Cytology of the Tonsils

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The tonsils are part of the lymphoreticular system and their histology is well known. But in spite of the abundantly available material from tonsillectomies, records of cytological investigations are scarce (4). This is the more surprising since less accessible organs, for example lymph nodes and spleen, have been examined repeatedly and extensively (1, 3, 6, 10, 11).

This may be due to the still widespread underestimation of cytology in comparison with histology and has also been mentioned by *Leiber* in connection with the cytology of lymph nodes. The two techniques – histology and cytology – are not competitive but complementary and their combined use is often of great value for clinical diagnosis (9). The cytology of lymph nodes and the spleen is familiar to the experienced haematologist. From this point of view the results of the cytological examination of tonsils from 103 cases are described here. The indication for tonsillectomy in all cases was chronic inflammation.

Material and Methods

We obtained the tonsils immediately after removal. Smears and imprints were made on slides from a freshly cut surface within 120 minutes. The same procedure is followed when lymph nodes are submitted for cytology.

The 103 patients were between 2 and 54 years old. 57 of them were in the age group 2 to 12 years inclusive, 46 were older and of these 23 were 13 to 22 years old (see table 1).

The airdried smears were stained according to May-Grünwald-Giemsa. In our laboratory the same technique is used for smears from bone-marrow, lymph nodes, spleen, tumours and deposits from effusions. Identical cells therefore give an identical picture.

We particularly observed the various types of cells and their relative proportions. The results were compared with those from lymph nodes. This comparison is possible because in every case the organs had been changed by chronic inflammation. Though the same types of cells were mostly found in both kinds of organ their relative proportions differed. This difference needs explanation.

Results

Large and small *lymphocytes* predominate in all cases. Irrespective of the technique, whether smears or imprints, some parts of one and the same slide showed more large lymphocytes and other parts more small lymphocytes. Though both types occur in lymph follicles, the distribution suggested some technical cause: where the film dried slowly

the cells became rounded and appeared small, while quicker drying fixed other cells to the glass surface so that they appeared larger and paler. The proportions of large and small lymphocytes were therefore ignored; they showed no connection with other findings, nor with the age of the patients.

In spite of the predominance of lymphocytes the tonsillar smears gave in all cases a more varied cellular picture than that of inflamed lymph nodes. This is mainly due to a far greater proportion of *stem cells* or *blasts*. These cells are regarded as cells from the germinal centre. Their nucleus is large, the basophilic cytoplasm more or less abundant and a nucleolus can usually be seen in the dense chromatin (fig. 1a). There is no clear cut distinction between these blasts and similar cells with less cytoplasm; the nucleus of the latter is indented or lobulated and the nucleolus is hardly visible (fig. 1 b). When cells of this appearance occur in the bone-marrow or in the peripheral blood they would be regarded as atypical elements, as seen in leukaemia of the immature or blast cell type. Typical blasts and these "atypical" elements, probably belonging to the same category, were found in all our preparations to be more frequent than in lymph nodes. In

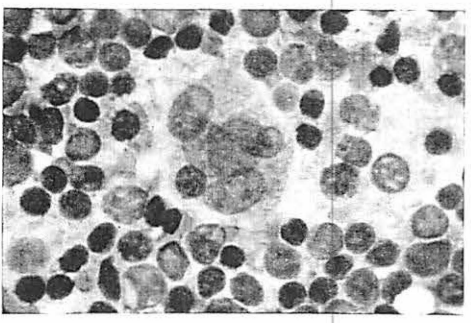

Fig. 1a Large blast with nucleoles (320 : 1).

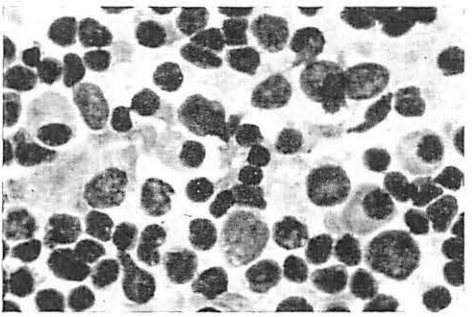

Fig. 1b Blasts with scanty cytoplasm, "atypical", among lymphocytes (320 : 1).

32 cases they were conspicuously more numerous (table 1). This was in spite of the fact that the lymph nodes were also chronically inflamed and showed increased numbers of blasts. *Lennert* found increased numbers of blasts in cervical nodes in cases of German measles, toxoplasmosis and in other inflammatory states, but he did not give any figures. We examined lymph nodes in cases of toxoplasmosis, tuberculosis, and carcinoma with metastases, and we found a maximum of 3% blasts (table 2). In contrast to these findings most of the tonsils examined contained about 5% blasts, and the 32 cases with an even higher blast count contained about 10% blasts (table 2). This high blast count occurred particularly in individuals up to the age of 22 and was only rarely found in higher age groups (table 1).

Plasma cells may be seen in small numbers in diseased lymph nodes as well as in tonsils, not exceeding 0.1%. In lymph nodes they are found in cases of German measles, carcinoma, hepatic cirrhosis, septicaemia and inflammations of non-bacterial origin. In histological sections they are sometimes situated in germinal centres in perivascular tissue (6).

Table 1 Cytological results from 103 tonsillar smears, in 3 age groups.

Age in years	No. of patients	Cases with		
		increased no. of blasts (about 10%)	increased no. of plasma cells (up to about 1%)	giant cells
2 – 12	57	21 (= 36.84%)	1	12
13 – 22	23	8 (= 34.78%)	4	2
23 – 54	23	3 (= 13.00%)	5	2
Total	103	32	10	16

Only one of our tonsillar smears did not contain any plasma cells (nine year old child). In 10 cases, however, we found an increased number of plasma cells, i.e. most fields contained one or more plasma cells, making 1% or more (table 2); occasionally they

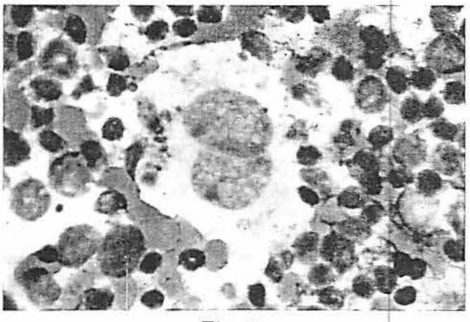

Fig. 2a

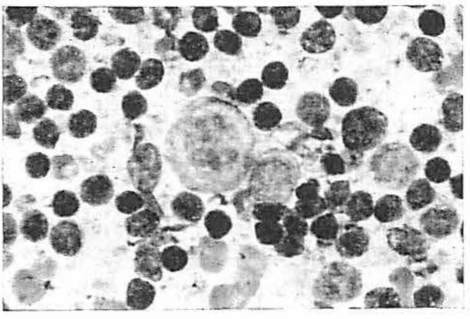

Fig. 2b

Fig. 2 Increased number of plasma cells. a) singly, b) in group (320 : 1).

Table 2 Proportion of blasts and plasma cells in inflamed lymph nodes and tonsils (400 cells/smear counted).

	Blasts in %	Plasma cells in %
Inflamed lymph nodes	< 3.0	< 0.1
inflamed tonsils	5.0 – 10.0	< 1.0

occurred in small groups (fig. 2 a and b). It struck us that the increased proportion of plasma cells was seen more often in the tonsils of older patients than in those of children (table 1).

We found *giant cells* with two or more nuclei more frequently in tonsils than in diseased lymph nodes, i.e. in 16 of the preparations examined (age distribution: table 1). If with such a small number of cases a conclusion may be drawn at all, then the formation of multinucleate giant cells seems to be more frequent in younger patients. These giant cells are neither of the Langhans nor of the Sternberg-Reed type (fig. 3 a and b). They

contain fewer and somewhat larger nuclei than the Langhans type cell and they differ from the cell type found in Hodgkin's disease mainly by their well defined though occasionally not quite rounded nucleus; the nucleoli are not enlarged and their number is not increased. The nuclei resemble those of epitheloid cells. Giant cells of this type are a characteristic feature in the histology of temporal arteritis. We also saw them in a case of Hashimoto's disease (8) and in an unpublished case of necrotising dermatitis with tissue eosinophilia.

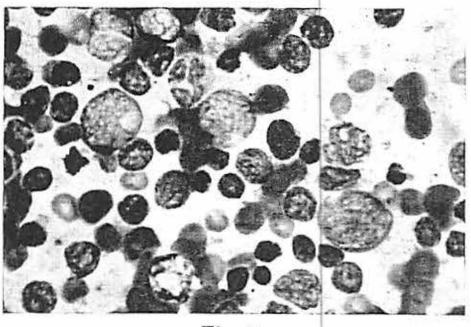

Fig. 3a

Fig. 3b

Fig. 3 Giant cells. a) two nuclei (cell showing phagocytosis), b) multinucleate (320 : 1).

Granulocytes occur in the tonsils as in other inflamed lymphatic organs. As all the tonsils examined were excised because of chronic inflammation one would have expected a more marked increase of granulocytes than was in fact found. Except in two cases their occurrence never rose above 2%. In 10 cases we also observed some eosinophils.

The tonsils were of varying consistency: some were firm and looked fresh, others were friable, seemingly necrotising. But even the tonsils of the latter texture did not contain more granulocytes than the firm material. As regards the two cases with an increased proportion of granulocytes, one was firm, the other friable.

Tonsillar smears naturally contain also *epithelial cells*, usually in larger groups. They are still connected to one another as a tissue. Their pale cytoplasm is abundant. Mostly they are pavement epithelia. Occasionally one also finds cells with non-homogeneous basophilic cloudy cytoplasm (secretory cells).

As expected, most smears contained *bacteria;* they were mainly cocci, sometimes also rods and fusiforms. In seven cases we did not see any bacteria; none of these smears had an increased number of blasts or plasma cells. But the significance of this observation is questionable because of the small number of cases.

Macrophages were seen in most preparations as is usual in inflamed lymphoreticular tissue. Their apparent absence in some smears could have been due to their being invisible in the thicker parts of the smear.

Discussion

The human body contains lymphatic tissue especially as solitary follicles in the submucous layers of the digestive and respiratory tracts. Larger accumulations are found in the spleen, in the lymph nodes and tonsils. Lymph follicles may also be formed in the

thyroid gland, in the bone-marrow and at various sites in human connective tissue. *Watzka* describes the tonsils as lymphoreticular organs (quoted by 2).

But the cytology of the palatine tonsil differs from that of the lymph nodes especially in the proportions of the various elements of the R.E.S. There are always far more blast cells in tonsillar tissue than in inflamed lymph nodes.

The even more marked increase of blast cells in younger subjects differs significantly from the findings in adults. The cytological picture coincides with the observation on histological sections from children's tonsils, which may often show large numbers of germinal centres and lymph follicles (7). Therefore the increased number of blast cells in tonsils may be assumed to have some functional significance.

Hellman did not regard the pale centres of secondary follicles as the site of lymphocyte formation, but as "centres of reaction" to inflammatory or toxic stimuli. They are therefore said to be sites of immunisation. Though *Aschoff* accepted this conception, he also assumed the formation of lymphocytes in the germinal centres and in extranodular tissue (quoted by 2).

We found an increased number of plasma cells more often in the tonsils of adults than in those of children, while increased numbers of blast cells occured more often in children's tonsils. *Naumann* observed plasma cells repeatedly in the so-called reticulated parts of the tonsils, but mainly in the extranodular lymphatic tissue. In the smear of a freshly cut surface of the excised material the original site of the plasma cell cannot be identified. It may be only concluded that the plasma cell signifies a reaction to bacterial antigen stimulation. It remains open to discussion why adults tend to produce in their tonsils more plasma cells rather than more blast cells as children do.

Multinucleate giant cells occur more often in the younger age groups than in adults. This may be due to a higher capacity for transformation of lymphocytes into giant cells, linked with the capacity for blast transformation. The tissue of younger subjects seems to be more active in this respect.

The more varied picture of the tonsils containing many more blast cells, more plasma cells, and giant cells, in the absence of "specific" inflammation, and the apparent higher transformation rate, could be explained by their site. Though they lack afferent lymph ducts, unlike lymph nodes in other parts of the body, many antigens reach the tonsils directly from the outside world. Their crypts contain numerous bacteria. The active lymphoreticular tissue has to deal with these antigen stimuli and it produces secondary lymph follicles under the epithelium of the crypts where blast transformation then takes place.

Summary

From the freshly cut surface of 103 tonsils smears were prepared and stained. The indication for tonsillectomy was recurrent inflammation. Cytological results are here compared with those from lymph nodes showing inflammatory reactions.

1. There were more blast cells in all tonsils than in lymph nodes.
2. In 32 cases the blast count was markedly increased, up to 10%; these were mostly tonsils from young patients.
3. There are also more plasma cells in tonsils compared with inflamed lymph nodes, occasionally up to 1%; this is more obvious in adults than in children.

4. Giant cells with several nuclei occur in tonsils more often than in lymph nodes, especially in young patients.

The lymphoreticular tissue in the tonsils is more exposed to external antigen stimuli than that in the lymph nodes. This fact may explain the higher blast transformation rate in tonsils. The presumed antigenic response in young subjects is stronger than in the adult.

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Lymphatic Dynamics in Filarial Chyluria and Prechyluric State — Lymphographic Analysis of 52 Cases

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Chyluria is an abnormal urinary condition in which intestinal chyle appears in the urine as the result of fistulous communications between the lymphatic pathways (transmitting chyle) and the urinary tract at, or beyond the level of the renal tubules either within the kidney, the renal pelvis or the urinary bladder.

Lymphatics of the kidney (Fig. 1) fall into three groups – (1) inter-tubular lymphatics – within the substance of the kidney; (2) sub-capsular lymphatics, and (3) perinephric

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