.

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