

Clinical and Immunohistochemical Characteristics of Dermoid Cysts of the Neck

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Abstract: The paper has been written within the research scientific work, entitled “Integrative-differential rationale of the choice of the optimal methods of surgical interventions and scope of treatment in surgical pathology of maxillofacial area”; State registration number 0116U003821.

Keywords: dermoid cyst, neck, immunohistochemical characteristic.

Relevance of the topic. Dermoid cyst or dermoid is a benign tumor of the choristoma (teratoma) group. Cavitory cyst is formed as a result of the shift of undifferentiated elements of the blastophylli under the skin, namely, the parts of the ectoderm, follicles of the hair, pigment cells, and sebaceous glands [4.5]. The mature teratomas are originated in embryonic development disorder and formed along the lines of developing parts of the fetus body, embryonic connections, creases, i.e., where there are all conditions for separation and accumulation of blastophylli.

Dermoid cysts of the maxillofacial area are commonly appear in the neck and on the floor of the mouth, due to peculiarities of their pathogenesis, as they develop in embryonic clefts, grooves and wrinkles of the ectoderma from its dystopic elements. Dermoid cysts can be localized in any tissue, and their wall is composed of all layers of the skin and its adnexa: hair follicles, sebaceous and sudoriparous glands and even teeth (complex dermoid cysts) [6, 7, 9,10].

To obtain the differential signs among cysts of the lateral area of the neck several pathomorphological types of studies are carried out: histological study of its wall, cytological study of the content of the cyst's cavity. But, unfortunately, no data on the role of the immune system in the formation of the components of the cysts of the lateral area of the neck, including dermoid ones, have been found. According to the publications, there are many proofs that the morphological organization of the cysts of the lateral area of the neck resembles lymphoid tissue [5], but no data on the composition of the subpopulation of immune cells and their representation in it have been presented. To resolve these issues, immunohistochemical methods of study are considered to be the advanced one to date. Notwithstanding the relatively short period of time of applying such methods their informativeness has been already recognized [1,2,3]. Immunohistochemistry is a high-tech methodical complement to the traditional histological research methods in clinical diagnosis.

Since, currently, multiple poly- and monoclonal antibodies with high specificity and avidity become available for the laboratory diagnostics, the amount of applied problems, where immunohistochemical methods can be used, is almost unlimited [6,7]. Therefore, they occupy one of the leading places in the list of pathomorphological studies to date. This method is widely used both in scientific developments and in daily practice of the morphologists. Currently, the immunohistochemical methods are widely used in pathohistological diagnosis of oncological diseases, the oral mucosa lesions, and gradually introduced into forensic medical examination [2,8].

Purpose. The paper was aimed at the study of clinical and immunohistochemical features of all layers of dermoid cyst of the lateral area of the neck.

Material and Methods

To reach the objective of the study common clinical methods of examination have been used, including gender identity, complaints, triggering factors that contributed to the onset of clinical manifestations of the cystic masses, its shape and size, color and turgor of cutaneous integuments in the area of lesion, the sternocleidomastoid muscle ratio, consistency, relations to the surrounding tissues, occurrence of the general somatic diseases.

To verify and identify the nature of the cellular immune factors 20 tissue samplings, obtained after surgical interventions, have been immunohistochemically

studied. For the quantitative and qualitative characteristics of the major immune cells subpopulations expressing the HLA-DR, CD3, CD4, CD8, CD20 have been identified.

Antigen-presenting dendritic (APC or DC) cells, the general T cell population, T-helper cells, cytotoxic lymphocytes, B cells have been identified according to the HLA-DR, CD3, CD4, CD8, CD20 expression, respectively, on the frozen sections, made from the epithelial lining, using the technique, patented by the staff of the central scientific-research laboratory at the Higher State Educational Establishment of Ukraine "Ukrainian Medical Stomatological Academy" [3].

Immunohistochemical stain has been carried out indirectly, each antigen on every individual section, and 5-6 specimens from each tissue sampling have been studied.

The first layer of the specific antibodies has been identified using the protea biotin-conjugated antibodies of the Fc-fragment of the molecule of immunoglobulins, and extravidin peroxidase kit (Sigma, USA). The visualization was carried out with 3-Amino-9-ethylcarbazole (Sigma, USA). Contrasting was made with hematoxylin or methylene blue and specimens were placed into resin syrup under the cover glass. The count of positively stained cells (immunoreactive) has been made per 100 epithelial cells throughout the thickness of the layer, defining the typical places of localization; in subepithelial compartments cells were counted on a standard area, which also consisted of 100 epithelial cells [3].

Results and Discussion. The total number of patients with cysts of the lateral area of the neck constituted 102 people aged 17 to 70 years. The in-house algorithm of examination of patients with neck cysts [7] enabled the assignment of patients into four groups, one of them was a group of patients with dermoid cysts of the lateral area of the neck, which included 20 patients (19,6% of the total number), including 10 women (50%) and 10 men (50%). The age period of most of patients was from 21 to 35 years. In 9 cases (45%) the cyst was localized on the left, and in 11 cases (55%) it was on the right.

Among the triggering factors contributed to the occurrence of the manifestations of the disease the patients have mentioned a variety of reasons (Table 1). The hypothermia was mentioned in 9 cases (45%), the acute infectious process or exacerbation of the concomitant somatic diseases has been stated in 8

patients (40%). In 3 cases (15%) the patients were unable to name a reliable reason that has led to the occurrence of cystic mass.

Table 1

Triggering factors, contributed to the occurrence of the clinical manifestations of the dermoid cysts of the lateral area of the neck

Triggering factor	Men		Women		Total	
	Number	%	Number	%	Number	%
Hypothermia	5	25	4	20	9	45
Acute infectious or exacerbation of chronic diseases	4	20	4	20	8	40
Unspecified	1	5	2	10	3	15
Total	10	50	10	50	20	100

Locally, on examination, the asymmetry of the neck due to the presence of the oval and orbicular mass has been noted in 8 patients (40%) and 12 (60%) patients, respectively. Skin area over the swelling was of a regular color. Skin over the mass was folded. The topography of the dermoid cyst was variable with regard to sternocleidomastoid muscle: in 2 cases (10%) it was localized under the muscle, in 11 cases (55%) its location in front of the muscle was typical, and in 7 patients (35%) it was located behind it.

The dimensions of the mass varied from 2 to 4 cm in 5 patients (25%), 4 to 6 cm in 6 patients (30%), 6 to 8 cm in 9 patients (45%). In 12 patients (60%) the mass was dense at palpation, in 5 cases (25%) its consistency was defined as solid elastic, and in 3 cases (15%) as gently elastic. In all patients contouring surface of the mass was painless and smooth at palpation with clear contours.

Planned conventional surgical treatment has been provided for all 20 patients with dermoid cysts of the lateral area of the neck with the appropriate follow up drug treatment [202]. 17 patients (85%) underwent surgery under general anesthesia and 3 patients (15%) and the local one.

Patients who were admitted in the period of suppuration (19 out of 102; (18,6%)), among which 12 patients (11,8%) were with dermoid cyst, underwent mediodiagnostic puncture, controlled by ultrasonography. The complete content of

the cyst was cautiously aspirated; after that a cavity was washed with 1% dioxydin solution. In cases when the substrate of the cyst was very heavy, the cavities were washed out twice. Usually cystic cavities needed to be washed out during three days. In 5 cases (4,9%) the conservative measures were not successful and resulted in the dissection with the prescription of antibiotic therapy, anti-inflammatory agents and anaesthetics. Subsequently, these patients were excluded from the scientific investigation, and in 3-4 weeks all the others underwent surgery after removal of inflammatory phenomena.

Immunohistochemical study aimed at the HLA-DR⁺ cells identification showed that in the epithelial lining their number was different: from single cells to clusters in the amount up to 5 individual areas with predominant localization in the basal portion of the layer. The presence of large areas free from these cells was also notable. Under the epithelium their uneven redistribution has been found. Against the background of fibers of dense connective tissue a significant number of HLA-DR⁺ cells with elongated compressed bodies and processes, oriented on the fibers' pathway, were observed (Fig. 1).

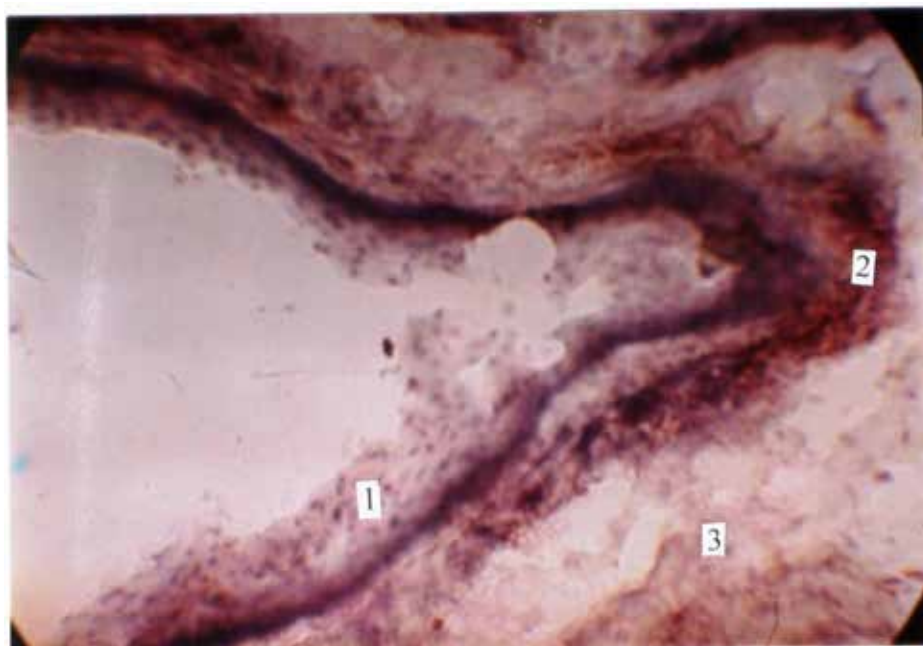


Fig. 1. Microphotogram of the fragment of the dermoid cyst's wall (patient K., 17 years old, case report No.1060). Frozen section; mcAT1 – anti-HLA-DR; Hematoxylin and eosin stain; Magnification × 60: 1- epithelium; 2- the focus of the expressed population of the HLA-DR⁺ cells; 3- area free from the HLA-DR⁺ cells.

Noteworthy, the areas both fully populated with CD3⁺, CD4⁺, CD8⁺ and CD20⁺ lymphocytes and without them have been found in the epithelium. Populations of the CD3⁺ and CD8⁺ cells were the most numerous, namely, up to 8-10-15 per100 epithelial cells, whereas CD4⁺ cells constituted from 1-2 to 5-10, and CD20⁺ cells from 1 to 2-5 (Fig. 2-5). Subepithelially, alternation of the areas with greater or lesser population of these cells and free zones has been noted.

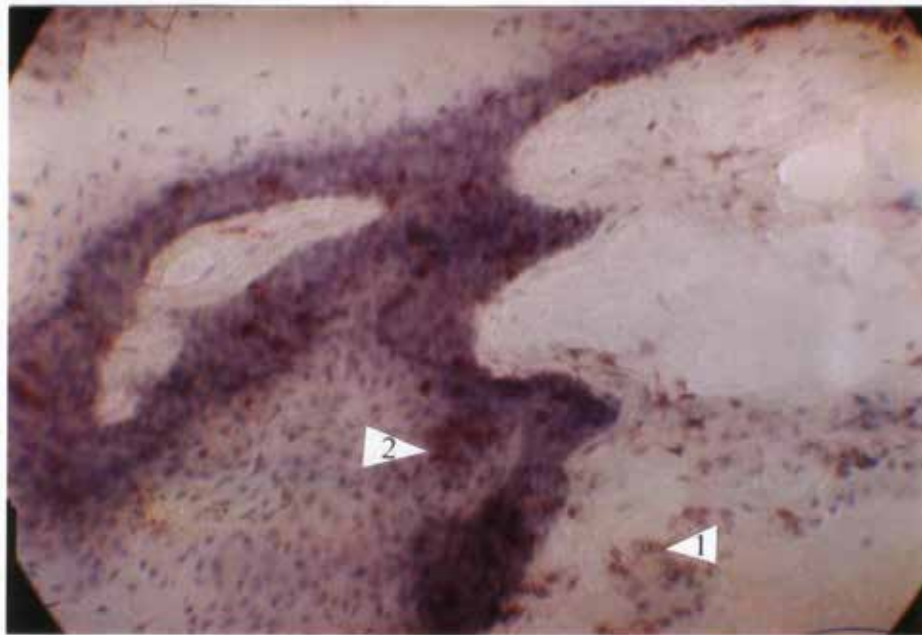


Fig. 2. Microphotogram of the fragment of the dermoid cyst's wall (patient K., 17 years old, case report No.1060). Frozen section; mcAT1 – CD3; Hematoxylin and eosin stain; Magnification × 60:
1- CD3⁺ cells of subepithelial layer;
2- CD3⁺ cells localized in the epithelium

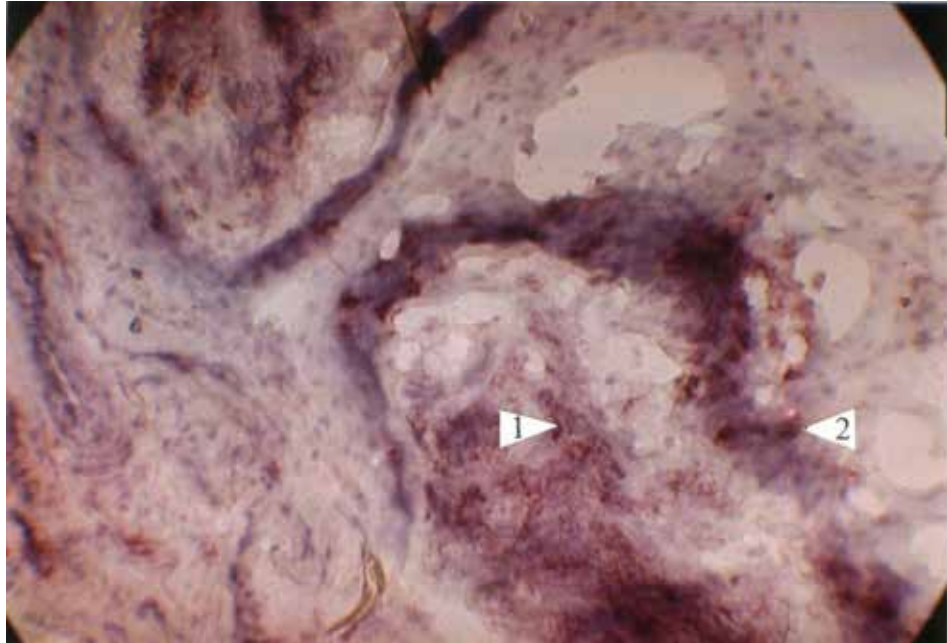


Fig. 3. Microphotogram of the fragment of the dermoid cyst's wall (patient K., 17 years old, case report No.1060). Frozen section; mcAT1 – CD8; Hematoxylin and eosin stain; Magnification × 60:
1- CD8⁺ cells of subepithelial layer;
2- CD8⁺ cells localized in the epithelium.

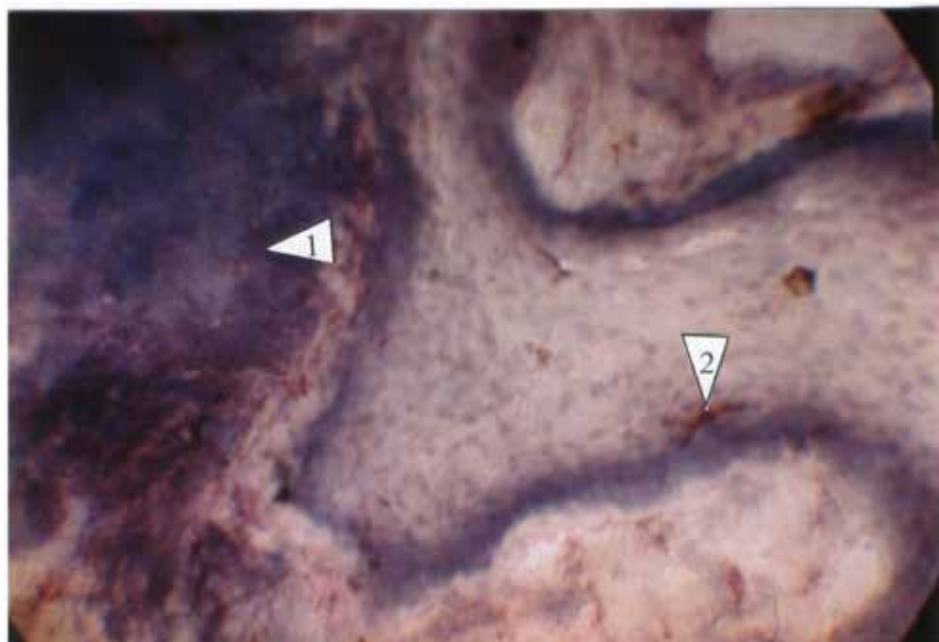
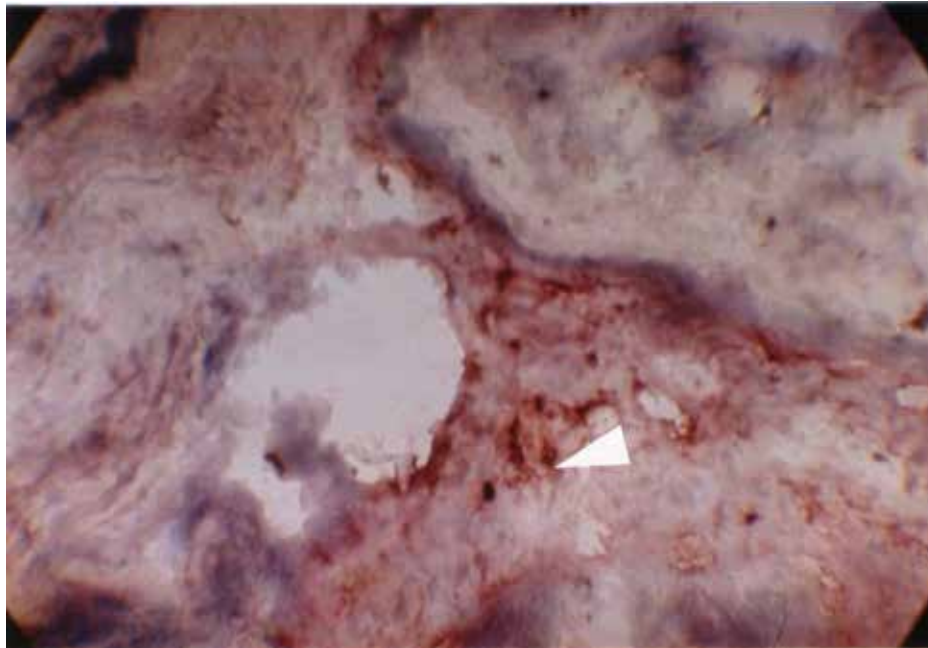


Fig. 4. Microphotogram of the fragment of the dermoid cyst's wall (patient K., 17 years old, case report No.1060). Frozen section; mcAT1 – CD4; Hematoxylin and eosin stain; Magnification × 60:
1- CD4⁺ cells of subepithelial layer; 2- CD4⁺ cells localized in the epithelium.



**Fig. 5. Microphotogram of the fragment of the dermoid cyst's wall (patient K., 17 years old, case report No.1060). Frozen section; mcAT1 – CD20; Hematoxylin and eosin stain; Magnification × 60:
1- CD20⁺ cells of subepithelial layer;
2- CD20⁺ cells localized in the epithelium.**

Conclusions. Thus, our studies prove the importance of application of the advanced technologies in the investigation of the immune competency of the layers of the wall of the lateral cysts of the neck and demonstrate its effectiveness that allows defining the distribution of the immune cells with the purpose of differential diagnostics of their varieties in difficult or doubtful cases. In addition, the immunohistochemical method of research, if necessary, and if tactical approach has been selected correctly, can be useful for predicting the probability of the frequency of occurrence of the acute inflammation and possible malignancy in the presence of exactly the dermoid masses.

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